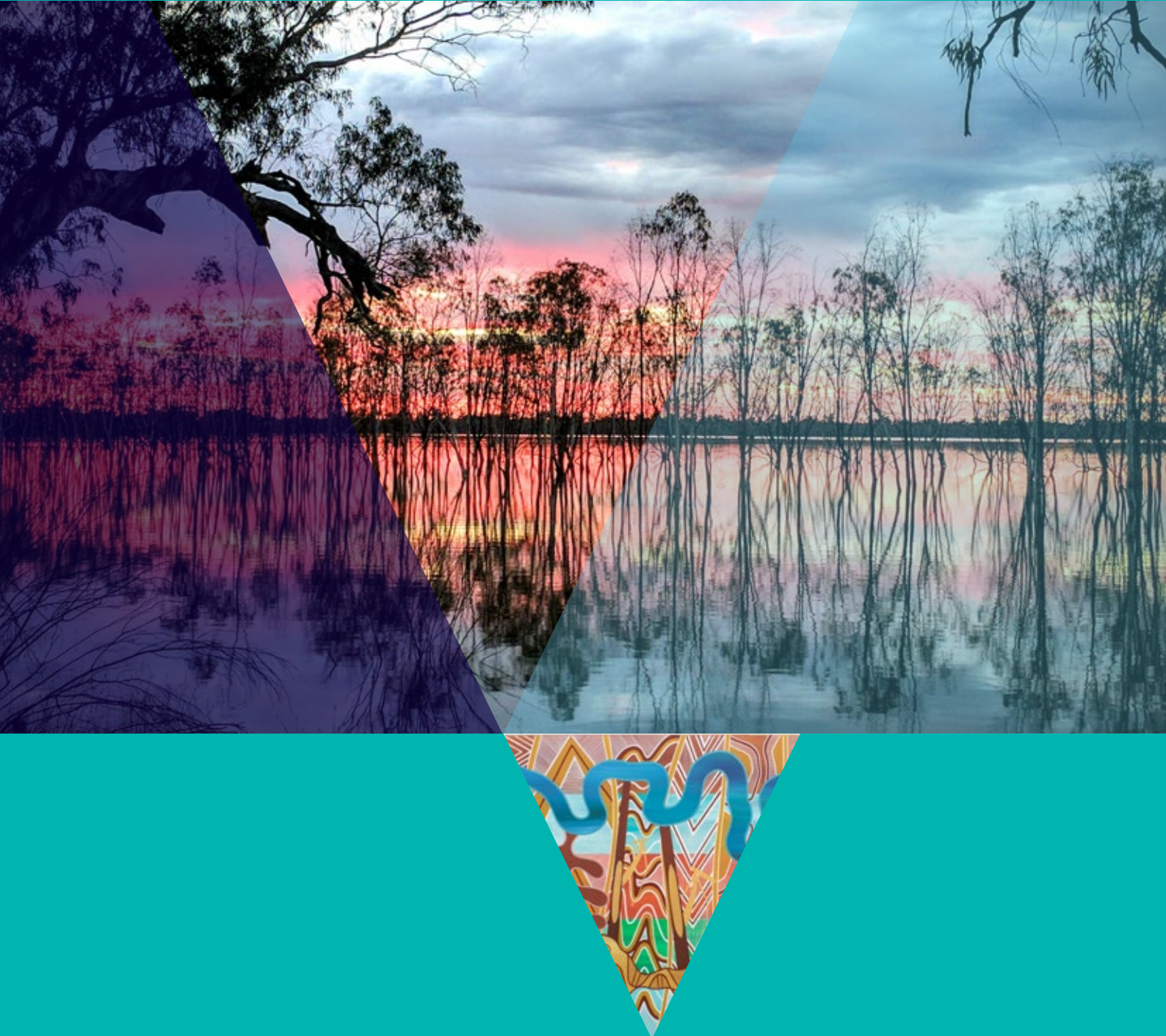


Victoria's North and Murray Water Resource Plan

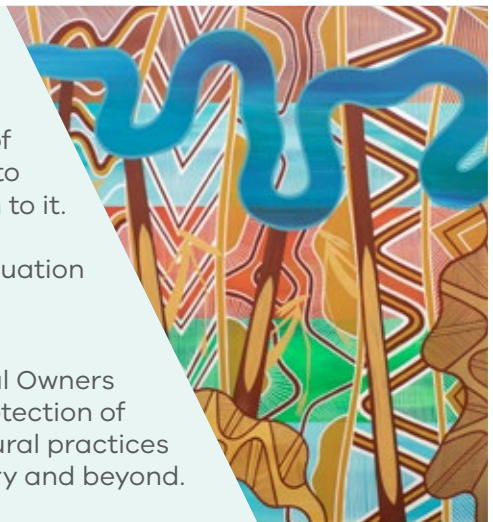
Comprehensive Report



Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.



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Photos

Cover: Lake Hattah

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Chapter 1: Sunraysia Modernisation Project

Photo credit: Lower Murray Water

Chapter 2: Farming at Nangiloc on the River Murray

Photo credit: Mallee CMA

Chapter 3: Echuca paddle steamer

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Chapter 4: Channel, Irymple

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Chapter 5: Bushfire

Photo credit: DELWP

Chapter 6: GMW engaging with water users

Photo credit: GMW

Chapter 7: Hume Dam

Photo credit: MDBA

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Photo credit: DELWP

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Photo credit: MCMA

Chapter 14: Salt Tree, Karadoc Swamp

Photo credit: Bob Merlin

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Photo credit: North East Catchment Management Authority

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Photo credit: Keith Ward

Glossary: Wannon Water

Photo credit: Wannon Water

Appendix A: Lake Walpolla Fish Survey

Photo credit: Mallee CMA

Appendix B: Blue-green algae

Photo credit: Alison Pouliot

Appendix C: New channel lining, Central Goulburn

Photo credit: Ralph Ewart

Appendix D: Mallee CMA excursion

Photo credit: Mallee CMA

Appendix E: Flooded red gums

Photo credit: Department of Sustainability and Environment

Appendix F: Tati Tati Wadi Wadi child

Photo credit: DELWP

Accredited Text

The substantive components of the accredited Victoria's North and Murray Water Resource Plan will be identified in this document as follows:

Sample accredited text

<<end of accredited text for s10.49(1) of the Basin Plan>>

The accredited text is Victoria's response to each requirement of Chapter 10 of the Basin Plan and is contained in Victoria's North and Murray Index table attached here (see Accredited Text Table). The remaining content of this document is supplementary to Victoria's North and Murray Water Resource Plan and is intended to explain and give context to the text that is accredited for Basin Plan purposes.

**Basin Plan
s10.49(1)**

Victoria’s North and Murray Index Table

Index Table to identify the content of Victoria’s North and Murray Water Resource Plan

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 1	Preliminary			
10.01	1. This section sets out a simplified outline of this Chapter. 2. This Chapter sets out requirements in relation to the following matters that a water resource plan must comply with in order for it to be accredited or adopted under Division 2 of Part 2 of the Act (item 11 of the table in subsection 22(1) of the Act): (a) the identification of the water resource plan area and other matters (Part 2); (b) the incorporation, and application, of the long-term annual diversion limit for each SDL resource unit in the water resource plan area (Part 3); (c) the sustainable use and management of water resources of the water resource plan area within the long-term annual diversion limits (Part 4); (d) the regulation, for the purpose of managing Basin water resources, of interception activities with a significant impact (whether on an activity-by-activity basis or cumulatively) on those water resources (Part 5); (e) planning for environmental watering (Part 6); (f) water quality objectives for the water resource plan area (Part 7); (g) the circumstances in which tradeable water rights in relation to the water resource plan area may be traded, and the conditions applicable to such trades (Part 8); (h) the broad approaches to the way risks to the water resources of the water resource plan area should be addressed (Part 9); (i) information about measuring the water taken from the water resources of the water resource plan area and monitoring the water resources of the water resource plan area (Part 10); (j) reviews of the water resource plan and amendments of the plan arising from those reviews (Part 11); (k) the scientific information or models on which the water resource plan is to be based (Part 12); (l) planning for extreme events (Part 13); (m) Indigenous values and uses (Part 14).	n/a	Interpretation of text in Column 5 of Victoria’s North and Murray Index Table: ‘Commonwealth Water Act’ is reference to Water Act 2007 (Cth) for the purposes of this Index Table; ‘Victorian Water Act’ is reference to the <i>Water Act 1989</i> (Vic) for the purposes of this Index Table; ‘Victoria’s North and Murray Comprehensive Report’ means the Comprehensive Report prepared to explain and outline the content of Victoria’s North and Murray Water Resource Plan as referred to in Columns 3 and 5 of Victoria’s North and Murray Water Resource Plan Index Table; ‘Victoria’s North and Murray Index Table’ means this Index Table; ‘Victoria’s North and Murray Water Resource Plan’ means the water resource plan prepared for the water resource plan area as defined in this Index Table in response to section 10.02(1) of the Basin Plan; ‘Victoria’s North and Murray water resource plan area’ means the water resource plan areas defined in this Index Table in response to section 10.02(1) of the Basin Plan, which includes the Northern Victoria, Victorian Murray, and Goulburn–Murray water resource plan areas; ‘Victoria’s North (surface water) water resource plan area’ means both the Northern Victoria water resource plan area (as described in section 3.05(d) of the Basin Plan) and the Victorian Murray water resource plan area (as described under section 3.05(m) of the Basin Plan); In Column 5 of this Index Table references are made to: - Chapters of Victoria’s North and Murray Water Resource Plan Comprehensive Report to refer to one or more of the 15 components of that Report; - Reference to Sections with a capital “s” in Victoria’s North and Murray Index Table in respect of Victoria’s North and Murray Comprehensive Report to refer to sub-components of the Chapters of that Report; - Parts of Appendices to Victoria’s North and Murray Water Resource Plan Comprehensive Report; - Chapters, Parts and sections of the Basin Plan; - sections of Acts of Parliament.	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 2	Identification of water resource plan area and other matters			
10.02(1)	A water resource plan must identify: (a) the water resource plan area; and (b) the water resources; to which it applies	Victoria's North and Murray water resource plan area 1. Victoria's North and Murray Water Resource Plan applies to the following water resource plan areas and water resources: (a) Northern Victoria water resource plan area and all surface water resources in that area as described under section 3.05(d) of the Basin Plan; and (b) Victorian Murray water resource plan area and all surface water resources in that area as described under section 3.05(m) of the Basin Plan; and (c) Goulburn-Murray water resource plan area and all groundwater resources beneath the area as described by 3.06(e) of the Basin Plan. 2. Reference to Victoria's North and Murray Water Resource Plan is a reference to the Plan to be accredited under section 63 of the Water Act 2007 (Cth). 3. Reference to Victoria's North (surface water) water resource plan area is a reference to both the Northern Victoria water resource plan area and the Victorian Murray water resource plan area as described above.	n/a	This requirement is met as the accredited text in Column 3 of this row identifies the water resource plan area and the water resources to which Victoria's North and Murray Water Resource Plan applies. The descriptions of the water resources are the same as are prescribed at sections 3.05(d), 3.05(m) and 3.06(e) of the Basin Plan. See Chapter 2 of Victoria's North and Murray Comprehensive Report for the discussion of Victoria's North and Murray water resource plan areas. The version of the Basin Plan that is referred to throughout this water resource plan is that registered on the Federal Register of Legislative Instruments on 11 July 2018 with the reference F2018C00451.
10.02(2)	The water resource plan area must be one of the water resource plan areas described in Part 2 of Chapter 3 and must be identified using the same description of that area as is set out in that Part, with any variations permitted by section 3.04	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.02(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a	
10.02(3)	The water resources must be those described in Part 2 of Chapter 3 as the water resources of the water resource plan area and must be identified using the same description of those water resources as it is set out in that Part.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.02(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.03(1)	A water resource plan must identify: (a) each SDL resource unit in the water resource plan area (b) the water resources within each SDL resource unit.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. For the purposes of section 10.03(1) of the Basin Plan all water resources in the following SDL resource units are identified in Victoria's North and Murray Water Resource Plan and the Northern Victoria water resource plan area in accordance with section 6.02 and Schedule 2 of the Basin Plan: (a) Ovens (SS4) (b) Goulburn (SS6) (c) Broken (SS5) (d) Campaspe (SS7) (e) Loddon (SS8). Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. For the purposes of section 10.03(1) of the Basin Plan all water resources in the following SDL resource units are identified in Victoria's North and Murray Water Resource Plan and the Victorian Murray water resource plan area in accordance with section 6.02 and Schedule 2 of the Basin Plan: (a) Victorian Murray (SS2) (b) Kiewa (SS3).	n/a	This requirement is met as the accredited text in Column 3 identifies the SDL resource units within the water resource plan area as described in section 6.02 and Schedule 2 (surface water) of the Basin Plan. The water resource plan area is depicted in Figure 1-1 of Victoria's North and Murray Comprehensive Report. The relevant SDL resource units and water resources for the Northern Victoria water resource plan area and Victorian Murray water resource plan area are depicted in Figure 2-1 of Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. For the purposes of section 10.03(1) of the Basin Plan all water resources in the following SDL resource units are identified in the Goulburn-Murray (groundwater) water resource plan area in accordance with section 6.02 and Schedule 4 of the Basin Plan: (a) Goulburn-Murray: Shepparton Irrigation Region (GS8a) all groundwater in the Shepparton Irrigation Region Water Supply Protection Area to a depth of 25 metres below the land surface (b) Goulburn-Murray: Highlands (GS8b) all groundwater in the outcropping Palaeozoic rocks (or the in-situ weathered horizon where it is within 5 metres of the surface) from the land surface to 200 metres below the surface (c) Goulburn-Murray: Sedimentary Plain (GS8c) all groundwater from the land surface to 200 metres below the surface or 50 metres below the base of the Tertiary sediments, whichever is the deeper, excluding groundwater in Item 2; (d) Goulburn-Murray: deep (GS8d) all groundwater, excluding groundwater in items 2, 3 and 4. Note 1: Shepparton Irrigation Region Water Supply Protection Area has been revoked and is now the Shepparton Irrigation Region Groundwater Management Area. Note 2: References to items are references to items in Schedule 4 to the Basin Plan.	n/a	This requirement is met as the accredited text in Column 3 identifies the SDL resource units within the water resource plan area as described in section 6.03 and Schedule 4 (groundwater) of the Basin Plan. The Goulburn-Murray water resource plan area is depicted in Figure 1-1 for groundwater in Chapter 2 of Victoria's North and Murray Comprehensive Report. The relevant Victorian groundwater management areas (GMA), water supply protection areas (WSPA) and groundwater catchments (GC) within the Goulburn-Murray water resource plan area are depicted in Figure 2-4 in Chapter 2 of Victoria's North and Murray Comprehensive Report.
10.03(2)	The SDL resource units must be those described in sections 6.02 and 6.03 and Schedules 2 and 4 as the SDL resource units within the water resource plan area, as applicable.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.03(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a	
10.03(3)	The water resources within each SDL resource unit must be those described in sections 6.02 and 6.03, and Schedules 2 and 4	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.03(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a	
10.04(1)	If a water resource plan is constituted by 2 or more instruments or texts, subsections (2) and (3) apply to it.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.04(2) of the Basin Plan and does not contain a water resource plan requirement.	n/a	
10.04(2)	The water resource plan must identify the instruments or texts that constitute the water resource plan.	Victoria's North and Murray water resource plan area Victoria's North and Murray Water Resource Plan is constituted by columns 1, 2, 3 and 4 of Victoria's North and Murray Index Table, Tables A and B attached to Victoria's North and Murray Index Table, and those parts of Victoria's North and Murray Comprehensive Report and its appendices identified in Column 3.	n/a	This requirement is met as the text in Column 3 identifies the relevant text and instruments that constitute Victoria's North and Murray Water Resource Plan.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.04(3)	If an instrument or text applies to only some of the water resources of the water resource plan area, the water resource plan must: (a) identify the water resources or the parts of the water resources to which the instrument or text applies; (b) include an indicative map of the water resources identified in paragraph (a)	Victoria's North and Murray water resource plan area This matter is responded to in Column 3 of Victoria's North and Murray Index Table at each relevant water resource plan requirement.	n/a	This requirement is met as the text in Column 3, for each water resource plan requirement, identifies if accreditation text only applies to particular water resources rather than all water resources in Victoria's North and Murray water resource plan. Victoria's North and Murray water resource plan area is the area identified in response to section 10.02(1) of the Basin Plan including the relevant water resources identified in response to section 10.03(1) of the Basin Plan. A large portion of the accredited text applies across all of Victoria's North and Murray water resource plan area (surface water and groundwater) given that Victoria applies rules and policies state wide. Column 3 will identify if the response applies to either: - Victoria's North and Murray water resource plan area being the Northern Victoria water resource plan area (as described in section 3.05(d) of the Basin Plan), the Victorian Murray water resource plan area (as described under section 3.05(m) of the Basin Plan) and the Goulburn-Murray water resource plan area as described by 3.06(e) of the Basin Plan; or - Victoria's North (surface water) water resource plan area being both the Northern Victoria water resource plan area (as described in section 3.05(d) of the Basin Plan) and the Victorian Murray water resource plan area (as described under section 3.05(m) of the Basin Plan); or - Victorian Murray water resource plan area as described under section 3.05(m) of the Basin Plan; or - Northern Victoria water resource plan area as described in section 3.05(d) of the Basin Plan; or - Goulburn-Murray water resource plan area as described by 3.06(e) of the Basin Plan. The water resource plan areas and relevant water resources are identified in Figure 1-1 and outlined in Chapters 2 and 4 of Victoria's North and Murray Comprehensive Report.
10.04(4)(a)	A water resource plan must include a list that specifies: (a) each requirement set out in this Chapter (individually or by reference to a group of requirements); and	Victoria's North and Murray water resource plan area Columns 1 and 2 of Victoria's North and Murray Index Table constitute a list of each requirement in Chapter 10 of the Basin Plan.	n/a	
10.04(4)(b)	A water resource plan must include a list that specifies: (b) the part of the plan that addresses each requirement (or group of requirements); and	Victoria's North and Murray water resource plan area Column 3 of Victoria's North and Murray Index Table specifies the part of the plan that addresses each requirement.	n/a	
10.04(4)(c)	A water resource plan must include a list that specifies: (c) the parts of the plan that will cease to have effect or are to be reviewed, and the times at which those parts will cease to have effect or are to be reviewed.	Victoria's North and Murray water resource plan area Victoria's North and Murray Water Resource Plan, as constituted by Columns 1, 2, 3, and 4 of Victoria's North and Murray Index Table, will cease to have effect at the end of the accreditation period in accordance with section 64 of the <i>Water Act 2007</i> (Cth). Victoria's North and Murray Water Resource Plan will be reviewed if, at any time during its accreditation period, changes to the Victorian legislative or water resource management framework, are, in the Department's view, relevant to the Plan's consistency with the Basin Plan.	n/a	This requirement is met as the text explains when parts of Victoria's North and Murray Water Resource Plan will cease to have effect and when the Plan will need to be reviewed. As no State instruments have been included for accreditation there are no parts of Victoria's North and Murray Water Resource Plan that will expire during the accreditation period. Where changes are made within the State frameworks, reviews of Victoria's North and Murray Water Resource Plan will occur to ensure consistency with the Basin Plan and with State law. The Commonwealth Water Act identifies that in the case of inconsistency the water resource plan will override any State law. Furthermore, in accordance with sections 10.47 and 10.48 of the Basin Plan, Victoria's North and Murray Water Resource Plan contains a process for review.
10.04(5)	If a water resource plan is constituted by an instrument or text which contains additional material that is not part of the water resource plan, the water resource plan must identify that material.	Victoria's North and Murray water resource plan area Victoria's North and Murray Water Resource Plan does not include any instrument or text that is not identified in Column 3 of Victoria's North and Murray Index Table. Victoria's North and Murray Water Resource Plan does not include any content of Victoria's North and Murray Comprehensive Report that is not identified in Column 3 of Victoria's North and Murray Index Table.	n/a	This requirement is met by the text in Column 3 of this row as it explains that there is no additional instrument or text that forms a part of Victoria's North and Murray Water Resource Plan, other than what is identified in Column 3 of Victoria's North and Murray Index Table.
10.05(a)	A water resource plan must: (a) be prepared having regard to the management and use of any water resources which have a significant hydrological connection to the water resources of the water resource plan area.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. This is described in response to section 10.05(b) of the Basin Plan.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.05(b)	A water resource plan must: (b) describe the way in which paragraph (a) was complied with.	Victoria's North and Murray water resource plan area 1. Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. For groundwater to surface water connections: (a) the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit is significantly connected to surface water in the Campaspe, Goulburn and Broken SDL resource units. (b) the Goulburn-Murray: Sedimentary Plain SDL resource unit is significantly connected to surface water (in the Kiewa, Ovens, Goulburn, Broken, Campaspe and Loddon SDL resource units) except where it underlies the Shepparton Irrigation Region SDL resource unit (GS8a). In the Upper Ovens River Water Supply Protection Area where groundwater and surface water are highly connected, groundwater in the Goulburn-Murray: Sedimentary Plain SDL resource unit (GS8a) is managed under rules consistent with surface water. (c) the Goulburn-Murray: Highlands SDL resource unit (GS8b) is significantly connected to surface water in the Victorian Murray, Kiewa, Ovens, Goulburn, Broken, Campaspe and Loddon SDL resource units. Typically, a 1:1 relationship is assumed, however there is a delayed response to pumping and the impact of taking groundwater from the Highlands SDL resource unit is extended over the year. 2. Where groundwater and surface water is significantly hydrologically connected, where connection is local to regional but is not of a similar timing volume or reliability, consideration will be given to the need to cap the total available take from licensed groundwater use for the area location for construction of bores for both licensed and domestic and stock to prevent unacceptable drawdown in the water table at the connected feature, and for issuing licences to take to prevent unacceptable drawdown in the water table at the connected feature.	n/a	This requirement is met as the text in Column 3 of this row details how section 10.05(a) of the Basin Plan was complied with. The MDBA's Position Statement 2B states that a significant connection is where the water of one resource is physically able to move to the other resource and activities in one resource may have a material impact on the state or condition of the other. In assessing connectivity to support development of Victoria's North and Murray Water Resource Plan, Victoria determined connectivity in the following ways: • significant connections: There are clear connections between different resources and a high likelihood of impacts from the use of one resource on the other. For groundwater statutory management plans provide additional levels of management and include restrictions on trading to manage the potential for any material impact to be acceptable. For surface water bulk entitlements and trade rules describe how the resources are managed including restrictions and trade rules. • local significant connections: A connection is significant but only to a small local area and there are no broad implications for the resource as a whole. For groundwater guidance on licensing for high value GDEs, statutory management plans provide additional levels of management including restrictions on trading to manage the potential for any material impact to be acceptable. For surface water bulk entitlements and trade rules describe how the resources are managed. • medium level connections: Connections between resources exist to varying degrees but the current resource management framework and the Victorian Water Act provide sufficient management arrangements that are fit-for-purpose and appropriate to manage the potential for any material impact to be acceptable • connections that are not significant: There is limited to no connection between resources, or activities in one resource are unlikely to have a material impact on the other and therefore no specific management strategies are required. The Goulburn-Murray: deep SDL resource unit does not connect to surface water. Elsewhere the connection is variable depending on the presence of fractures. Where the groundwater and surface water are not significantly hydrologically connected, where connection is regional and not of a similar timing volume or reliability, consideration will be given to the need to cap the total available take from licensed groundwater use for the area location for construction of bores for both licensed and domestic and stock to prevent unacceptable drawdown in the water table at the connected feature, and for issuing licences to take to prevent unacceptable drawdown in the water table at the connected feature. Where groundwater and surface water are highly connected that is where connection is local and has a similar timing volume and reliability, consideration of connected management of licensed groundwater and surface water extraction will be considered, and to the need to cap the total available take from licensed use of both groundwater and surface water for the area. For connections in the Ovens see https://www.g-mwater.com.au/downloads/gmw/Groundwater/Upper_Ovens_WSPA/TATDOC--3249685-v2-WATER_MANAGEMENT_PLAN_FOR_THE_UPPER_OVENS_RIVER_WSPA_-_FINAL_-_AUGUST_2011.pdf

FOR ACCREDITATION		NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)
		Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. - Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. The following significant connections have been identified between the Victorian Murray water resource plan area and the Northern Victoria water resource plan area: - the Ovens River, Broken River (via Broken Creek), Goulburn River, Campaspe River and Loddon River have a significant hydrological connection with the River Murray. These rivers are in the Northern Victoria water resource plan area, however connect through to the River Murray via the Victorian Murray water resource plan area. The connections in the River Murray relate to the NSW Murray and Lower Darling water resource plan area, and the South Australian River Murray water resource plan area; - the Goulburn River has a significant connection to the River Murray via the East Goulburn Main Channel which comes off the Goulburn River and diverts water into the Lower Broken Creek and the Murray Irrigation Area connecting the Northern Victoria water resource plan area to the Victorian Murray water resource plan area. - Where surface water is significantly hydrologically connected from the Northern Victoria water resource plan area and the Victorian Murray water resource plan area into the River Murray the connected resources are primarily managed through the Murray-Darling Basin Agreement. - Where surface water is significantly hydrologically connected within Victoria, bulk entitlements issued under the <i>Water Act 1989</i> (Vic) contain arrangements for the management of those resources. Rules relating to system management and in setting those rules consideration is given as to how water is taken by individual users from the system.	n/a
		For further information regarding the operation of the River Murray and the Murray-Darling Basin Agreement see Section 4.21 and more specifically the southern connected basin in Section 4.2.4.1 of Victoria's North and Murray Comprehensive Report. Section 12.7.4 of Victoria's North and Murray Comprehensive Report also outlines how environmental watering is coordinated across the River Murray under the Murray-Darling Basin Agreement No additional connections have been identified specifically for the Victorian Murray water resource plan area other than the connections identified in response to Victoria's North (surface water) water resource plan area. There are no significant connections between the Wimmera-Mallee (surface water) water resource plan area and the Victorian Murray water resource plan area. The Wimmera-Mallee pipeline does connect between the Victorian Murray water resource plan area and the Wimmera-Mallee water resource plan area, however, water from the pipeline does not have a material impact on the state or condition of the Wimmera-Mallee Water Resource Plan area resources (including changes in surface or groundwater levels and pressures, quantity, timing of water availability or quality). For this reason, the connection was not identified as "significant" in the Wimmera-Mallee Water Resource Plan and will not be identified as significant in Victoria's North and Murray Water Resource Plan. Section 4.3.6 of Victoria's North and Murray Comprehensive Report outlines the significant connections: - between Northern Victoria water resource plan area and other water resource plan areas (Section 4.3.6.1 of the Report); and - between SDL resource units within the Northern Victoria water resource plan area (Section 4.3.6.2 of the Report); and - between surface water and groundwater within the Northern Victoria water resource plan area (Section 4.3.6.3 of the Report). Section 4.2.4 of Victoria's North and Murray Comprehensive Report outlines significant connections: - between Victorian Murray water resource plan area and other water resource plan areas (Section 4.2.4.1 of the Report); and - between SDL resource units within the Victorian Murray water resource plan area (Section 4.2.4.2 of the Report); and - between surface water and groundwater within the Victorian Murray water resource plan area (Section 4.2.4.3 of the Report). Significant groundwater connections are discussed in Section 4.4.6, Section 12.7 and Section 12.8.2 of Victoria's North and Murray Comprehensive Report. Column 5 of Victoria's North and Murray Index Table in respect of Part 4 of the Basin Plan provides discussion on groundwater dependent priority environmental assets and priority ecosystem functions. See also Section 12.7 and Section 12.8 of Victoria's North and Murray Comprehensive Report for further discussion on these matters. Column 5 of Victoria's North and Murray Index Table in respect of sections 10.27 and 10.39 of the Basin Plan also discusses connections between surface water and groundwater areas. See Section 12.7.4 and Section 7.4.2.10 of Victoria's North and Murray Comprehensive Report respectively for further discussion on connectivity in respect of those requirements. In respect of groundwater to groundwater connections and how Victoria's framework supports management of connected resources see Section 4.4.6 and Section 12.8 of Victoria's North and Murray Comprehensive Report for further discussion on groundwater connections. Surface water to surface water connections in the Victorian Murray water resource plan area are described in Section 4.2.4. Surface water to surface water connections in the Northern Victoria water resource plan area are described in Section 4.3.6.	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. In the Northern Victoria water resource plan area, the following resources have a significant hydrological connection: (a) the Broken River flows into the Goulburn River; (b) the Goulburn River is connected to the Campaspe River and the Loddon River via the Waranga Western Channel; (c) the Goulburn River (via the Waranga Western Channel) is connected to the Campaspe system (Lake Eppalock) via the Goldfields superpipe; (d) the Goulburn system is connected to resources outside the Basin in Southern Victoria via an aqueduct transfer from Silver and Wallaby Creeks to Yan Yea Reservoir in the Melbourne headworks system; (e) the Goulburn River is connected to resources outside the Basin in Southern Victoria (from the Goulburn River to Sugarloaf Reservoir in the Melbourne headworks system) via the North-South pipeline; (f) the Goulburn River is connected to resources outside the Basin in Southern Victoria (from the Waranga Western Channel to White Swan Reservoir in the Ballarat urban water supply system) via the Goldfields Superpipe; (g) the Campaspe River is connected to the Loddon River via the Waranga Western Channel; (h) the Campaspe basin (Lake Eppalock) is connected to the Loddon basin via the Eppalock-Bendigo pipeline (to supply Bendigo); (i) the Coliban River (Campaspe basin) is connected to the Loddon basin via the Coliban Main Channel (to supply Bendigo); (j) the Campaspe system is connected to resources outside the Basin in Southern Victoria (from Lake Eppalock to White Swan Reservoir in the Ballarat urban water supply system) via the Goldfields Superpipe. 2. Where surface water is significantly hydrologically connected within Victoria, bulk entitlements issued under the <i>Water Act 1989</i> (Vic) contain arrangements for the management of those resources. In setting rules relating to system management consideration is given as to how and where water is taken by individual users from the system.	n/a	In developing Victoria's North and Murray Water Resource Plan, consideration of the identified connections between surface water resources, between surface water and groundwater resources and between groundwater resources has informed the following: - assessment of possible current and future risks to the continued availability and condition of water resources in Victoria's North and Murray water resource plan area. The details of the risks identified are contained in Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report. - consideration of whether rules are necessary in response to Part 4 of Chapter 10 of Basin Plan and the identification of appropriate rules in response to sections 10.18, 10.19 and 10.20 of the Basin Plan - the review and development of measures relating to responding to extreme events - review of the circumstances in which trade can occur between groundwater resources and between groundwater and surface water resources - consideration of whether rules are necessary to address water quality issues in groundwater in response to section 10.35C of the Basin Plan (see Part 5.5 of Appendix A to Victoria's North and Murray Comprehensive Report). NSW and Victoria have identified common text for groundwater to groundwater connections which is identified in response to section 10.05(b) of the Basin Plan for the water resources in the Goulburn-Murray water resource plan area. In a 2012 report on the <i>'Potential for the alignment of management of common aquifers along the NSW-Victorian border'</i> SKM reported that there was a number of aspects that require consideration within the context of shared aquifers. These include: - complete return of all currently over allocated or overused systems to environmentally sustainable levels of extraction; - progressive removal of barriers to trade in water, and opportunities for trading within and between States and Territories, where water systems are physically shared or hydrologic connections and water supply considerations will permit water trading; - addressing future adjustment issues that may impact on water users and communities; - recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource; - in the case of water access entitlements, be compatible across jurisdictions to improve investment certainty. Consideration of groundwater connectivity between Victoria and NSW particularly applies to the groundwater resources contained in the Goulburn-Murray Sedimentary Plain SDL resource unit managed in the Katunga WSPA and the Lower Campaspe Valley WSPA plans, which includes the Shepparton formation, the Calivil formation and the Renmark formation aquifer systems. These are the most significant areas of development that adjoin the NSW Lower Murray Alluvium water resource plan area. Where these areas underlie the Shepparton Irrigation Region SDL resource area (all of Katunga, and the northern section of the Campaspe Valley adjoining the Murray River), the Upper Shepparton (<25m deep) is excluded as this resource unit is connected to surface water systems (the Campaspe, Goulburn and Broken surface water catchments) in the Shepparton Irrigation Region SDL resource unit. NSW and Victoria have agreed to further explore joint management and to give effect to any future arrangements.

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		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. In the Victorian Murray water resource plan area, the Kiewa River flows into the River Murray and this is considered a significant hydrological connection. 2. There are some connections to the Wimmera-Mallee (surface water) water resource plan area due to the use of water on land from Victorian Murray water resource plan area, however the connection is not based on connectivity between water resources within those plan areas but based on geographical use of the water. For this reason, no significant connections have been identified between Wimmera-Mallee (surface water) water resource plan area and the Victorian Murray water resource plan area.	n/a	The groundwater resources along the border region of Victoria and NSW are variously contained within shared or common aquifers. The existing state legislation in Victoria and New South Wales enables policy and management to deliver equitable water sharing of stock and domestic rights, groundwater entitlements and entitlements of linked surface water users and dependent or partially dependent ecosystems. The existing prescriptions in the Katunga WSPA and Lower Campaspe WSPA plans aim to provide protection for existing users and the environment by supporting a cap on licence entitlement; restricting the extraction of groundwater when triggered; and placing limits on the concentration of groundwater pumping. These prescriptions contribute to the management and use of the shared aquifers to limit the impacts of groundwater extraction in Victoria on NSW. Victoria expects NSW will have similar rules or measures identified in the NSW Murray Alluvium WRP to ensure the operation of the Murray Alluvium WRP doesn't compromise the hydraulic relationships and properties of the shared aquifers The Lower Campaspe Management Plan can be found at - https://www.g-mwater.com.au/downloads/gmw/Groundwater/Lower_Campaspe_Valley_WSPA/Nov_2013_-_Lower_Campaspe_Valley_WSPA_Plan_A4_FINAL-fixed_for_web.pdf The Katunga Management Plan can be found at - https://www.g-mwater.com.au/downloads/gmw/Groundwater/Katunga_WSPA/20170901_4449443-v1-KATUNGA_WATER_SUPPLY_PROTECTION_AREA_GROUNDWATER_MANAGEMENT_PLAN_-_2017.pdf The Southern Connected Basin is discussed at Section 4.2.4.1 and Section 12.7.4 of Victoria's North and Murray Comprehensive Report.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. In the Goulburn-Murray water resource plan area the following significant hydrological connections are identified: (a) Goulburn-Murray: Shepparton Irrigation Region (GS8a) is connected to Goulburn-Murray: Sedimentary Plain (GS8c) (b) Goulburn-Murray: Highlands (GS8b) is connected to Goulburn-Murray: Sedimentary Plain (GS8c) (c) Goulburn-Murray: Sedimentary Plain (GS8c) is connected to Lower Murray Shallow Alluvium (GS27a), Lower Murray Deep Alluvium (GS27b) (d) Goulburn-Murray: Sedimentary Plain (GS8c) is connected to Southern Victoria outside of the Basin. 2. The Renmark aquifer within the Goulburn-Murray water resource plan area extends into the Wimmera-Mallee: Sedimentary Plan SDL resource unit, and into New South Wales and South Australia. There is generally very little development of this aquifer in Goulburn-Murray water resource plan area where is underlies the Calivil formation and none in the Wimmera-Mallee (groundwater) water resource plan area where it is typically too saline for productive use, or too deep to be economically developed, or both. As such, the use of this resource is unlikely to have a material impact on the connected groundwater resources and is therefore not considered a significant connection for the purposes of the Basin Plan. 3. Management of connected resources occurs through establishment of groundwater management areas, declaring water supply protection areas under the <i>Water Act 1989</i> (Vic) and mitigating third party impacts (including on the environment) through Victoria's entitlement framework. 4. The groundwater resources along the border region of Victoria and NSW are variously contained within shared or common aquifers. Although cross border statutory arrangements are not currently in place to manage these shared aquifers, the existing state legislation in Victoria and New South Wales enables policy and management to deliver equitable water sharing of stock and domestic rights, groundwater entitlements and entitlements of linked surface water users and dependent or partially dependent ecosystems. In the Goulburn-Murray water resource plan area, these arrangements include prescriptions in the Katunga WSPA and Lower Campaspe WSPA plans to limit use to permissible consumptive volumes, apply restrictions based on water level triggers and zone limits/intensity rules to limit licences and trades within a localised area. Groundwater level and salinity monitoring prescriptions are also included in these WSPA plans to monitor the groundwater resources. Victoria will continue to work with New South Wales to explore joint management arrangements for addressing the impacts of groundwater extraction in one state, on other uses across the border.	n/a

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10.06(1)	For each matter that this Chapter requires to be dealt with in a water resource plan, the plan must specify the person responsible for the matter.	Victoria's North and Murray water resource plan area The person responsible for each matter to be dealt with in a water resource plan is the Deputy Secretary Water and Catchments, of the Department.	n/a	The Deputy Secretary Water and Catchments is identified as the person responsible for developing the content of Victoria's North and Murray Water Resource Plan as the document was prepared by the Department. Reference to the Department is reference to the Department responsible through administrative arrangement orders for the administration of the Victorian Water Act. Reference to Water and Catchments means any group in the Department that assists in the administration of the Victorian Water Act and the name may change by administrative arrangements from time to time.
10.06(2)	Without limiting subsection (1), if a water resource plan requires a measure or action to be undertaken, the plan must specify the person responsible for undertaking that measure or action.	Victoria's North and Murray water resource plan area - The person responsible for any action or measure to be undertaken under Victoria's North and Murray Water Resource Plan is listed in Column 4 of Victoria's North and Murray Index Table. - If there is no person identified in Column 4, there is no requirement for an action or a measure to be undertaken. - If: - Victoria's North and Murray Water Resource Plan purports to impose an obligation on a Basin State to do a particular thing; and - the imposition of that obligation would contravene a constitutional doctrine restricting the obligations that the Commonwealth may impose on a State; - Victoria's North and Murray Water Resource Plan is taken, instead of imposing the obligation, to confer a discretion on the Basin State to do the thing.	n/a	This requirement is met by the text in Column 4 of Victoria's North and Murray Index Table, for each water resource plan requirement, which identifies the person responsible for each measure or action to be undertaken. The text in Column 3 of this row outlines how Column 4 should be applied to Victoria's North and Murray Water Resource Plan. The constitutional limitation provision is adapted from section 109 of the Basin Plan.
10.07(1)	A water resource plan prepared by a Basin State must contain a description of the consultation in relation to the plan (including in relation to any Part of the plan, if any, that was undertaken before the State gave the plan to the Authority under subsection 63(1) of the Act.	Victoria's North and Murray water resource plan area The Consultation Report contained at Appendix D of Victoria's North and Murray Comprehensive Report describes the consultation in relation to Victoria's North and Murray Water Resource Plan that was undertaken before Victoria gave the Plan to the MDBA under section 63(1) of the <i>Water Act 2007</i> (Cth).	n/a	This requirement is met by the Consultation Report, contained at Appendix D of Victoria's North and Murray Comprehensive Report, as identified in Column 3 of this row. The Consultation Report describes the consultation that occurred to develop the material contained in Victoria's North and Murray Water Resource Plan prior to giving the plan to the MDBA under section 63 of the Commonwealth Water Act.
10.07(2)	If a water resource plan is amended in accordance with section 65 of the Act, the plan must contain a description of the consultation in relation to the amendment, if any, that was undertaken before the relevant Basin State gave the proposed amendment to the authority under subsection 65(2) of the Act.	Victoria's North and Murray water resource plan area This matter is not relevant to Victoria's North and Murray Water Resource Plan as it does not contain any amendments.	n/a	

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10.08(2)	A water resource plan must require a holder of a water access right to comply with the conditions of that right.	Victoria's North and Murray water resource plan area The holder of a water access right must comply with the conditions specified in the water access right instrument. Note: The types of conditions that may be imposed on a water access right are identified in Table A and Table B attached to Victoria's North and Murray Index Table for surface and groundwater respectively.	water access right holder	

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10.09(1)	A water resource plan must identify the planned environmental water in the water resource plan area and associated rules and arrangements relating to that water.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 1 in Appendix E to Victoria's North and Murray Comprehensive Report identifies the planned environmental water in the Northern Victoria water resource plan area and the relevant associated rules and arrangements relating to that water. Table 2 in Appendix E to Victoria's North and Murray Comprehensive Report identifies the associated rules and arrangements relating to the planned environmental water identified in Table 1 in Appendix E to Victoria's North and Murray Comprehensive Report.	n/a	The Explanatory Memorandum for the Commonwealth Water Act identifies that planned environmental water is water that is delivered through flow rules that specify flows that must be released for environmental purposes or delivered or retained through restrictions on the taking of water. There are three instances of planned environmental water identified for the Northern Victoria water resource plan area, sitting within the Broken and Ovens Bulk Entitlements, and the Upper Ovens River Water Supply Protection Area Water Management Plan. No planned environmental water is identified for the Victorian Murray water resource plan area. See Section 12.4.2.2 of Victoria's North and Murray Comprehensive Report for further discussion on planned environmental water. There are further types of water in Victoria that contribute to environmental benefit, but do not meet the Commonwealth definition for planned environmental water. These further types of water include above cap and unallocated water, both in regulated and unregulated systems, for groundwater and surface water. While these further types of water cannot be managed to provide a specific environmental outcome in the way held environmental water can (in regulated systems only) and are not solely committed for environmental purposes under Victoria law, they are recognised as contributing to environmental benefit under Victoria's environmental water reserve policy. See Section 12.4.3 of Victoria's North and Murray Comprehensive Report for further discussion on water that contributes to the environment. This requirement is met as the text in Column 3 identifies the relevant planned environmental water and associated rules and arrangements are outlined in Table 1 and Table 2 in Appendix E to Victoria's North and Murray Comprehensive Report. The Upper Ovens River Water Supply Protection Area Water Management Plan provides for a 'water sharing regime'. The issue of new licensed volume is capped under the Plan. While the Plan identifies, at prescription 3, that the above cap water contributes to environmental outcomes, the Plan also identifies the water may also be taken and used for multiple purposes, including providing base flows (not just for environmental benefit but for system management and water sharing regime reasons). The Upper Ovens River WSPA Management Plan clearly provides for rules to establish and protect minimum passing flows in a range of circumstances to account for different levels of water availability. The Plan also provides for compliance points (measuring point) to ensure that the minimum passing flows can be maintained. The prescriptions contained in the Plan (as referenced in Appendix E to Victoria's North and Murray Comprehensive Report) are designed to protect minimum passing flows in the system. The Upper Ovens River WSPA Management Plan identifies specifically that: <i>"[The Plan] aims to recognise the needs of existing and future water users whilst attempting to maintain or improve waterway health by protecting minimum flows for the environment. Providing sufficient environmental flows to achieve health rivers is a key component of ensuring the long-term sustainability of the water resources."</i> Section 12.1.9 of the Upper Ovens River WSPA Management Plan provides the following: <i>The Plan prevents groundwater or surface water extraction from occurring that would cause flows in the Ovens River at Myrtleford to decline below 1ML/d. Thereby providing an environmental water reserve that protects the following environmental flow objectives:</i> - wetting the bottom of river channel and maintaining pool depth - watering of aquatic plants - the provision of critical macroinvertebrate habitat The above minimum flow is identified as the specific environmental flow that can be identified as planned environmental water (PEW). While the Plan makes reference to the Environmental Water Reserve (EWR) this does not provide an equivalent characterisation of water under the Commonwealth definition of PEW. The Plan does not identify all "above cap" water as being part of the EWR, section 12.1.9 of the Upper Ovens River WSPA Management Plan identifies the 1 ML/d minimum environmental flow as the "environmental water reserve".

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		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. No planned environmental water has been identified for the Victorian Murray water resource plan area. No associated rules or instruments have been identified.	n/a	The environmental water reserve under 4A of the Victorian Water Act and the environmental water reserve objective under section 4B of the Victorian Water Act do not have the effect of defining above cap water as planned environmental water for the purposes of section 6 of the Commonwealth Water Act or section 10.09(1) of the Basin Plan. Water may be part of the environmental water reserve for the purposes of the Victorian Water Act and will support the environmental objective however, it cannot be characterised as 'planned environmental water' as more narrowly defined in section 6 of the Commonwealth Water Act which specifies that planned environmental water is water that cannot be taken or used for any other purpose. The issues previously raised with the MDBA regarding the protection of above cap water against any other form of take remain under this statutory management plan. There is no prohibition on the water being taken for any other purpose. The protection provided under the Plan is to protect the cap on licensed consumptive take but does not limit basic rights (domestic and stock) and does not limit other uses such as recreational or emergency purposes (beyond the scope of what is defined under emergency management legislation) etc which would contravene the requirement to prevent it from being used for any other purpose to the extent that it is committed or preserved for the environment. Reference to "above cap water" in Victoria's North and Murray Index Table refers to water that includes water that remains in the system after meeting entitlements, flows specified in bulk entitlements or environmental entitlements as minimum passing flows which may also be identified as "systems water" and water that remains in the system where water users have not taken their full volume from the system. For more information on other water that contributes to meeting environmental outcomes see the response to section 10.26 of the Basin Plan in Victoria's North and Murray Index Table and Section 12.4.3 of Victoria's North and Murray Comprehensive Report.	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to the groundwater resources of Victoria's North and Murray water resource plan area.	n/a	There is no specific groundwater identified as planned environmental water in Victoria's North and Murray water resource plan area. The Upper Ovens River WSPA Water Management Plan identifies a significant connection between surface water and groundwater and the Management Plan therefore identifies management arrangements to apply to surface water and groundwater as though it is a single resource. These measures do not apply, however, in respect of the planned environmental water (passing flow). All rules and compliance points relate to surface water. Given there are no deliverables related to groundwater for the water set aside for the environment it is not proposed to identify this minimum environmental passing flow as planned environmental water for the Goulburn-Murray water resource plan area. Therefore, no planned environmental water is identified for the Goulburn-Murray water resource plan area. See Section 12.4.2.2 of Victoria's North and Murray Comprehensive Report for further discussion on planned environmental water. See also Section 12.4.3 of Victoria's North and Murray Comprehensive Report for further discussion on water that contributes to the environment.	
10.09(2)	A water resource plan must provide for the establishment and maintenance of a register, to be published on a website specified by the plan, of held environmental water for the water resource plan area which records: (a) the characteristics of held environmental water in the water resource plan area (for example, quantity, reliability, security, class, licence type, limitations); and (b) who holds that water.	Victoria's North and Murray water resource plan area The Victorian Water Register contains the details of the characteristics of held environmental water in Victoria's North and Murray water resource plan area and identifies who holds the entitlements to the water. The relevant page of the Victorian Water Register is published at http://waterregister.vic.gov.au/water-entitlements/bulk-entitlements .	Department	This requirement is met through the Victorian Water Register published at http://waterregister.vic.gov.au. This register contains the details of the characteristics of held environmental water in Victoria's North and Murray water resource plan area and identifies who holds entitlements to that water. This information is searchable by filtering entitlements by holder of the environment, being the VEWH in Victoria (http://waterregister.vic.gov.au/water-entitlements/bulk-entitlements). The Victorian Water Register also contains links to specific details about all held environmental water held by the CEWH through links to the CEWH records accessed through a link to the CEWH website which is found on the Victorian Water Register at the following web address: https://www.environment.gov.au/water/cewo/about/water-holdings The Victorian Water Register also contains links to specific details about all held environmental water held by the VEWH through a link to the VEWH website which is found at the following web address: http://www.vewh.vic.gov.au/watering-program/how-much-water-is-available See Section 7.3.2 and Figure 7-6 of Victoria's North and Murray Comprehensive Report for more information on the Victorian Water Register. Table 12-1 in Chapter 12 of Victoria's North and Murray Comprehensive Report identifies all the held environmental water in Victoria's North and Murray water resource plan area (as at 30 April 2019).	
10.09(3)	Subsection (2) is satisfied if the plan identifies a register of held environmental water which records the matters required by subsection (2) and is published on a website.	Victoria's North and Murray water resource plan area This requirement informs the response to section 10.09(2) of the Basin Plan.	n/a		

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10.10(1)	For each SDL resource unit in a water resource plan area, and for each form of take, the water resource plan must set out the method for determining the maximum quantity of water that the plan permits to be taken for consumptive use during a water accounting period.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of the Comprehensive Report. - The method set out in Column 3 at Item 1 of Table 6 of the Methods Report at Appendix C of Victoria's North and Murray Comprehensive Report applies to the form of take identified in Column 2 of Table 6 for the Ovens SDL resource unit (SS4) in the Northern Victoria water resource plan area. - The method set out in Column 3 at Items 2-3 of Table 6 of the Methods Report at Appendix C of Victoria's North and Murray Comprehensive Report applies for the forms of take identified in Column 2 of Table 6 in the Northern Victoria water resource plan area for the following SDL resource units: (a) Goulburn (SS6); (b) Broken (SS5); (c) Campaspe (SS7); (d) Loddon (SS8). - The methods set out in Column 3 for Items 4-7 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to all SDL resource units in the Northern Victoria water resource plan area. Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. - The method for annual permitted take set out in Column 3 at Item 1 of Table 6 of the Methods Report at Appendix C of Victoria's North and Murray Comprehensive Report applies to the form of take identified in Column 2 of Table 6 for the Victorian Murray SDL resource unit (SS2), Kiewa SDL resource unit (SS3) in the Victorian Murray water resource plan area. - The methods for annual permitted take set out in Column 3 for Items 3-7 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to the Victorian Murray SDL resource unit. - The methods for annual permitted take set out in Column 3 for Items 4-7 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to the Kiewa SDL resource unit.	n/a	The relevant SDL resource units and water resources for the Northern Victoria water resource plan area and Victorian Murray water resource plan area are depicted in Figure 2-1 of Victoria's North and Murray Comprehensive Report. Reference to column numbers in this section refer to the column number of the header row of the relevant table. In some instances, the response for a particular item may be merged across two columns. The requirement of section 10.10(1) of the Basin Plan for Victoria's North (surface water) water resource plan area is met as the proposed text identifies the methods to be used for determining permitted take in Victoria's North (surface water) water resource plan area. The methods are described in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. Column 3 of Table 6 identifies the methods for permitted take for the forms of take identified in Column 2 of that Table. Table 6 applies to the surface water SDL resource units in the Northern Victoria water resource plan area and the Victorian Murray water resource plan area. The method developed for the modelled component of take from a watercourse (excluding basic rights) in consultation with the MDBA for the Victorian Murray water resource plan area includes the Ovens SDL resource unit which is located in the Northern Victoria water resource plan area. Management of water access rights in accordance with the methods for permitted take are outlined in Part 3 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. These methods are based on the best available information at the time of developing the method as described in Column 5 of Table 6. The information used to develop the model or method is outlined in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. The Goulburn BDL/WRP model representation is the best available knowledge as at 30 April 2019. It is recognised though that there are some policy discrepancies that will need to be addressed and fixed through a model review process to be completed within two years – 30 April 2021. The method for permitted take, BDL and SDL for the out of model component of take from a watercourse (excluding basic rights) is subject to a two-year review so that it is based on best available information. This is explained in Part 2.2.1, Part 31.3.2 and Item 3 of Table 6 and applies to the Goulburn, Broken, Campaspe, Loddon and Victorian Murray SDL resource units. An interim method is proposed until the two-year review is complete. This is explained in Appendix C. Adoption of the interim method does not: - limit the ability of a holder of a take and use licence to utilise their entitlement during the two-year review process; - prejudice Victoria from identifying a method on review that would enable the accumulation of credits if actual take is below what would be permitted in a given year, as using the interim method eliminates Victoria's ability to accumulate credits against SDL reporting; - prejudice Victoria from adopting a method in two years which may result in an increased BDL - prevent a revised SDL compliance assessment to be undertaken of the period since 1 July 2019, once a revised BDL and permitted take method is agreed (consistent with the MDBA's SDL reporting and compliance framework).

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The methods set out in Column 2 for the forms of take identified in Column 1 of Table 11 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to all SDL resource units in the Goulburn-Murray water resource plan area.	n/a	Reference to column numbers in this section refer to the column number of the header row of the relevant table. In some instances, the response for a particular item may be merged across two columns. The requirement of section 10.10(1) of the Basin Plan for the Goulburn-Murray water resource plan area is met as the proposed text identifies the methods to be used for determining permitted take in the Goulburn-Murray water resource plan area. The methods are described in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. Column 1 of Table 11 identifies the forms of take in Victoria's North and Murray Water Resource Plan and Column 2 of Table 11 identifies the methods for permitted take. These methods are based on the best available information at the time of developing the method. The information used to develop the model or method is outlined in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report.
10.10(2)	The method for subsection (1) may include modelling, and must be designed to be applied after the end of the relevant water accounting period, having regard to the water resources available during the period.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. The methods for annual permitted take identified in Column 3 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report are applied at the end of each accounting period having regard to the water resources available during that period. 2. For take from a regulated river (excluding basic rights) a method for determining allocations based on water availability is included in the method for determining annual permitted take.	n/a	This requirement is met by the methods outlined in response to section 10.10(1) of the Basin Plan. In Victoria's North (surface water) water resource plan area allocations are not determined for take and use licences. Determination of allocation is only done for bulk entitlements, environmental entitlements and water shares. Actual take in response to water availability is managed via other means in respect of take and use licences. Actual take can be adjusted by measures that respond to water shortages as outlined in Chapter 10 of Victoria's North and Murray Comprehensive Report and is managed throughout the accounting period. Under the Victorian Water Act a water corporation is required to determine water availability for the accounting period. In practice, rather than making an assessment at the end of the accounting period, the water corporation makes assessments throughout the period. Water allocations cannot be reduced, and water users can only use water they are allocated. This mitigates the risk of actual take exceeding permitted take while taking into account water availability for the period. The method for determining annual permitted take at the end of the accounting period uses the same allocation rule used through the accounting period. Part 3.2 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report outlines how water availability is considered.
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The methods for annual permitted take set out in Column 2 for the forms of take identified in Column 1 of Table 11 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report are applied at the end of each accounting period having regard to the water resources available during that period.	n/a	This requirement is met by the methods outlined in response to section 10.10(1) of the Basin Plan. Groundwater permitted take is equal to SDL for the relevant SDL resource unit. The estimate for take from groundwater under basic rights takes into account take patterns based on the best available information for that form of take. Use of a long-term average is appropriate as seasonal availability is not relevant to groundwater and changes to availability occur over a longer period.
10.10(3)(a)	The method must: (a) account for the matters in subsection 10.12(1)	Victoria's North and Murray water resource plan area This requirement is responded to in the response for section 10.12(1) of the Basin Plan in Victoria's North and Murray Index Table.	n/a	
10.10(3)(b)	The method must: (b) be consistent with the other provisions of the water resource plan.	Victoria's North and Murray water resource plan area The methods are consistent with the other provisions of Victoria's North and Murray Water Resource Plan.	n/a	This requirement is met as the other provisions of Victoria's North and Murray Water Resource Plan, being the accredited text, are consistent with the method for determining permitted take.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.10(4)	The plan must also set out a demonstration that the method relates to the SDL of each resource unit in such a way that, if applied over a repeat of the historical climate conditions, it would result in meeting the SDL for the resource unit, including as amended under section 23B of the Act.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. Part 3.4 and Table 10 of Appendix C to Victoria's North and Murray Comprehensive Report provides a demonstration that the long-term average permitted take applied over the same climate sequences of the sustainable diversion limit will result in meeting the sustainable diversion limit for the following SDL resource units: (a) Ovens (SS4); (b) Goulburn (SS6); (c) Broken (SS5); (d) Campaspe (SS7); (e) Loddon (SS8). Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Part 3.4 and Table 9 of Appendix C to Victoria's North and Murray Comprehensive Report provides a demonstration that the long-term average permitted take applied over the same climate sequences of the sustainable diversion limit will result in meeting the sustainable diversion limit for the Victorian Murray (SS2) and Kiewa (SS3) SDL resource units. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. See Part 4.3 of Appendix C to Victoria's North and Murray Comprehensive Report provides a demonstration that the long-term average permitted take applied over the same climate sequences of the sustainable diversion limit will result in meeting the sustainable diversion limit for the following SDL resource units: (a) Goulburn-Murray: Shepparton Irrigation Region (GS8a); (b) Goulburn-Murray: Highlands (GS8b); (c) Goulburn-Murray: Sedimentary Plain (GS8c); (d) Goulburn-Murray: deep (GS8d).	n/a	This requirement is met by the demonstration via volumetric outputs from the methods outlined in Table 10 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report and the text contained in Column 3 of this row. Part 3.4 provides an explanation of the demonstration. The relevant SDL resource units and water resources for the Northern Victoria water resource plan area and Victorian Murray water resource plan area are depicted in Figure 2-1 of Victoria's North and Murray Comprehensive Report.
			n/a	This requirement is met by the demonstration via volumetric outputs from the methods outlined in Table 9 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report and the text contained in Column 3 of this row. Part 3.4 provides an explanation of the demonstration.
			n/a	This requirement is met by the demonstration via volumetric outputs from the methods outlined in Table 13 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report and the text contained in Column 3 of this row. Given that permitted take is an annual volume and SDL is a long-term average, the only means for comparison is to run the method as a repeat of the historical climate conditions and provide a long-term average. As identified in Victoria's North and Murray Index Table and in the Methods Report, the SDL method and permitted take method are the same and therefore are based on identical climate sequences.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.10(5)	If, as a result of an amendment under section 23B of the Act, the SDL for a surface water SDL resource unit is expressed as a formula that changes with time, the SDL for subsection (4) is taken to be: (a) for a water accounting period beginning on or after 1 July 2019—the SDL as it stood on 30 June 2019; and (b) for a water accounting period beginning on or after 1 July 2022—the SDL as it stood on 30 June 2022; and (c) for a water accounting period beginning on or after 1 July 2024—the SDL as it stood on 30 June 2024.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. This matter informs the interpretation of section 10.10(4) of the Basin Plan and does not contain a Basin Plan requirement. The methods that adjust for supply and efficiency measures are identified in Items 1 and 2 of Table 6 of Appendix C to Victoria’s North and Murray Comprehensive Report in response to 10.10(1). This demonstrates that the SDL is a formula that changes with time. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. This requirement does not apply to groundwater.	n/a	
			n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.11(1)	A water resource plan must set out rules (including, if applicable, rules for water allocations) that ensure, as far as practicable, that the quantity of water actually taken from each SDL resource unit consumptive use in a water accounting period that beginning on or after 1 July 2019 does not (after making any adjustments for the disposal or acquisition of held environmental water) exceed the unit's annual permitted take for the period.	Victoria's North and Murray water resource plan area - From 1 July 2019: - the Minister must not amend or issue new entitlements to take water or apply restrictions to entitlements; and - an appointed water corporation must not make an allocation to entitlement holders in a declared system under section 64GB of the <i>Water Act 1989</i> (Vic) - in respect of authorising take from a water resource in Victoria's North and Murray water resource plan area, if to do so would cause actual take to exceed permitted take for the relevant SDL resource unit. - The Department must monitor annual actual take against annual permitted take to determine whether on an annual basis, or for groundwater SDL resource units from 30 June 2028 an average basis, annual actual take is exceeding annual permitted take. - For surface water SDL resource units, and groundwater SDL resource units up to 30 June 2028, if the Department identifies the cumulative balance of the difference between actual take and permitted take exceeds the sustainable diversion limits in the amount of 15% or more of the relevant sustainable diversion limit the Department must investigate the cause of the exceedance for the relevant SDL resource unit. - For groundwater SDL resource units after 30 June 2028, if the Department identifies the average annual take over the 10-year period ending with that water accounting period exceeds the average annual permitted take over the 10-year period, the Department must investigate the case of the exceedance for the relevant SDL resource unit. - If it is determined that authorisation to take water needs to be adjusted to support meeting sustainable diversion limits: - the Minister must determine whether restrictions must be applied to take and use licences; or - the appointed water corporation must determine whether adjustments must be made to future allocations under section 33AC of the <i>Water Act 1989</i> (Vic) in consultation with entitlement holders as per the requirements under the <i>Water Act 1989</i> (Vic). - References to sections of the <i>Water Act 1989</i> (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only. "appointed water corporation" means a water corporation appointed under section 64GA of the <i>Water Act 1989</i> (Vic); Note 1: The response to section 10.08(2) of the Basin Plan, requiring the holder of a water access right to comply with the conditions specified in the water access right instrument supports the above obligation to ensure, as far as practical that actual take does not exceed annual permitted take. Note 2: The response to section 10.13 of Basin Plan in respect of other forms of take.	Minister	This requirement is met as the rule provided as accredited text ensures that decisions regarding entitlements do not impact on Victoria's ability to comply with the relevant permitted take or SDL. The obligation states that the Minister (and any delegates) cannot do any of the three things specified if to do so would cause annual permitted take or the SDL to be exceeded. Under the current framework, to respond to availability or mitigate the impacts of reduced availability the following occurs: - restrictions are applied to take and use licences; and - allocations made to entitlement holders in declared water systems are done in accordance with seasonal determinations under section 64GB of the Victorian Water Act. This means actual take will not exceed permitted take as the above is measured to water availability in the relevant year. Victoria's water management framework is premised on the allocation of water up to a maximum volume that represents a sustainable level of diversion. For surface water, the current level of entitlements for consumptive use aligns with the prescribed SDL. For groundwater, current level of entitlements is below the prescribed SDL. As is identified in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report, Victoria's long-term average permitted take equals the SDL for the relevant form of take in the relevant SDL Resource Unit. The management of allocation or actual take underneath the primary entitlement only occurs to respond to water availability in accordance with the methods identified in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. The Minister authorises the take of water subject to conditions which include how the water may be taken and the ability to adjust the volume of take in a given accounting period to respond to water availability. This rule is to provide assurance that no new entitlements will be issued and that no entitlement will be amended in the water resource plan area that would result in authorised take in Victoria exceeding the SDL or permitted take. The obligation also requires that the exercise of powers to adjust authorisations to respond to water availability must consider the impact on permitted take and the SDL. Victoria's framework ensures compliance with the requirement under section 10.11(1) of the Basin Plan through commitments under the Basin Plan and its supporting agreements. For more information on the Minister's responsibilities and commitments under the Basin Plan, see Victoria's water institutions and functions in Chapter 6 of Victoria's North and Murray Comprehensive Report. The limit on what can be authorised to be taken for consumptive purposes is determined under the methods required under section 10.10 of the Basin Plan. These methods are outlined in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. This rule is complemented by the requirement in response to section 10.13 of the Basin Plan which limits the volume of water that may be intercepted by the specified forms. See Section 6.7 of Victoria's North and Murray Comprehensive Report for more details on compliance and enforcement and Section 9.3 of Victoria's North and Murray Comprehensive Report for further discussion of Victoria's response to section 10.11(1) of the Basin Plan. The requirement to respond to potential increases of annual actual take where the cumulative balance increases above the sustainable diversion limits for all SDL resource units in the Northern Victoria, Victorian Murray and Goulburn-Murray water resource plan areas is provided to support operation of Chapter 6 of the Basin Plan in managing SDL compliance. The response identifies that Victoria will act in accordance with Chapter 6 of the Basin Plan to address any growth in use that would cause non-compliance with SDLs in Victoria's North and Murray water resource plan area. This response is linked to the response to section 10.12(1)(g) of the Basin Plan where growth in utilisation must be considered. The obligation identified in Column 3 is commensurate to the level of risk of SDL non-compliance in Victoria's North and Murray water resource plan area given the water resource management arrangements in that plan area.

FOR ACCREDITATION			NOT FOR ACCREDITATION		
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10.11(2)	To avoid doubt, the rules may be designed to ensure that the quantity of water that is actually taken for consumptive use from an SDL resource unit in a water accounting period is less than the annual permitted take.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.11(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a		
10.12(1)(a)	For paragraph 10.10(3)(a), the following matters must be accounted for: (a) all forms of take from the SDL resource unit and all classes of water access right;	Victoria's North and Murray water resource plan area For Victoria's North and Murray water resource plan area all forms of take from the SDL resource units and all classes of water access rights are accounted for by the methods specified for the purposes of section 10.10(1) of the Basin Plan.	n/a	For more information see the Part 3.3 (surface water) and Part 4.2 (groundwater) of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. This requirement is addressed in item (a) of Table 8 (surface water) and item (a) of Table 12 (groundwater) in Appendix C to Victoria's North and Murray Comprehensive Report.	
10.12(1)(b)	For paragraph 10.10(3)(a), the following matters must be accounted for: (b) water allocations that are determined in one water accounting period and used in another, including water allocations that are carried over from one water accounting period to the next;	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Item (b) of Table 8 in Appendix C to Victoria's North and Murray Comprehensive Report provides the response to this requirement.	n/a	For more information see the Part 3.3 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. This requirement is addressed in item (b) of Table 8 in Appendix C to Victoria's North and Murray Comprehensive Report. See Section 7.2.2.5 of Victoria's North and Murray Comprehensive Report for a discussion of specific water access arrangements under entitlements.	
10.12(1)(c)	(c) for a surface water SDL resource unit—return flows, in a way that is consistent with arrangements under the Agreement immediately before the commencement of the Basin Plan;	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Item (b) of Table 12 in Appendix C to Victoria's North and Murray Comprehensive Report provides the response to this requirement.	n/a	For more information see the Part 4.2 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. This requirement is addressed in item (b) of Table 12 (groundwater) in Appendix C to Victoria's North and Murray Comprehensive Report.	
		Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Item (c) of Table 8 in Appendix C to Victoria's North and Murray Comprehensive Report provides the response to this requirement.	n/a	For more information see the Part 3.3 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. This requirement is addressed in item (c) of Table 8 .	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to groundwater.	n/a		

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10:12(1)(d)	For paragraph 10:10(3)(a), the following matters must be accounted for: (d) subject to subsection (3)—trade of water access rights;	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Item (d) of Table 8 in Appendix C to Victoria’s North and Murray Comprehensive Report provides the response to this requirement.	n/a	This requirement is met by the text in Column 3 of this row as it identifies that the matter in section 10:12(1)(d) of the Basin Plan has been taken into account. Trade of entitlements is permitted in Victoria’s North (surface water) water resource plan area. All trade is recorded on the Victorian Water Register and the data on the Register is the point of truth for entitlement data. For more information see the Part 3.3 of the Methods Report at Appendix C to Victoria’s North and Murray Comprehensive Report. This requirement is addressed in item (d) of Table 8 in Appendix C to Victoria’s North and Murray Comprehensive Report. Planned Environmental Water is not tradeable.
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Item (d) of Table 12 in Appendix C to Victoria’s North and Murray Comprehensive Report provides the response to this requirement.	n/a	This requirement is met by the text in Column 3 of this row as it identifies that the matter in section 10:12(1)(d) of the Basin Plan has been taken into account. Trade of entitlements is permitted in the Goulburn-Murray water resource plan areas. Trade of take and use licences is only permitted where it will not adversely impact on existing users (including the environment) and will not change the maximum volume of take permitted in the relevant system. Given the method for permitted take (that it equals SDL) represents a long-term average of take from the relevant SDL resource unit the method will not be adjusted for trade. Trade will be accounted for in the method for actual take as it will reflect the effect of the trade in the system. Under Victoria’s water resource management framework, a trade will not be allowed if the result is to exceed the relevant limit on take for that resource. In respect of how permitted take will be complied with, see response to section 10:11(1) of the Basin Plan in Victoria’s North and Murray Index Table. All trade is recorded on the Victorian Water Register and the data on the Register is the point of truth for entitlement data. For more information see the Part 4.2 of the Methods Report at Appendix C to Victoria’s North and Murray Comprehensive Report. This requirement is addressed in item (d) of Table 12 in Appendix C to Victoria’s North and Murray Comprehensive Report.
10:12(1)(e)	For paragraph 10:10(3)(a), the following matters must be accounted for: (e) water resources which have a significant hydrological connection to the water resources of the SDL resource unit;	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Item (e) of Table 8 in Appendix C to Victoria’s North and Murray Comprehensive Report provides the response to this requirement. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Item (e) of Table 12 in Appendix C to Victoria’s North and Murray Comprehensive Report provides the response to this requirement.	n/a	For more information see the Part 3.3 (surface water) and Part 4.2 (groundwater) of the Methods Report at Appendix C to Victoria’s North and Murray Comprehensive Report. This requirement is addressed in item (e) of Table 8 and item (e) Table 12 in Appendix C to Victoria’s North and Murray Comprehensive Report. See Section 4.2.4 (Victorian Murray water resource plan area), Section 4.3.6 (Northern Victoria water resource plan area) and Section 4.4.6 (Goulburn-Murray water resource plan area) of Victoria’s North and Murray Comprehensive Report for a discussion of significant hydrological connections. See also the discussion in Column 5 of Victoria’s North and Murray Index Table in response to section 10.05(b) and Part 4 of the Basin Plan.
10:12(1)(f)	For paragraph 10:10(3)(a), the following matters must be accounted for: (f) circumstances in which there is a change in the way water is taken or held under a water access right;	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Item (f) of Table 8 in Appendix C to Victoria’s North and Murray Comprehensive Report provides the response to this requirement. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. This matter is not relevant to the Goulburn-Murray water resource plan area.	n/a	This requirement is met by the text in Column 3 of this row as it identifies that the matter in section 10:12(1)(f) of the Basin Plan has been taken into account. There are no proposed changes to the way surface water or groundwater is taken or held in Victoria’s North and Murray water resource plan area. For more information see the Part 3.3 (surface water) and Part 4.2 (groundwater) of the Methods Report at Appendix C to Victoria’s North and Murray Comprehensive Report. This requirement is addressed in item (f) of Table 8 (surface water) and item (f) of Table 12 (groundwater) in Appendix C to Victoria’s North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION		
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10:12(1)(g)	For paragraph 10:10(3)(a), the following matters must be accounted for: (g) changes over time in the extent to which water allocations in the unit are utilised; Note: Paragraph (g) includes what is commonly known as a growth-in-use strategy.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Item (g) of Table 8 in Appendix C to Victoria's North and Murray Comprehensive Report provides the response to this requirement. Note: See also the response to section 10:11 of the Basin Plan in Victoria's North and Murray Index Table. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Item (g) of Table 12 in Appendix C to Victoria's North and Murray Comprehensive Report provides the response to this requirement. Note: See also the response to section 10:11 of the Basin Plan in Victoria's North and Murray Index Table.	n/a	For more information see the Part 3.3 (surface water) and Part 4.2 (groundwater) of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. This requirement is addressed in item (g) of Table 8 (surface water) and item (g) of Table 12 (groundwater) in Appendix C to Victoria's North and Murray Comprehensive Report. In response to section 10:11 of the Basin Plan a requirement to respond to potential increases of annual actual take where the cumulative balance increases above the sustainable diversion limits for all SDL resource units in the Northern Victoria, Victorian Murray and Goulburn-Murray water resource plan areas is provided in Victoria's North and Murray Water Resource Plan to support operation of Chapter 6 of the Basin Plan in managing SDL compliance. The response identifies that Victoria will act in accordance with Chapter 6 of the Basin Plan to address any growth in use that would cause non-compliance with SDLs in Victoria's North and Murray water resource plan area. This response is linked to the response to section 10:12(1)(g) of the Basin Plan where growth in utilisation must be considered. The obligation identified in Column 3 is commensurate to the level of risk of SDL non-compliance in Victoria's North and Murray water resource plan area given the water resource management arrangements in that plan area.	
10:12(1)(h)	For paragraph 10:10(3)(a), the following matters must be accounted for: (h) water sourced from the Great Artesian Basin and released into a Basin water resource, by excluding that water;	Victoria's North and Murray water resource plan area This matter is not relevant to Victoria's North and Murray water resource plan area as there is no water sourced from the Great Artesian Basin.	n/a		
10:12(1)(i)	For paragraph 10:10(3)(a), the following matters must be accounted for: (i) water resources which are used for the purpose of managed aquifer recharge.	Victoria's North and Murray water resource plan area This matter is not relevant to methods for permitted take in Victoria's North and Murray water resource plan area as currently there are no managed aquifer recharge schemes operating or proposed in Victoria's North and Murray water resource plan area.	n/a		
10:12(2)	Subject to this section, the method may account for other matters.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10:10 of the Basin Plan and does not contain a water resource plan requirement.	n/a		
10:12(3)	For paragraph 1(1)(d), the water resource plan must account for the disposal and acquisition of held environmental water separately and in a way that does not affect the method under section 10:10.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10:12(1)(d) of the Basin Plan and does not contain a water resource plan requirement. See response to section 10:12(1)(d) of the Basin Plan above.	n/a	Any change to entitlement volumes or allocation as a result of trade is recorded in the VWR and is taken into account in the method used to determine permitted take for both forms of take, including separate accounting of held environmental water (section 10:12(3) of the Basin Plan). The trade of water from consumptive use to HEW or from HEW to consumptive use will not impact on the methods used to determine permitted take under section 10:10 of the Basin Plan. The net balance of any disposal or acquisitions of HEW will be used to adjust the cumulative balance at the end of the water accounting period in accordance with section 6:12 of the Basin Plan. In respect of groundwater there are no entitlements to groundwater for the environment and therefore this matter is not relevant to the Goulburn-Murray water resource plan area.	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.13(1)	Subject to this section, a water resource plan must require that the long-term annual average quantity of water that can be taken from a surface water SDL resource unit for consumptive use by: (a) take under basic rights; or (b) take by runoff dams; or (c) net take by commercial plantations; does not exceed the level specified in Column 2 of Schedule 3 for that form of take.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. - For the purposes of responses to Part 3 of Chapter 10 of the Basin Plan in Victoria's North and Murray Water Resource Plan the relevant SDL resource units are the: - combined Victorian Murray SDL Resource Unit which includes Victorian Murray, Kiewa and Ovens; - combined Northern Victoria SDL Resource Unit which includes, Goulburn, Broken, Campaspe and Loddon. - The long term annual average quantity of water in the: - combined Victorian Murray SDL Resource Unit that can be taken for consumptive use for the forms of take listed at section 10.13(1) of the Basin Plan is the level specified in items 17-19 of Column 2 of Schedule 3 to the Basin Plan; - combined Northern Victoria SDL Resource Unit that can be taken for consumptive use for the forms of take listed at section 10.13(1) of the Basin Plan is the level specified in items 20-23 of Column 2 of Schedule 3 to the Basin Plan. This is the level of take at a specified point in time and is represented by the estimated volume of the baseline diversion limit identified in Table 3 of Appendix C to Victoria's North and Murray Comprehensive Report for that form of take from Combined Victorian Murray and Combined Northern Victoria SDL resource units. - Annual actual take under Victoria's North and Murray Water Resource Plan is limited by the volume of annual permitted take determined by the method specified in response to section 10.10(1) of the Basin Plan for the following forms of take: - take under basic rights; or - take by runoff dams; or - net take by commercial plantations. - The requirement for section 10.13(1) of the Basin Plan is met by the response to sections 10.08(2), 10.10(1) and 10.11(1) of the Basin Plan. - The Department will monitor actual take for the above specified forms of take and where the actual take increases above permitted take the application of section 10.13(2) of the Basin Plan to Victoria's North and Murray Water Resource Plan will be assessed by the Department and an amendment to the Plan will be pursued if necessary.	n/a	Section 9.4 of Victoria's North and Murray Comprehensive Report provides further details regarding the limit on certain types of take. For more information regarding how take is managed for all forms of take within Victoria's North and Murray water resource plan area see Chapter 7 of Victoria's North and Murray Comprehensive Report and the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. How annual permitted take and actual take for these forms of take are estimated is outlined in Table 6 of the Methods Report at Appendix C to the Victoria's North and Murray Comprehensive Report. As identified in Column 3 of the Victoria's North and Murray Index Table, the response to sections 10.11(1) and 10.08(2) of the Basin Plan operate together to ensure actual take does not exceed permitted take. By complying with annual permitted take, the volume of take will not exceed the level specified in Column 2 of Schedule 3 to the Basin Plan. While basic rights are not subject to conditions, take under basic rights is limited by the scope of that right under sections 8 and 8A of the Victorian Water Act (see Section 7.2.1 of the Victoria's North and Murray Comprehensive Report). If take in the forms specified in section 10.13(1) of the Basin Plan exceeds permitted take, section 10.13(2) may be applied. Paragraph in Column 3 identifies the Department will review how section 10.13(2) can be applied and will seek amendment to the Victoria's North and Murray Water Resource Plan if necessary. For take from runoff dams, it is not clear whether increased numbers and capacity of runoff dams will necessarily lead to increased take, due to the impacts of climate change and associated changes in patterns of on-farm demand. Changes in the extent of runoff dams will be determined using aerial imagery periodically at least every 10 years, and this information may be used to assess whether annual actual take is exceeding the level specified in Column 2 of Schedule 3 to the Basin Plan. Little or no growth in commercial plantations is expected to occur over the next decade, due to the lack of sufficient rainfall in the WRP area. Changes in the extent of plantations in Victoria's North (surface water) water resource plan area will be determined using information provided on an annual basis by managers and owners of large plantation estates, and this information may be used to assess whether annual actual take is exceeding the level specified in Column 2 of Schedule 3 to the Basin Plan. In addition, the Victorian Government has made the following commitments in Water for Victoria to improve water use information, and these may provide relevant information to assess whether annual actual take is exceeding the level specified in Column 2 of Schedule 3 to the Basin Plan: - periodically review the long-term risks to Victoria's water resources through mechanisms such as long-term water resource assessments and sustainable water strategies; - to better monitoring and reporting on the effects of emerging water uses on other uses in the Victorian Water Accounts. The Department is the entity responsible for undertaking the action in (4) of Column 3 of this row for the purposes of section 10.06(2) of the Basin Plan.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Note 1: Volume for permitted take is identified in Table 9 (Victorian Murray water resource plan area) and Table 10 (Northern Victoria water resource plan area) of Appendix C to Victoria's North and Murray Comprehensive Report. The methods for determining the volume of annual permitted take is identified in Table 6 of Appendix C to Victoria's North and Murray Comprehensive Report. The Table further identifies the modelling related to determining permitted and actual take will be reviewed as follows: (a) take under basic rights every 5 years; (b) take by runoff dams every 10 years; (c) take by commercial plantations every 10 years subject to any significant changes in the industry in which case a review would occur earlier. Note 2: The relevant responses identified in (3) above relate to: (a) section 10.08(2) of the Basin Plan which requires holders of a water access right to comply with the conditions of that right; (b) section 10.10(1) of the Basin Plan which sets out the method for determining permitted take limits for the relevant forms of take in Victoria's North (surface water) water resource plan area; (c) section 10.11(1) of the Basin Plan which ensures that actual take does not exceed permitted take.		
10.13(1)		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to the groundwater resources of Victoria's North and Murray water resource plan area.	n/a	
10.13(2)	The quantity specified in subsection (1) for a form of take may be increased above the level specified in Column 2 of Schedule 3 for that form of take if: (a) the long-term annual average quantity of water that can be taken by another form of take from the same SDL resource unit is changed at the same time so that there is no overall change in the total long-term annual average quantity of water that can be taken; and (b) take by the forms of take affected by the changes are capable of: (i) being accurately measured (for example, through the use of a meter); or (ii) in the case of a form of take that is not capable of being accurately measured at the time the water resource plan is submitted for accreditation or adoption—being reasonably estimated using the best available method immediately before the water resource plan is submitted; and (c) the changes are not expected to result in the take from the SDL resource unit ceasing to be an environmentally sustainable level of take.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10.13(1) of the Basin Plan and does not contain a water resource plan requirement. See the response to section 10.13(1) above as to how section 10.13(2) will be triggered.	n/a	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.14(1)	A water resource plan must identify the effect, or potential effect, if any, of the following on the use and management of the water resources of the water resource plan area: (a) the taking of groundwater that is not a Basin water resource resulting in water being removed from a groundwater SDL resource unit in the water resource plan area because of a preexisting hydrological connection or a hydrological connection created by the process of taking that groundwater; (b) the taking of groundwater that is not a Basin water resource resulting in water that would otherwise flow directly or indirectly into an SDL resource unit in the water resource plan area no longer flowing into that unit.	Victoria’s North and Murray water resource plan area No effects or potential effects have been identified relating to the use and management of the water resources in Victoria’s North and Murray water resource plan area relating to the taking of groundwater that is not a Basin water resource. The groundwater from the New Volcanics formation south of the Loddon Highlands water supply protection area is hydraulically connected to the Basin water resource in the Goulburn-Murray: Highlands SDL resource unit but is not considered to have a potential effect on the use and management of water resources of the water resource plan area.	n/a	The investigation documented within “Loddon Highlands WSPA Groundwater Modelling, 2011” found lateral flow was not significant. See Figure 2–4 of Victoria’s North and Murray Comprehensive Report for an indication of the resource that sits outside of the Goulburn-Murray water resource plan area marked as the “Loddon Highlands WSPA”.
10.14(2)	If a water resource plan identifies an effect, or potential effect, of the kind referred to in subsection (1), the water resource plan must set out: (a) a process for monitoring that effect or potential effect; and (b) actions that will be taken to respond to that effect or potential effect.	Victoria’s North and Murray water resource plan area This requirement is not relevant to Victoria’s North and Murray Water Resource Plan as no effect or potential effect of the kind referred to in section 10.14(1) of the Basin Plan was identified.	n/a	
10.14(3)	Without limiting paragraph (2)(b), the water resource plan may require a person to hold a water access right in the water resource plan area in relation to the effect, or potential effect, identified.	Victoria’s North and Murray water resource plan area This matter assists in the interpretation of section 10.14(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.15(1)	A water resource plan must set out how the quantity of water actually taken for consumptive use by each form of take from each SDL resource unit will be determined after the end of a water accounting period using the best information available at the time.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of the Comprehensive Report. 1. The method for annual actual take set out in Column 4 at Item 1 applies to for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report for the Ovens SDL resource unit (SS4) in the Northern Victoria water resource Plan area. 2. The methods for annual actual take set out in Column 4 at Items 2-3 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to the following SDL resource units in the Northern Victoria water resource plan area: (a) Goulburn (SS6); (b) Broken (SS5); (c) Campaspe (SS7); (d) Loddon (SS8). 3. The methods for annual actual take set out in Column 4 for Items 4-7 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to all SDL resource units in the Northern Victoria water resource plan area.	n/a	Reference to column numbers in this section refer to the column number of the header row of the relevant table. In some instances, the response for a particular item may be merged across two columns. This requirement is met as the methods used for estimating or determining actual take for the forms of take for surface water in the Northern Victoria water resource plan area and the Victorian Murray water resource plan area are outlined in Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. The text in Column 3 of this row identifies the water resources to which the content in Column 4 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report applies.
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The method set out in Column 4 at Item 1 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report applies to take from a watercourse (excluding basic rights) for the Victorian Murray SDL resource unit (SS2). Kiewa SDL resource unit (SS3) in the Victorian Murray water resource Plan area. The methods set out in Column 4 for Items 3-7 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to the Victorian Murray SDL resource unit. The methods set out in Column 3 for Items 4-7 for the forms of take identified in Column 2 of Table 6 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to the Kiewa SDL resource unit.	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The methods set out in Column 3 for the forms of take identified in Column 1 of Table 11 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report apply to all SDL resource units in the Goulburn-Murray water resource plan area.	n/a	Reference to column numbers in this section refer to the column number of the header row of the relevant table. In some instances, the response for a particular item may be merged across two columns. This requirement is met as the methods used for estimating or determining actual take for the forms of take for groundwater in the Goulburn-Murray water resource plan area are outlined in Table 11 of the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report. The text in Column 3 of this row identifies the water resources to which the content in Table 11 of Appendix C to Victoria's North and Murray Comprehensive Report applies.

FOR ACCREDITATION			NOT FOR ACCREDITATION		
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10:15(2)	For a particular form of take, and subject to the requirement that a determination use the best information available at the time, a determination may be made by: (a)measuring the quantity of water actually taken; or (b)estimating the quantity of water actually taken; or (c)a combination of the above.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of section 10:15(1) of the Basin Plan and does not contain a water resource plan requirement. Whether actual take is measured or estimated is set out in Table 6 , and Table 11 , of Appendix C to Victoria's North and Murray Comprehensive Report.	n/a		
10:15(3)	Where a determination for a form of take is made by estimating the quantity of water actually taken, the water resource plan must provide for the estimate to be done consistently with the method under subsection 10:10(1) that relates to that form of take.	Victoria's North and Murray water resource plan area In Victoria's North and Murray water resource plan area, where the determination of actual take is estimated, the method is the same as the method used to determine permitted take under section 10:10(1) of the Basin Plan.	n/a	This requirement is met in Victoria's North and Murray water resource plan area as the method used for determining actual take is based on the same information source used to determine permitted take where the volumes are estimated.	
10:15(4)	The quantity of water actually taken must: (a)include water that was held environmental water which was disposed of and then used in the SDL resource unit for consumptive use; and (a)exclude water sourced from the Great Artesian Basin and released into and taken from a Basin water resource.	Victoria's North (surface water) water resource plan area For the purposes of section 10:04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Methods for determining actual take in accordance with section 10:15(1) of the Basin Plan include water that was held environmental water which was disposed of and then used in the relevant SDL resource unit for consumptive use. No water is sourced from the Great Artesian Basin and released in Victoria's North (surface water) water resource plan area. Goulburn-Murray water resource plan area For the purposes of section 10:04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The matter listed in section 10:15(4)(a) of the Basin Plan is not relevant to the Goulburn-Murray water resource plan area. No water is sourced from the Great Artesian Basin and released in the Goulburn-Murray water resource plan area.	n/a	See discussion on section 10:12(1)(d) and section 10:12(1)(h) of the Basin Plan above.	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 4	The sustainable use and management of water resources			
10.16	This Part sets out the requirements in relation to the sustainable use and management of water resources of the water resource plan area within the long-term annual diversion limit for an SDL resource unit.	Victoria's North and Murray water resource plan area This matter assists in the interpretation of Part 4 of Chapter 10 of the Basin Plan and does not require accredited content for Victoria's North and Murray Water Resource Plan.	n/a	Part 4, Chapter 10 of the Basin Plan requires the consideration of whether Victoria's North and Murray Water Resource Plan should contain rules to mitigate the impact of the operation of other elements of the Plan on environmental watering in Victoria's North and Murray (surface water) water resource plan area. For further discussion on significant hydrological connections see response to section 10.05(b) of the Basin Plan outlined in Column 3 and Column 5 of Victoria's North and Murray Index Table. Connectivity as described in that part of this Index informed the response provided in response to Part 4 of the Basin Plan. The following discussion applies to the response to section 10.17 of the Basin Plan for surface water and groundwater water resource plan areas in Victoria's North and Murray Water Resource Plan. See also discussion in Column 5 of Victoria's North and Murray Index Table in response to sections 10.22 and 10.26(l) of the Basin Plan. A summary of specific risks to:
10.17(1)	A water resource plan must be prepared having regard to whether it is necessary for it to include rules which ensure that the operation of the Plan does not compromise the meeting of environmental watering requirements of priority environmental assets and priority ecosystem functions.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	• priority environmental assets provided in Table 5-5 and Table 5-8 • environment and environmental watering in respect of water availability are summarised in Section 5.3.1 and Section 5.4.1 and Table 5-3 and Table 5-6 • environment and environmental watering in respect of water condition are summarised in Section 5.3.2 and Section 5.4.2 and Table 5-4 and Table 5-7 of Victoria's North and Murray Comprehensive Report. Risks relating to uncontrolled water or above cap water (for the purposes of the Risk Assessment outlined in Appendix B above cap water does not include system water as that was assessed separately given its higher reliability) and the relevant risks to that water are identified in Table 5-3 and Table 5-6 in Victoria's North and Murray Comprehensive Report. See Column 5 for an outline of the different components of Victoria's North and Murray Risk Assessment Report at Appendix B . Section 10.17 of the Basin Plan applies to environmental watering requirements of priority environmental assets (PEAs) and priority ecosystem functions (PEFs). See the response to section 10.05(b) of the Basin Plan for a discussion on connectivity between resources within and to resources outside of the Victoria's North and Murray water resource plan area. Coordination of environmental watering is discussed at Section 12.7.4 of Victoria's North and Murray Comprehensive Report. The impact of environmental watering in Victoria on Basin States connected to Victoria through the River Murray is outlined in that Section. See also Figure 12-7 for the process for coordinating environmental watering in the River Murray. In Victoria, the Victorian Environmental Water Holder (VEWH) manages held environmental water. The VEWH meets Victorian environmental watering objectives, including the requirements of PEAs, through water available under its environmental entitlements. This occurs in regulated systems, where there is ability to store and release water at specific times and volumes. All of Victoria's PEAs are located in regulated systems where there is the specific ability to deliver held environmental water to meet the PEAs' watering requirements. The PEA watering requirements are set out in the long-term watering plan and relevant asset-based environmental water management plans. The available environmental entitlement will meet these requirements, under dry, average or wet scenarios as outlined in environmental watering plans. The MDBA has advised that in its opinion Victoria's Long-Term Watering Plans (LTWPs) for Victorian Murray water resource plan area and the Northern Victoria water resource plan area do not adequately describe long-term watering requirements for Victoria's priority environmental assets and priority ecosystem functions. Therefore, to meet Basin Plan requirements for Part 4 of Chapter 10, Victoria's Environmental Water Management Plans (EWMPs) are identified (rather than the long-term watering plans) as outlining environmental watering requirements for the purposes of Victoria's North and Murray Water Resource Plan. Following any updates to the LTWPs that satisfy the requirements of the Basin Plan in outlining environmental watering requirements, Victoria's North and Murray Water Resource Plan may be updated to refer to LTWPs instead of EWMPs.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.17(2)	Without limiting subsection (1), regard must be had to whether it is necessary for the rules to prescribe: (a) the times, places and rates at which water is permitted to be taken from a surface water SDL resource unit; and (b) how water resources in the water resource plan area must be managed and used.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	EWMPs contain the long-term environmental watering requirements for each PEA identified for Victoria's North and Murray water resource plan area. EWMPs are not prepared for PEFs and Victoria relies on its LTWPs for this purpose. Although efficiencies are made through use of tools, the environmental entitlement is the primary mechanism for achieving the watering requirements of PEAs. See Section 12.7.6 of Victoria's North and Murray Comprehensive Report. All environmental entitlements are protected under Victoria's water management framework. Victoria's water corporations manage water resources and access to water to ensure that all users in the system are supported, including the VEWH. Section 12.4.3 of Victoria's North and Murray Comprehensive Report discusses other water that contributes to the environment. See also Section 7.2.2 which discusses water entitlements and Section 7.2.2.4 which discusses above cap water. See also Section 12.4.4 for a discussion on how water that contributes to environmental objectives (but is not held environmental water or planned environmental water) is protected under Victoria's water resource management framework. Above cap water can also contribute to environmental objectives for PEA (see Section 12.5.1 of Victoria's North and Murray Comprehensive Report) and PEF (see Section 12.5.2 of Victoria's North and Murray Comprehensive Report) by requiring the use of less held environmental water that would otherwise be needed if the above cap water was not present. The effect of this is that increased efficiency in using held environmental water means the VEWH can allocate saved water to other uses to be maximise environmental outcomes. See response to section 10.26(1) of the Basin Plan for further information on above cap water. See the following parts of Victoria's North and Murray Comprehensive Report for further details: Chapter 6: Victoria's water institutions and functions, Chapter 7: Victoria's water entitlement framework and trade, and Chapter 12: Environmental water. In assessing whether rules were required in Victoria's North and Murray Water Resource Plan to ensure environmental watering to meet requirements of the PEAs is not compromised, other components of the Plan were considered. As Victoria's North and Murray Water Resource Plan only includes rules on rights to take water that ensure that entitlement holders comply with the conditions of their entitlements (see response to section 10.08(2) of the Basin Plan), nothing in this Plan compromises the meeting of environmental watering requirements. On that basis it is not considered that rules are necessary to ensure the operation of Victoria's North and Murray Water Resource Plan and would compromise the meeting of environmental watering requirements. However to support the continued contribution of above cap water to the meeting of environmental watering objectives of PEAs and PEFs, a rule has been included to require the storage manager to manage the system to achieve this. The rule references the relevant environmental water management plan to identify the environmental watering requirements of the relevant PEAs and PEFs for the system being managed. See Appendix B to Victoria's North and Murray Comprehensive Report for a discussion of risks to environmental watering of PEAs and PEFs and the description of the relevant strategies in Table 3.2.36 to Table 3.2.39 and Table 3.4.33 to Table 3.4.36 in Appendix B. Rules to manage environmental watering requirements that are dependent on groundwater or where there are surface water connections is considered in response to sections 10.18 and 10.19 of the Basin Plan.

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10.17(3)	If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.	Victoria's North and Murray water resource plan area The storage manager will manage the system and above cap water in line with the Victorian water management framework described in Victoria's North and Murray Water Resource Plan in response to section 10.26(1) of the Basin Plan so the environmental watering requirements of PEAs and PEFs identified in relevant environmental water management plans are met, which is the responsibility of the VEWH. Note: see response to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table for a discussion of environmental watering arrangements in Victoria.	n/a	The matters identified for section 10.17(2) of the Basin Plan were considered to inform the analysis for section 10.17(1) of the Basin Plan, as follows. The rules water access right holders in Victoria comply with may relate to the time, place and rates at which water is permitted to be taken and how water in the water resource plan area must be managed and used. In Victoria, all take and use licences are subject to standard terms and conditions. Included in the standard conditions are provisions relating to the time, place and rate of take water is permitted to be taken under that take and use licence. These rules are applied to all individual entitlements (the exception is bulk entitlements, which contain rules for the management of the system) at the time of issuing the licence. They are considered independently of priority environmental watering and are developed to support reliability of all entitlements in the system (including held environmental water). The storage manager, in managing the system, is responsible for delivering water for all users in the system including the VEWH and CEWH in accordance with any orders made and in consultation with all entitlement holders. All bulk entitlements and environmental entitlements are available on the Victorian Water Register see response to section 10.09(3) of the Basin Plan for a link. Appendix B to Victoria's North and Murray Comprehensive Report outlines the risks identified in Victoria's North and Murray water resource plan area and discusses risks relating to section 10.17 of the Basin Plan at Section 12.9 of Victoria's North and Murray Comprehensive Report. Management of risks to environmental watering are also discussed at Section 12.7.8 of Victoria's North and Murray Comprehensive Report. How these risks were considered in responding to Part 4 of Chapter 10 of the Basin Plan is discussed below in response to section 10.22(b) of the Basin Plan and in Section 12.9 of Victoria's North and Murray Comprehensive Report. See also Part 3.2.6 and Part 3.4.6 of Appendix B to Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION				NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10.18(1)	A water resource plan must be prepared having regard to whether it is necessary for it to include rules which ensure that, for priority environmental assets and priority ecosystem functions that depend on groundwater, the operation of the plan does not compromise the meeting of environmental watering requirements.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	See discussion in Column 5 in response to section 10.22 of the Basin Plan in Victoria's North and Murray Index Table for a discussion on environmental watering requirements. See also the response in Column 3 and Column 5 to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table. The response to section 10.26(1) of the Basin Plan outlines how baseflows are considered in environmental water. Section 10.18 of the Basin Plan applies to environmental watering requirements of priority environmental assets (PEAs) and priority ecosystem functions (PEFs) dependant on groundwater systems and as such meets the requirements of section 10.18 of the Basin Plan for Victoria's North and Murray water resource plan. The MDBA has advised that in its opinion Victoria's Long-Term Watering Plans (LTWPs) for Victorian Murray water resource plan area and the Northern Victoria water resource plan area do not adequately describe long-term watering requirements for Victoria's priority environmental assets and priority ecosystem functions. Therefore, to meet Basin Plan requirements for Part 4 of Chapter 10, Victoria's Environmental Water Management Plans (EWMPs) are identified (rather than the long-term watering plans) as outlining environmental watering requirements for the purposes of Victoria's North and Murray Water Resource Plan. Following any updates to the LTWPs that satisfy the requirements of the Basin Plan in outlining environmental watering requirements, Victoria's North and Murray Water Resource Plan may be updated to refer to LTWPs instead of EWMPs. EWMPs contain the long-term environmental watering requirements for PEA identified for Victoria's North and Murray water resource plan area. EWMPs are not prepared for PEFs and therefore Victoria relies on its LTWPs for this purpose. Ensuring environmental watering requirements are met when there is a significant connection between surface water and groundwater is discussed in Section 12.8.4 of Victoria's North and Murray Comprehensive Report. Groundwater dependency of the PEAs has been categorised, based on best available information, into high, medium, low confidence, or unknown. While some PEAs have a known groundwater dependency, the primary mechanism for meeting the environmental watering requirements is the held environmental water delivery. It is acknowledged that groundwater inflows, or in some cases reduction, may provide additional environmental benefit, but are not the primary mechanism for meeting the PEA watering requirements. However, groundwater is protected or managed under Victoria's water management framework, as specified in the explanatory material above for section 10.17 of the Basin Plan.	
10.18(2)	Without limiting subsection (1), regard must be had to whether it is necessary for the water resource plan to include rules that specify: (a) the times, places and rates at which water is permitted to be taken from a groundwater SDL resource unit; and (b) resource condition limits, being limits beyond which the taking of groundwater will, for a priority environmental asset that depends on groundwater, compromise an environmental watering requirement; and (c) restrictions on the water permitted to be taken (including the times, places and rates at which water may be taken) in order to prevent a resource condition limit from being exceeded.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	A list of groundwater dependant PEAs is provided at Table 7 , Table 8 , Table 9 and Table 10 in Appendix E to Victoria's North and Murray Comprehensive Report. An outline of the relevant environmental watering requirements for each PEA is identified in its Environmental Water Management Plans available at https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways-environmental-water-environmental-water-management-plan See the response to section 10.17of the Basin Plan in Column 5 for discussion on the types of rules identified in section 10.18(2) of the basin Plan. The discussion applies here also. Management instruments are developed in consultation with local stakeholders, customer groups, environmental representatives and relevant government agencies. Management plans are typically reviewed at least every 5 years, as monitoring information, groundwater level observations and other analyses provide better information for management purposes. These may suggest changes to management plans to improve resource management outcomes. These adaptive management approaches improve equitable and sustainable resource management. See Section 12.8.3 of Victoria's North and Murray Comprehensive Report for further details.	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.18(3)	If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.	Victoria's North and Murray water resource plan area - The Minister may prepare guidelines under section 30 of the <i>Water Act 1989</i> (Vic) for the preparation of a draft management plan for an area declared under section 27 of the <i>Water Act 1989</i> (Vic) to require the consultative committee to consider the matters in paragraph (4) when developing a draft statutory management under section 31 of the <i>Water Act 1989</i> (Vic). - The guidelines may require the consultative committee to consider whether the draft statutory management plan should include prescriptions for groundwater management having regard to: - groundwater dependent priority environmental assets and priority ecosystem functions as identified in the Northern Victoria Long-Term Watering Plan and the Victorian Murray Long-Term Watering Plan; - any risks to meeting environmental watering requirements for those groundwater dependent priority environmental assets and priority ecosystem functions as a result of groundwater take in the area. - Prescriptions identified in accordance with paragraph (4) may include: - a requirement to undertake monitoring; - the period and frequency over which the monitoring should occur; - the locations at which monitoring should occur; - identified trigger levels to reflect when extraction would pose a risk to the aquifer; - restrictions that may be applied to the extraction of groundwater under a take and use licence and how the restrictions will be applied; - conditions on the transfer of take and use licences within or into the relevant water supply protection area. - In considering a draft statutory management plan under section 32A of the <i>Water Act 1989</i> (Vic), the Minister must consider whether the prescriptions included in the draft plan address the types of risks referred in paragraph (4) if identified for the water supply protection area relevant to the draft plan. - The storage manager will manage the system and above cap water in line with the Victorian water management framework described in Victoria's North and Murray Water Resource Plan in response to section 10.26(1) of the Basin Plan so the environmental watering requirements of PEAs and PEFs identified in relevant environmental water management plans are met, which is the responsibility of the VEWH. - References to sections of the <i>Water Act 1989</i> (Vic) do not have the purpose of including those sections as part of the response but are included for reference only. Note 1: For environmental watering obligations and requirements see the response in Column 3 to section 10.26 of the Basin Plan in Victoria's North and Murray Index Table and the supplementary material discussed in Column 5. Note 2: see response to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table for a discussion of environmental watering arrangements in Victoria.	Minister	Above cap water can also contribute to environmental objectives for PEA (see Section 12.5.1 of Victoria's North and Murray Comprehensive Report) and PEF (see Section 12.5.2 of Victoria's North and Murray Comprehensive Report) by requiring the use of less held environmental water that would otherwise be needed if the above cap water was not present. The effect of this is that increased efficiency in using held environmental water means the VEWH can allocate saved water to other uses to be maximise environmental outcomes. See response to section 10.26(1) of the Basin Plan for further information on above cap water. See also discussion in response to section 10.17 relating to risks to the environment, environmental water and priority environmental assets and priority ecosystem functions. How these risks were considered in responding to Part 4 of Chapter 10 of the Basin Plan is discussed below in response to section 10.22(b) of the Basin Plan and in Section 12.9 of Victoria's North and Murray Comprehensive Report. See also Section 3.3.6 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report. The rule identified in Column 3 of Victoria's North and Murray Index Table in response to section 10.18 of the Basin Plan for the purposes of Victoria's North and Murray water resource plan area apply to all the water resources in the plan area where a water supply protection area is declared. The rule at paragraph 5 in column 3, has been included to support the continued contribution of above cap water so the VEWH can meet the environmental watering objectives of PEAs and PEFs, through the management of the system. The rule is a requirement on the storage manager and references the relevant environmental water management plan to identify the environmental watering requirements of the relevant PEAs and PEFs for the system being managed. Table 12-4 in Victoria's North and Murray Comprehensive Report outlines the existing arrangements under the Victorian Water Act and in statutory management plans that align with the requirements for Part 4 of Chapter 10 of the Basin Plan.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.18(3)	If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. This rule only applies where a statutory management plan has not been approved under section 32A of the <i>Water Act 1989</i> (Vic) and groundwater dependent ecosystems have been identified as high value in the Goulburn-Murray water resource plan area: (a) the Minister must undertake a risk assessment to determine whether the issue of a new licence or transfer of an existing licence will have a medium or high risk of having an adverse impact on the groundwater dependent ecosystem; (b) where a medium or high risk under paragraph (1), before issuing a take and use licence or approving the transfer a take and use licence for the take of groundwater the Minister must consider whether conditions should be imposed on the take and use licence to modify: (i) the adverse consequences of the take including pumping schedules, offsets, options for supplementing surface water flows; (ii) the adverse impact of the take including reducing the entitlement volume or location of the bore. 2. Where a water supply protection area has been declared under section 27 of the <i>Water Act 1989</i> (Vic) the rule under (1) above does not apply.	Minister	The rule identified in Column 3 of Victoria's North and Murray Index Table in response to section 10.18(3) of the Basin Plan for the purposes of the Goulburn-Murray water resource plan area applies in respect of an application to transfer (trade) a take and use licence (water access right) for the take and use of groundwater where a risk to a groundwater dependent PEA or PEF is identified. This rule does not apply where a statutory management plan is in place. The rule identified reflects the <i>Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems</i> (Minister for Water, 2015) regarding decisions to issue or transfer (trade) that applies to decisions relating to a take and use licence for the taking of groundwater in the Goulburn-Murray water resource plan area. Under the Guidelines the Minister (or delegate): (a) undertakes a risk assessment to determine the existence of high value ecosystems dependent on the relevant groundwater; (b) determines risk to the ecosystem dependent on groundwater; (c) determines how risk will be managed. The operation of this existing process is outlined in the Ministerial Guidelines. This takes a risk-based approach to identify where a proposed groundwater take may result in a threshold of impact at the boundary of a potential groundwater dependent ecosystem. It is applicable at all potential groundwater-dependent ecosystems, including PEAs. As identified above in relation to the response to section 10.17 of the Basin Plan as Victoria's North and Murray Water Resource Plan only includes rules on rights to take water that ensure that entitlement holders comply with the conditions of their entitlements (see response to section 10.08(2) of the Basin Plan), nothing in Victoria's North and Murray Water Resource Plan compromises the meeting of environmental watering requirements. On that basis it is not considered that rules are necessary to ensure the operation of Victoria's North and Murray Water Resource Plan and would compromise the meeting of environmental watering requirements. Table 12-4 in Victoria's North and Murray Comprehensive Report outlines the existing arrangements under the Victorian Water Act and in statutory management plans that align with the requirements for Part 4 of Chapter 10 of the Basin Plan.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10.19(1)	A water resource plan must be prepared having regard to whether it is necessary for it to include rules which ensure that, for groundwater that has a significant hydrological connection to surface water, the operation of the plan does not compromise the meeting of environmental watering requirements (for example, base flows).	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	See discussion in Column 5 in response to section 10.17 of the Basin Plan in Victoria's North and Murray Index Table for a discussion on environmental watering requirements. See also the response in Column 3 and Column 5 to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table. The response to section 10.26(1) of the Basin Plan outlines how baseflows are considered in environmental water. See also the discussion in response to section 10.17 of the Basin Plan relating to risks to the environment, environmental water and (PEAs) and (PEFs). Take and use licences are issued for the take and use of both unregulated surface water and groundwater. The considerations relating to the issue of a take and use licence under sections 40 and 53 of the Victorian Water Act apply to both surface water and groundwater licences. The matters identified in paragraphs (7)(c)(iv), (v) and (vi) and (7)(e) of Column 3 of Victoria's North and Murray Index Table in response to section 10.26(1) of the Basin Plan apply to groundwater and require licensing of groundwater to consider the impacts on surface water systems or groundwater dependent environmental assets. See discussion in Column 5 of this Index against section 10.17 of the Basin Plan for explanation of priority environmental assets (PEAs) and priority ecosystem functions (PEFs). Above cap water can also contribute to environmental objectives for (PEAs) (see Section 12.5.1 of Victoria's North and Murray Comprehensive Report) and (PEFs) (see Section 12.5.2 of Victoria's North and Murray Comprehensive Report) by requiring the use of less held environmental water that would otherwise be needed if the above cap water was not present. See response to section 10.26(1) of the Basin Plan for further information on above cap water.	
10.19(2)	Without limiting subsection (1), regard must be had to whether it is necessary for the water resource plan to include rules that specify: (a) the times, places and rates at which water is permitted to be taken from a groundwater SDL resource unit; and (b) resource condition limits, being limits beyond which the taking of groundwater will compromise the discharge of water into any surface water resource; and (c) restrictions on the water permitted to be taken (including the times, places and rates at which water may be taken) in order to prevent a resource condition limit from being exceeded.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	See response to section 10.05 of the Basin Plan in this Index for discussion of significant hydrological connections between surface water and groundwater in Victoria's North and Murray water resource plan area. See also discussion in Section 12.8.2 of Victoria's North and Murray Comprehensive Report. As identified above in relation to the response to sections 10.17 and 10.18 of the Basin Plan, for Victoria's North and Murray Water Resource Plan existing rules on rights to take water ensure that entitlement holders comply with the conditions of their entitlements (see response to section 10.08(2) of the Basin Plan), therefore nothing in this Plan compromises the meeting of environmental watering requirements. On that basis it is not considered that rules are necessary to ensure the operation of Victoria's North and Murray Water Resource Plan will compromise the meeting of environmental watering requirements. See the response to sections 10.17 and 10.18 of the Basin Plan in Column 5 for discussion on the types of existing rules identified to meet section 10.19(2) of the Basin Plan. The discussion applies here also. Further discussion of existing rules and arrangements is provided at Section 12.6 of Victoria's North and Murray Comprehensive Report. As discussed above for the response to section 10.18 of the Basin Plan, Ministerial Guidelines are in place that must be applied in decisions to issue or transfer (trade) a take and use licence for the taking of groundwater in the Goulburn-Murray water resource plan area. They require the Minister (or delegate) to: (a) undertake a risk assessment to determine the existence of high value ecosystems dependent on the relevant groundwater; (b) determine risk to the ecosystem dependent on groundwater where there is a significant connection between surface water and groundwater; (c) determine how risk will be managed.	

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10.19(3)	If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.	Victoria's North and Murray water resource plan area 1. This rule only applies where a management plan for a water supply protection area has not been approved under section 32A of the <i>Water Act 1989</i> (Vic) and where a significant hydrological connection between surface water and groundwater has been identified in the Goulburn-Murray water resource plan area and groundwater extraction has been identified as affecting surface water flow relating to a high value ecosystem: (a) the Minister must undertake a risk assessment to determine whether the issue of a groundwater take and use licence or transfer of groundwater take and use licence will have a medium or high risk of having an adverse impact on the high value ecosystem; (b) where a medium or high risk under paragraph (1) is identified, before issuing or approving the transfer a take and use licence for the take of groundwater the Minister must, in consultation with the relevant catchment management authority, consider whether conditions may be imposed on the take and use licence to modify: (i) the adverse consequences of the take (which may include pumping schedules, offsets, options for supplementing surface water flows); (ii) the adverse impact of the take (which may include reducing the entitlement volume or location of the bore). 2. Where a water supply protection area has been declared under section 27 of the <i>Water Act 1989</i> (Vic) the rule under (1) above does not apply. 3. Where a water supply protection area has been declared under section 27 of the <i>Water Act 1989</i> (Vic) the Minister may prepare guidelines under section 30 of the <i>Water Act 1989</i> (Vic) relating to the preparation of a draft statutory management plan for that declared area to require the consultative committee to consider the matters in paragraph (4) when developing a draft statutory management under section 31 of the <i>Water Act 1989</i> (Vic). 4. The guidelines may require the consultative committee to consider whether the draft statutory management plan should include prescriptions for groundwater management having regard to: (a) any significant hydrological connection between groundwater and surface water; and (b) any risk to meeting environmental watering requirements as a result of groundwater take in the area. 5. Prescriptions identified in accordance with paragraph (4) may include: (a) a requirement to undertake monitoring; (b) the period and frequency over which the monitoring should occur; (c) the locations at which monitoring should occur; (d) identified trigger levels to reflect when extraction would pose a risk to the aquifer; (e) restrictions that may be applied to the extraction of groundwater under a take and use licence and how the restrictions will be applied; (f) conditions on the transfer of take and use licences within or into the relevant water supply protection area.	Minister	The operation of this existing process is outlined in the <i>Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems</i> (Minister for Water, 2015). This takes a risk-based approach to identify where a proposed groundwater take may result in a threshold of impact at the boundary of a potential groundwater dependent ecosystem. It is applicable at all potential groundwater-dependent ecosystems, including PEAs. The analysis of PEAs in the Groundwater Logic (2018) study concluded that most of the PEAs across the Victorian Murray and Northern Victorian water resource plan area are classified as low risk from interventions to the groundwater system through excessive pumping deficiencies in existing resource management arrangements. The study found that no wetlands were classified above a "low" risk rating and only four river reaches were classified as being moderate to high risk GDEs, these being two Lower Ovens River reaches and two Broken Creek reaches. For these, however, there are management rules in place for the Lower Ovens River which identify a baseflow-related target for environmental watering; and the Broken Creek reaches are covered by local arrangements contained within the Shepparton Irrigation Region GMA Plan and the Katunga WSPA plan. This study concludes that "no further recommendations for managing effects on GDEs, other than those that are already in place under Victoria's existing water management framework are considered necessary" (Groundwater Logic 2018). The rule under (1) in Column 3 of Victoria's North and Murray Index Table in response to section 10.19(3) of the Basin Plan identifies a requirement to surface water flows in relation to PEAs and PEFs. See Section 12.8.4 of Victoria's North and Murray Comprehensive Report for further explanation about how Victoria manages significant connections between groundwater and surface water in relation to environmental watering. How these risks were considered in responding to Part 4 of Chapter 10 of the Basin Plan is discussed below in response to section 10.22(b) of the Basin Plan and in Section 12.9.2 of Victoria's North and Murray Comprehensive Report. See also Part 3.3.6 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report. Management instruments are developed in consultation with local stakeholders, customer groups, environmental representatives and relevant government agencies. Management plans are typically reviewed at least every 5 years, as monitoring information, groundwater level observations and other analyses provide better information for management purposes. These may suggest changes to management plans to improve resource management outcomes. These adaptive management approaches improve equitable and sustainable resource management. Table 12-4 in Victoria's North and Murray Comprehensive Report outlines the existing arrangements under the Victorian Water Act and in statutory management plans that align with the requirements for Part 4 of Chapter 10 of the Basin Plan. No rules have been included in response to section 10.28 of the Basin Plan as the requirements under section 10.09 and 10.28 operate to ensure that there is no net reduction to the protection of planned environmental water. Section 10.19 of the Basin Plan requires that the water resource plan ensure the operation of the plan does not compromise the meeting of environmental watering requirements where there are significant hydrological connections between surface water and groundwater. The identification of environmental watering requirements is done separately from the identification and protection of water for the environment. On this basis no rules are required for the purposes of section 10.28 of the Basin Plan in response to section 10.19 of the basin Plan.

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		6. In considering a draft statutory management plan under section 32A of the <i>Water Act 1989</i> (Vic), the Minister must consider whether the prescriptions included in the draft plan address the types of risks referred in paragraph (4) if identified for the water supply protection area relevant to the draft plan. 7. References to sections of the <i>Water Act 1989</i> (Vic) do not have the purpose of including those sections as part of the response but are included for reference only. Note 1: For environmental watering obligations and requirements see the response in Column 3 to section 10.26 of the Basin Plan in Victoria's North and Murray Index Table and the supplementary material discussed in Column 5. Note 2: see response to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table for a discussion of environmental watering arrangements in Victoria.		

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10.20(1)	A water resource plan must be prepared having regard to whether it is necessary for it to include rules which ensure that the operation of the plan does not compromise: (a) the overall structural integrity of the aquifer (whether within or outside the water resource plan area) arising from take within the long-term annual diversion limit for an SDL resource unit; or (b) the overall hydraulic relationships and properties between groundwater and surface water systems, between groundwater systems, and within groundwater systems.	Victoria’s North and Murray water resource plan area No accredited text needed for a requirement to ‘have regard to’. Explanation of how regard was had is in Column 5.	n/a	Section 10.20 of the Basin Plan does not apply to surface water and therefore only applies to the Goulburn–Murray water resource plan area within Victoria’s North and Murray Water Resource Plan. See discussion in Column 5 of this Index for response to sections 10.17, 10.18 and 10.19 of the Basin Plan regarding types of rules on existing licences. The information contained in those responses applies to the response to section 10.20 of the Basin Plan. In assessing whether rules were required in Victoria’s North and Murray Water Resource Plan to ensure structural integrity of an aquifer or hydraulic relationships between surface water and groundwater are not compromised by the operation of this Plan, other components of the Plan were considered. As Victoria’s North and Murray Water Resource Plan only includes rules on rights to take water that ensure that entitlement holders comply with the conditions of their entitlements (see response to section 10.08(2) of the Basin Plan), nothing in this Plan compromises structural integrity of an aquifer or hydraulic relationships between surface water and groundwater. On that basis it is not considered that rules are necessary to ensure the operation of Victoria’s North and Murray Water Resource Plan will not compromise the meeting of environmental watering requirements. There are, however, circumstances where local risks to structural integrity of an aquifer or hydraulic relationships between surface water and groundwater may arise because of circumstances outside the operation of Victoria’s North and Murray Water Resource Plan. Areas potentially at risk are primarily where drawdown and de-watering may lead to changes in the structure of the aquifer or hydraulic gradients. Where a risk is identified is because the distribution or volume of entitlement in an area may lead to a significant drawdown. These are areas where limits to drawdown are defined. In issuing a licence under section 51, the Minister (or delegate) is required to have regard to any adverse effects the licence is likely to have on existing users, a waterway or aquifer and the maintenance of the environmental water reserve (Victorian Water Act, section 40(1)(d)). As the risk of structural damage is low it is not considered necessary to include rules in Victoria’s North and Murray Water Resource Plan as existing arrangements are sufficient. See discussion in Column 5 of Victoria’s North and Murray Index Table in response to sections 10.18 and 10.19 of the Basin Plan regarding surface water and groundwater connections. The rule developed in response to section 10.20(3) of the Basin Plan addresses the requirement in section 10.21 of the Basin Plan. In order to support consistent management of water resources across the Goulburn–Murray water resource plan area the proposed rule in response to section 10.21 of the Basin Plan for the Goulburn–Murray: Sedimentary Plain SDL resource unit has been included in Victoria’s North and Murray Water Resource Plan in response to section 10.20(3) of the Basin Plan so that it applies to all SDL resource units in the Goulburn–Murray water resource plan area. On that basis, the rule in response to section 10.20(3) of the Basin Plan meets the objectives of section 10.20 and allows Victoria to adaptively respond to resource management issues without requiring amendment to Victoria’s North and Murray Water Resource Plan. The rule provided in response to section 10.20(2) of the Basin Plan in Victoria’s North and Murray Water Resource Plan reflects and supports arrangements in place in the following statutory management plans prepared for water supply protection areas in Goulburn–Murray water resource plan area. The relevant plans are:	
10.20(2)	Without limiting subsection (1), regard must be had to whether it is necessary for the water resource plan to include rules that specify: (a) the times, places and rates at which water is permitted to be taken from a groundwater SDL resource unit; and (b) any zones in the water resource plan area where continued groundwater extraction will result in a long-term decline in groundwater levels; and (c) measures to prevent any long-term decline in groundwater levels in that zone, except where the groundwater is a non-renewable groundwater resource; and (d) for a non-renewable groundwater resource—the planned rate of decline in groundwater levels and the anticipated groundwater levels after 50 years from the commencement of the water resource plan; and (e) resource condition limits, being limits beyond which the taking of groundwater from the SDL resource unit will compromise the objectives in paragraphs (1)(a) and (b); and (f) restrictions on the water permitted to be taken (including the times, places and rates at which water may be taken) in order to prevent a resource condition limit from being exceeded.	Victoria’s North and Murray water resource plan area No accredited text needed for a requirement to ‘have regard to’. Explanation of how regard was had is in Column 5.	n/a	See discussion in Column 5 of Victoria’s North and Murray Index Table in response to sections 10.18 and 10.19 of the Basin Plan regarding surface water and groundwater connections. The rule developed in response to section 10.20(3) of the Basin Plan addresses the requirement in section 10.21 of the Basin Plan. In order to support consistent management of water resources across the Goulburn–Murray water resource plan area the proposed rule in response to section 10.21 of the Basin Plan for the Goulburn–Murray: Sedimentary Plain SDL resource unit has been included in Victoria’s North and Murray Water Resource Plan in response to section 10.20(3) of the Basin Plan so that it applies to all SDL resource units in the Goulburn–Murray water resource plan area. On that basis, the rule in response to section 10.20(3) of the Basin Plan meets the objectives of section 10.20 and allows Victoria to adaptively respond to resource management issues without requiring amendment to Victoria’s North and Murray Water Resource Plan. The rule provided in response to section 10.20(2) of the Basin Plan in Victoria’s North and Murray Water Resource Plan reflects and supports arrangements in place in the following statutory management plans prepared for water supply protection areas in Goulburn–Murray water resource plan area. The relevant plans are: - Katunga Water Supply Protection Area Management Plan which applies to the Goulburn–Murray: Sedimentary Plains and Goulburn–Murray: deep SDL resource units. https://www.g-mwater.com.au/water-resources/ground-water/management/katungawspa - Lower Campaspe Valley Water Supply Protection Area Groundwater Management Plan which applies to the Goulburn–Murray: Highlands, Goulburn–Murray: Sedimentary Plains and Goulburn–Murray: deep SDL resource units. https://www.g-mwater.com.au/water-resources/ground-water/management/lowercampaspevalleywspa	

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10.20(3)	If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. No rules are necessary for Victoria's North (surface water) water resource plan area as rules to manage to manage hydraulic relationships and properties are included in Victoria's North and Murray Water Resource Plan to apply to the Goulburn-Murray water resource plan area. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. - The Minister may prepare guidelines under section 30 of the <i>Water Act 1989</i> (Vic) for the preparation of a draft statutory management plan for an area declared under section 27 of the <i>Water Act 1989</i> (Vic) to require the consultative committee to consider the matters in paragraph (2) when developing a draft statutory management under section 31 of the <i>Water Act 1989</i> (Vic). - The guidelines may require the consultative committee to consider whether the draft statutory management plan should include prescriptions for groundwater management having regard to: - the risk to the structural integrity of the aquifer because of the level of take in the area; - the risk to maintaining the hydraulic relationships and properties between groundwater and surface water systems, between groundwater systems and within groundwater system within the area. - Prescriptions identified in accordance with paragraph (2) may include: - a requirement to undertake monitoring; - the period and frequency over which the monitoring should occur; - the locations at which monitoring should occur; - identified trigger levels to reflect when extraction would pose a risk to the aquifer; - restrictions that may be applied to the extraction of groundwater under a take and use licence and how the restrictions will be applied. - In considering a draft statutory management plan under section 32A of the <i>Water Act 1989</i> (Vic), the Minister must consider whether the prescriptions included in the draft plan address the types of risks referred in paragraph (2) if identified for the water supply protection area relevant to the draft plan. - References to sections of the <i>Water Act 1989</i> (Vic) do not have the purpose of including those sections as part of the response but are included for reference only.	Minister	- Loddon Highlands Water Supply Protection Area Groundwater Management Plan which applies to the Goulburn-Murray: Highlands, Goulburn-Murray: Sedimentary Plains and Goulburn-Murray: deep SDL resource units. https://www.g-mwater.com.au/water-resources/ground-water/management/loddonhighlandswspa - Upper Owens River Water Supply Protection Area Water Management Plan which applies to the Goulburn-Murray: Highlands, Goulburn-Murray: Sedimentary Plains and Goulburn-Murray: deep SDL resource units. https://www.g-mwater.com.au/water-resources/ground-water/management/upperovenswsipa Each Water Supply Protection Area Plan includes review and reporting requirements. For example, the Upper Owens River WSPA Management Plan is subject to annual reporting and a five-year review to assess whether the prescriptions in place are achieving the relevant objectives. The 2018 annual reports for each of the above plans can be found at the above links. Statutory management plans are supported by the Victorian Water Act. Section 32A of the Victorian Water Act sets out what a management plan may relate to and the matters which may be prescribed. It also provides an offence for the contravention of a management plan. See Section 12.8.5 of Victoria's North and Murray Comprehensive Report for more information regarding the response to section 10.20 of the Basin Plan. In respect of the matters outlined in section 10.20(2), the following is noted: - For 10.20(2)(a) - As discussed above in response to section 10.17, 10.18 and 10.19 of the Basin Plan conditions relating to time, place and rate of take on the authorisation to take groundwater from an aquifer are fundamental to Victoria's entitlement framework, for this reason it is not considered appropriate to include rules to that effect in Victoria's North and Murray Water Resource Plan. - For 10.20(2)(b)-(f) – consideration of resource condition limits are fundamental to Victoria's licencing framework. As identified in section 53 (which also links to section 40) of Victoria's Water Act the Minister (or delegate) must consider the resource condition limit, or any permissible consumptive cap set for the resource. Equally the Minister (or delegate) must consider the adverse impact the take or use of water may have on an aquifer. This includes consideration of any potential for long-term declines in the resource. Additionally, the rule proposed which requires consideration and management of risks to structural integrity of an aquifer includes requires to monitor the resource and identify when restrictions should be imposed on extraction to address this issue In addition to the measures outlined above as discussed in response to Part 8 of Chapter 10 of the Basin Plan in respect of groundwater trade, impacts of extraction on groundwater levels are also considered when applications are made for the transfer (trade) of a take and use licence authorising the take of groundwater. This assessment also informs decisions to issue a new entitlement. A more detailed hydrogeological resource assessment is undertaken in support of the development of statutory management plan for a declared water supply protection area. See discussion in Column 5 of Victoria's North and Murray Index Table in response to section 10.41(2)(b) of the Basin Plan for further information. See discussion of 'Temporal and spatial scale' in Part 1.2 of Appendix B to Victoria's North and Murray Comprehensive Report. Table 12-4 in Victoria's North and Murray Comprehensive Report outlines the existing arrangements under the Victorian Water Act and in statutory management plans that align with the requirements for Part 4 of Chapter 10 of the Basin Plan.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.21(1)	A water resource plan for the NSW Murray-Darling Basin Porous Rock water resource plan area must, in relation to the Western Porous Rock, Gunnedah-Oxley Basin MDB and Sydney Basin MDB SDL resource units, include rules that are designed to ensure that the objectives set out in the following provisions are met: (a) section 10.18; (b) section 10.19; (c) section 10.20.	Victoria’s North and Murray water resource plan area This matter is not relevant to Victoria’s North and Murray Water Resource Plan.	n/a	No rules are necessary to prevent the matters described in section 10.21(1) of the Basin Plan. This requirement only applies to the Western Porous Rock, Gunnedah-Oxley Basin MDB and Sydney Basin MDB SDL resource units.
10.21(2)	A water resource plan for the Goulburn-Murray water resource plan area must, in relation to the Goulburn-Murray: Sedimentary Plain SDL resource unit, include rules that are designed to ensure that the objective set out in section 10.20 is met.	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. 1. Restrictions on taking groundwater and the granting or transfer of licences for the taking of groundwater in the Goulburn-Murray: Sedimentary Plain SDL resource unit must be informed by any resource condition limit specified in a statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) for a water supply protection area declared under section 27 of the <i>Water Act 1989</i> (Vic). 2. See also the response to section 10.20(3) of the Basin Plan above for rules that apply to the groundwater resources in the Goulburn-Murray water resource plan area including Goulburn-Murray: Sedimentary Plain SDL. 3. References to sections of the <i>Water Act 1989</i> (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only.	n/a	In determining what rule should apply to meet the requirements of section 10.21(2) of the Basin Plan, consideration was given as to whether the rule should equally apply to the other SDL resource units in the Goulburn-Murray water resource plan area. On this basis the response to section 10.21(2) of the Basin Plan was applied as the response to section 10.20(3) of the Basin Plan to ensure consistent water resource management across all SDL resource units in the Goulburn-Murray water resource plan area. For a list of relevant statutory management plans already in place in the Goulburn-Murray: Sedimentary Plain SDL resource unit see the information contained in Column 5 for the response to section 10.20. In respect of those statutory management plans, resource condition limits for the purpose of section 10.21(1) of the Basin Plan include prescriptions in these plans relating to permissible consumptive volumes, trigger levels and restrictions, intensity rules and trade zone limits rules. Table 12-4 in Victoria’s North and Murray Comprehensive Report outlines the existing arrangements under the Victorian Water Act and in statutory management plans that align with the requirements for Part 4 of Chapter 10 of the Basin Plan.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.22(a)	A water resource plan must: (a) describe what was done to comply with the requirements in this Part; and	Victoria's North and Murray water resource plan area 1. In order to comply with this Part, each section of Part 4 was considered in the context of Victorian water resource management arrangements. Regard was had to the following: (a) the operation of Victoria's North and Murray Water Resource Plan and any potential impact on the ability of Victoria to meet its environmental watering requirements referred to in Part 4 of Chapter 10 of the Basin Plan (b) environmental watering requirements and objectives in regulated surface water systems to assess whether Victoria's environmental water was sufficient to meet environmental watering requirements and objectives as outlined in Victoria's environmental water management plans (c) the location of connections between surface water and groundwater as identified in Column 3 of Victoria's North and Murray Index Table in response to section 10.05(b) of the Basin Plan in relation to priority environmental assets and priority ecosystem functions in regulated surface water systems as outlined in Column 5 of Victoria's North and Murray Index Table in response to section 10.18 of the Basin Plan (d) the impact of groundwater use on priority environment assets and priority ecosystem functions as outlined in Column 5 of Victoria's North and Murray Index Table in response to section 10.18 of the Basin Plan (e) existing water resource management arrangements underpinning Victoria's entitlement regime as outlined Column 3 of Victoria's North and Murray Index Table in response to section 10.26(1) of the Basin Plan and explained in column 5 of that response (f) existing statutory management plans in place for declared water supply protection areas to determine whether existing measures are appropriate to respond to any identified risks to meeting environmental watering requirements. 2. Rules were included in response to the matters identified in sections 10.17 to 10.21 of the Basin Plan. A description of how this was considered is outlined in Column 5 of Victoria's North and Murray Index Table. 3. There is nothing in Victoria's North and Murray Water Resource Plan that will compromise the meeting of environmental watering objectives in Victoria's North and Murray water resource plan area. This is because environmental watering requirements will be met through the operation of the response to section 10.26(1) of Victoria's North and Murray Water Resource Plan.	n/a	The response to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table outlines how environmental watering occurs in Victoria's North and Murray water resource plan area. Part 4 of the Basin Plan requires consideration of Victoria's environmental watering requirements. Victoria's water corporations manage water resources and access to water to ensure that all users in the system are supported, including the VEWH. Annual watering priorities and relevant environmental watering requirements are reflected in the VEWH's seasonal watering plan, which is available on the VEWH website. This strategy for annual watering reflects the requirements of meeting long term watering requirements of environmental assets (priority environmental assets and priority ecosystem systems). The storage manager makes the releases of held environmental water on request by the VEWH. The storage manager works with VEWH to maximise the benefits of this water by providing VEWH with information on other releases to be made to meet the needs of other entitlement holders or passing flow requirements so VEWH can make release decisions to achieve maximum environmental benefits. MDBA has advised in its opinion, that Victoria's Long-Term Watering Plans (LTWPs) for Victorian Murray water resource plan area and the Northern Victoria water resource plan area do not adequately describe long-term watering requirements for Victoria's priority environmental assets and priority ecosystem functions. Therefore, Victoria's Environmental Water Management Plans (EWMPs) are identified as establishing environmental watering requirements for the purposes of Victoria's North and Murray Water Resource Plan. These EWMPs contain the long-term environmental watering requirements for each priority environmental asset identified for Victoria's North and Murray water resource plan area. EWMPs are not prepared for ecosystem functions and therefore Victoria relies on its long-term watering plans for this purpose. Following accreditation of Victoria's North and Murray Water Resource Plan, the Northern Victoria and Victorian Murray LTWPs will be updated to more clearly outline long term watering requirements in accordance with requirements under Part 4 and Part 5 of Chapter 8 of the Basin Plan. Environmental watering requirements are based on (EWMPs). Appendix E to Victoria's North and Murray Comprehensive Report identifies the PEAs and PEFs in Victoria's North and Murray water resource plan area. Each PEA has a relevant EWMP. All of Victoria's (EWMPs) can be found at - https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/environmental-water/environmental-water-management-plans Since the (LTWPs) were prepared in 2015, the list of (PEAs) has undergone some changes. Reasons for the changes include: • An asset is not watered anymore (e.g. Beulah Weir Pool) • An asset (river) was erroneously included in the LTWP and cannot receive held environmental water (e.g. Mitta Mitta River, Kiewa River, Avon River, etc.) • An asset (wetland) was included in the LTWP as it could potentially be watered, however they have not been watered, however they have not been watered yet nor are there plans to begin watering (e.g. Golf Course Lake, Lower Ovens wetland complex and Lake Wandella) • As asset which receives PEW noting that the identification of the relevant PEW was still under negotiation when LTWPs were being finalised therefore was omitted from the list • New assets were added that can now receive held environmental water (e.g. Gaynors Swamp was not included in the PEA table in 2015 as it didn't have the infrastructure to receive water then) See discussion in Column 5 in response to section 10.17 of the Basin Plan in Victoria's North and Murray Index Table for a discussion on environmental watering requirements. See also the response in Column 3 and Column 5 to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table. The response to section 10.26(1) of the Basin Plan outlines how baseflows are considered in environmental water.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.22(b)	A water resource plan must: (b) if a risk of a kind referred to in subsection 10.41(1) has been identified in relation to the water resources of the water resource plan area—explain why rules addressing the risk have or have not been included in the plan.	Victoria’s North and Murray water resource plan area - Rules have been included in response to sections 10.18, 10.19, 10.20 and 10.21 of the Basin Plan in response to the requirements of those sections. For the risks identified as medium or high in response to section 10.41(1) of the Basin Plan in respect of the matters identified in sections 10.17, 10.18, 10.19 and 10.20 of the Basin Plan rules have not been included to ensure Victoria’s North and Murray Water Resource Plan can remain adaptable to localised risks and respond to changing conditions over the life of the Plan. Column 5 of Victoria’s North and Murray Index Table in response to those sections sets out why rules have or have not been included. - As set out in Column 5 of Victoria’s North and Murray Index Table in response to sections 10.17-10.21 of the Basin Plan, additional rules of the kind listed in Part 4 were not considered necessary because in most cases, the risks referred to in s 10.41(1) are effectively managed to a low rating by the existing rules and management arrangements in place. - No rules have been identified to address climate change risks identified in response to section 10.41(1) of the Basin Plan. Strategies to address climate change risks have been identified in Victoria’s North and Murray Risk Assessment Report at Appendix B to Victoria’s North and Murray Comprehensive Report. Rules were not considered necessary to address any low risks identified in Table 2.11 (Northern Victoria water resource plan area), Table 2.21 (Goulburn-Murray water resource plan area) and Table 2.31 (Victorian Murray water resource plan area). - The rules identified in response to sections 10.18 and 10.19 are considered sufficient to respond to consequences of risks arising from changes to the timing and location of demand. Additional rules are not considered necessary in addition to the strategies identified in relation to these risks in Victoria’s North and Murray Risk Assessment Report at Appendix B to Victoria’s North and Murray Comprehensive Report. - Reference to Column 5 of Victoria’s North and Murray Index Table does not have the effect of importing the sections referenced into the accredited material but are included for reference only.	n/a	This requirement is met as the text in Column 3 of this row describes what was done to respond to the requirements of Part 4 of Chapter 10 of the Basin Plan. The reasons why rules were not considered necessary are outlined in response to each specific subsection of Part 4 of Chapter 10 of the Basin Plan. Consideration was given to each matter in Part 4 in the context of Victoria’s water resource management framework in accordance with section 55 of the Commonwealth Water Act, which requires regard to be had to the legislative framework within which the water resource plan operates. See discussion in Column 5 of Victoria’s North and Murray Index Table in response to sections 10.17 to 10.20 of the Basin Plan. The explanation to support the response to Part 4 requirements are set out in Column 5 of Victoria’s North and Murray Index Table for each section of Part 4 of Chapter 10 of the Basin Plan. A summary of specific risks to: - priority environmental assets provided in Table 5-5 and Table 5-8 - environment and environmental watering in respect of water availability are summarised in Section 5.3.1 and Section 5.4.1 and Table 5-3 and Table 5-6 - environment and environmental watering in respect of water condition are summarised in Section 5.3.2 and Section 5.4.2 and Table 5-4 and Table 5-7 of Victoria’s North and Murray Comprehensive Report. Consideration of environmental assets under the risk assessment was done with reference to existing EWMs and reflect the PEAs listed in Appendix E to Victoria’s North and Murray Comprehensive Report. As a result of the implementation of the Basin Plan and the changing uses of water, an increased risk relating to inter-valley transfers was considered during the development of Victoria’s North and Murray Water Resource Plan. This is a change to the risk considerations for “changes to the timing and location of demand” which resulted in high risks being identified. Measures have been included in Appendix B to Victoria’s North and Murray Comprehensive Report in response to these risks to support continued review of the issue and mitigation or management of the risks as they arise. Where risks to the condition of waterways and systems (including adverse environmental impacts) occur the current mechanism under Victoria’s Water Act is to prepare statutory management plans. Matters under section 40 always apply to consider third party impacts and environmental impacts when making decisions about approving new, amending or transferring (trade) water access rights. On this basis the rules proposed in response to Part 4 of Chapter 10 of Basin Plan are sufficient. Victoria’s North and Murray Water Resource Plan will be reviewed in response to any policy or regulatory changes in response to impacts relating to inter-valley transfers. Until such time as the matter is investigated further and appropriate mechanisms directly addressing the issue are identified, rules specific to the issue of inter-valley transfers will not be included in Victoria’s North and Murray Water Resource Plan. The application of strategies 5, 9, 10, 11, 23, 32 and 33 will support further investigation and identification of treatments for inter-valley transfer risks. Risks relating to uncontrolled water or above cap water (in this instance above cap does not include system water as that was assessed separately given its higher reliability) and the relevant risks to that water are identified in Table 5-3 and Table 5-6 in Victoria’s North and Murray Comprehensive Report. See Column 5 for an outline of the different components of Victoria’s North and Murray Risk Assessment Report at Appendix B. See Table 1.3.1 of Appendix B to Victoria’s North and Murray Comprehensive Report for an outline of how the matters under sections 10.17, 10.18, 10.19 and 10.20 of the Basin Plan were considered in the Risk Assessment. The tables provided in Part 3.2, Part 3.3 and Part 3.4 of Appendix B to Victoria’s North and Murray Comprehensive Report provide a description of risks and describe the causes, threats and impact of users/use types. The requirement under section 10.22(b) of the Basin Plan is met as Victoria’s North and Murray Risk Assessment Report contained at Appendix B to Victoria’s North and Murray Comprehensive Report identifies all risks relevant to Victoria’s North and Murray water resource plan area and strategies to manage or mitigate the medium and high risks. The appropriate approach to managing climate change risks is through Victoria’s water resource management framework that includes:

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
				- the periodic review of regional catchment strategies required by Division 1 of Part 4 of the <i>Catchment and Land Protection Act 1994</i> (Vic); - regional sustainable water strategies required by Division 1B of Part 3 of the Victorian Water Act; - long-term water resource assessments required by Division 1C of Part 3 of the Victorian Water Act; - regional waterway strategies required by the Victorian Water Act (section 190); - planning duties of the VEWH required by Division 5 of Part 3AA of the Victorian Water Act. Temporary qualifications by nature involve a temporary change in water sharing arrangements in a given system and generally reduce one user's or class of users' rights to water to provide more water to another user or class of user. For example, a temporary qualification of rights may involve temporarily increasing an urban water corporation's access to water in a waterway for urban supplies by reducing the required minimum passing flows downstream of the relevant harvesting point, which is a condition of the urban water corporation's bulk entitlement. Another qualification may involve temporarily reducing rural water users' access to water in one system to increase an urban water corporation's access to water in another connected system. The arrangements will apply for a determined period of time.	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 5	Interception activities			
10.23(1)	A water resource plan must, having regard to the risk identification and assessment conducted for section 10.41, specify whether there are any types of interception activity in the water resource plan area which have the potential to have a significant impact on: (a) the water resources of the water resource plan area; or (b) water resources which are hydrologically connected to the water resources of the water resource plan area; whether on an activity-by-activity basis, or cumulatively.	Victoria's North and Murray water resource plan area No interception activity has been identified to have a significant impact, nor to have the potential to have a significant impact, on water resources that are in or are hydrologically connected to the Victoria's North and Murray water resource plan area.	n/a	The requirement to specify interception activities with a potential to have significant impact on water resources or connected water resources is met as the accredited text explains that no such interception activity is identified. Victoria's North and Murray Risk Assessment identified medium and high risks arising from interception by runoff dams and interception by commercial plantations, however these risks were based on information that has been superseded since the completion of the Risk Assessment. Of the types of interception activities specified in the note to section 10.23 of the Basin Plan, none are expected to have a significant impact on the water resources of Victoria's North and Murray water resource plan area. Floodplain harvesting is not relevant to Victoria's North and Murray water resource plan area as it is not permitted in the area. Take under this form of take would fall within the Victorian entitlement framework and therefore would be managed within the SDL as with other forms of take. Floodplain harvesting is not currently undertaken in the Plan area and would not be permitted without a take and use licence for the take or diversion of water. Interception by runoff dams is expected to have modest growth over the next 10 years but the additional take as a result of that growth cannot be accurately estimated. Any additional take is expected to be small and is unlikely to have a significant impact on water resources. Take by runoff dams (excluding basic rights) is 84GL and all take by runoff dams under basic rights is 85GL. As identified in Victoria's North and Murray Comprehensive Report at Section 11.4.1.5, it is estimated that the capacity of runoff dams across the Northern Victoria water resource plan area could increase by 113GL over 10 years based on a conservatively high estimate of 0.55% rate of growth. Victoria's North and Murray Risk Assessment Report (see Appendix B of Victoria's North and Murray Comprehensive Report) identified a medium to very low risk associated with growth in runoff dams during the period to 2029. However, the risk was based on information that has been superseded by modelling work that occurred after the completion of the risk assessment. Victoria proposes to update the risk assessment for runoff dams when the uncertainty associated with estimates of take can be reduced. See Part 3.2.7, Part 3.3.7 and Part 3.4.7 of Appendix B to Victoria's North and Murray Comprehensive Report. A comparison of the figures used for the Risk Assessment in Appendix B and the revised figures is provided in Section Table 11-7 (Victorian Murray water resource plan area) and Table 11-8 (Northern Victoria water resource plan area) in Victoria's North and Murray Comprehensive Report. Interception by commercial plantations is not expected to grow in the next 10 years and therefore there will be no additional impact on water resources. This is discussed further at Section 11.4.3.1 of the Comprehensive Report. See Part 3.2.7, Part 3.3.7 and Part 3.4.7 of Appendix B to Victoria's North and Murray Comprehensive Report. As identified in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report in respect of the method for determining permitted and actual net take for commercial plantations, estimates are based on information obtained from the industry on a yearly basis. The estimate for net take by commercial plantation will be reviewed every 10 years or earlier if a significant shift in the industry is identified earlier. There are currently no mining activities in Victoria's North and Murray water resource plan area that intercept significant volumes of water. Take of water through mining activities is considered a form of take that would be subject to authorisation within Victoria's entitlement framework. On this basis it if mining activities intercepted water (by way of take or diversion) within Victoria's North and Murray water resource plan area it would be subject to a take and use licence and therefore managed within the SDL as with other forms of take. As identified in Section 11.3.3 of Victoria's North and Murray Comprehensive Report risks were identified with respect to earth resource development however they were identified as localised risks and did not have the potential to have a significant impact on the water resources of Victoria's North and Murray water resource plan area or water resources of connected water resource plan areas. See Section 11.4 of Victoria's North and Murray Comprehensive Report for discussion on potential interception in Victoria's North and Murray water resource plan area.

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10.23(2)	If there are any such types of interception activity, the water resource plan must list those types.	Victoria's North and Murray water resource plan area This requirement is not relevant to Victoria's North and Murray water resource plan area as no types of interception activity are identified in response to section 10.23(1) of the Basin Plan.	n/a	
10.23(3)	For the purpose of determining whether a type of interception activity is of the kind referred to in subsection (1), regard must be had to the following factors: (a) the location of particular activities of that type in the water resource plan area; (b) the impact of the type of activity on the availability of: (i) the water resources of the water resource plan area; and (ii) any water resources which are hydrologically connected to the water resources of the water resource plan area; (c) the projected growth of the type of activity over the period for which the water resource plan will have effect.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	The requirement to have regard to these factors is met as regard was given through the risk assessment, which considered the risk associated with scenarios regarding growth in runoff dams, commercial plantations, and mining activities. Floodplain harvesting was not considered as it is currently not permitted in the water resource plan area. This requirement includes factors relating to spatial extent, magnitude, connectivity, and growth for each of the interception activities. In each case, the risk assessment specifically examined the growth of each interception activity, along with the spatial distribution, magnitude, and duration of the impact on the hydrologically connected water resources of the water resource plan area. See Section 11.2 of Victoria's North and Murray Comprehensive Report for a summary of the risks identified in Victoria's North and Murray Risk Assessment. See Appendix B for the full Risk Assessment Report.
10.24	If a water resource plan includes a list of the kind referred to in subsection 10.23(2), the plan must set out, in respect of each type of interception activity listed, a process for monitoring the impact of that type of activity on: (a) the water resources of the water resource plan area; and (b) water resources which are hydrologically connected to the water resources of the water resource plan area.	Victoria's North and Murray water resource plan area This requirement is not relevant as no types of interception activity are listed under section 10.23(2) of the Basin Plan.	n/a	The requirement to set out a monitoring process for any interception activities listed under section 10.23(2) of the Basin Plan is met as there are no such activities listed. Victoria will review the impacts of runoff dams and any risks they pose to water resources as part of: - the Northern Region Sustainable Water Strategy under the Victorian Water Act - the Long-Term Water Resource Assessment under the Victorian Water Act - Action 8.4 of Water for Victoria (DELWP, 2016) which commits to better monitoring and reporting on the effects of emerging water uses on other uses in the Victorian Water Accounts. These processes will provide opportunities to review and improve hydrological understanding of runoff dams, as well as opportunities to consult stakeholders and communities about risks posed by runoff dams and possible mitigation measures.
10.25(1)	A water resource plan must identify actions that will be taken in the event that monitoring under section 10.24 shows that: (a) an impact of a type of interception activity compromises the meeting of an environmental watering requirement; or (b) an impact of several types of activity together compromises the meeting of an environmental watering requirement; or (c) there is an increase in the quantity of water being intercepted by a type of activity; after the commencement of the water resource plan.	Victoria's North and Murray water resource plan area This requirement is not relevant to Victoria's North and Murray water resource plan area as no interception activities were identified in response to section 10.23 of the Basin Plan and therefore no monitoring was identified in response to section 10.24 of the Basin Plan.	n/a	The requirement to identify actions that will be taken in light of section 10.24 of the Basin Plan is met as no such monitoring is relevant under section 10.24. Additionally, relevant outcomes in paragraphs (a), (b) and (c) are accounted for by the method described under section 10.10(1) of the Basin Plan.
10.25(2)	Subsection (1) does not apply if the relevant outcome in paragraph (1) (a), (b) or (c) is accounted for by the method under subsection 10.10(1).	Victoria's North and Murray water resource plan area This requirement informs the response to section 10.25(1) of the Basin Plan.	n/a	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 6	Planning for environmental watering			
10.26(1)	A water resource plan must provide for environmental watering to occur in a way that: (a) is consistent with: (i) the environmental watering plan; and (ii) the Basin-wide environmental watering strategy; and (b) contributes to the achievement of the objectives in Part 2 of Chapter 8.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. Environmental watering under Water Act 2007 (Ctn) is the delivery or use of environmental water to achieve environmental outcomes. 2. Under the <i>Water Act 1989</i> (Vic) environmental objectives – including contributing to the objectives of Chapter 8 of the Basin Plan – are supported in Victorian regulated and unregulated systems through a whole of system management approach (being more than the use of held environmental water and planned environmental water) which includes: (a) prohibiting the take of water that is “above cap” as it is an offence to take water without authorisation; (b) the issue of entitlements below a resource condition limit or extraction cap that includes consideration of the volume of water to be taken under basic rights; (c) using environmental entitlements held by the Victorian Environmental Water Holder to ensure water is delivered to identified priority environmental assets or for priority ecosystem functions and to support specified flows; (d) waterway management by the relevant catchment management authority in accordance with its functions under Part 10 of the <i>Water Act 1989</i> (Vic); (e) management of all entitlements in the system including managing the flow of water and timing of delivery and take of water in systems by water corporations. 3. Under the Victorian environmental framework, environmental benefits are achieved through held environmental water, planned environmental water and other water in the system (including ‘above cap’). Under existing definitions of Basin Plan, it is difficult to align Victoria's framework with the definition for planned environmental water.	n/a	This requirement is met as the text in Column 3 of this row creates an obligation to undertake environmental watering in the manner required by section 10.26(1) of the Basin Plan. Environmental watering specifically relates to the use and delivery of held environmental water and planned environmental water as defined under the Commonwealth Water Act. The VEWH is the Victorian body responsible for managing environmental watering and causing the delivery of held environmental water in consultation with CEWH and CMAs. VEWH works closely with CMAs and storage managers and, where practical, will seek opportunities to adjust the timing and route for delivery of consumptive water to achieve environmental objectives efficiently. This may include ‘piggy-backing’ delivery of environmental water on consumptive water or passing or minimum flow obligations, to maximise ecological outcomes. How environmental watering is supported by other water in the system is outlined in Section 12.4.3 of Victoria's North and Murray Comprehensive Report. While VEWH works with CMAs and storage managers, ultimate responsibility for determining how HEW is used to meet environmental objectives and outcomes rests with the VEWH in accordance with any rules determined by the Minister. The principal management entities responsible for environmental watering are outlined in Section 12.3 of Victoria's North and Murray Comprehensive Report. State environmental water planning is outlined in Section 12.6 of Victoria's North and Murray Comprehensive Report and provides an explanation of how environmental watering occurs under each of the key Victorian environmental watering plans and strategies in a way that is consistent with the environmental watering plan and the Basin-wide environmental watering strategy and contributes to the objectives in Part 2 of Chapter 8 of the Basin Plan. Figure 12-6 in Section 12.6 of Victoria's North and Murray Comprehensive Report sets out how the Victorian environmental water planning and management framework relates to Commonwealth legislation and planning mechanisms. Section 12.8 of Victoria's North and Murray Comprehensive Report provides further information on priority environmental assets and priority ecosystem functions. How water is managed differently in regulated and unregulated systems is outlined in Section 12.4.1 of Victoria's North and Murray Water Resource Plans. Additionally, refer to the discussion in Chapter 7 regarding Victoria's entitlement framework. In regulated systems passing flows are established and controlled through conditions and rules on a bulk entitlement or environmental entitlement. In unregulated systems, bulk entitlements specify a maximum daily take determined by flow rates in the waterway measured at a specified point. These conditions limit when water can be taken and manage the effect on the waterway of this take, ensuring that water is not taken when the flow in the waterway is below a certain flow rate. However, it should be noted that as water in unregulated systems is not actively managed by regulating structures, when flows recede, although rules in the bulk entitlement restrict or prevent take from the waterway at these low flows, the rules cannot prevent flows from receding further. Above cap water is described in Section 7.2.2.4 and Section 12.4.3.1 of Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		4. The use of held and planned environmental water in Victoria is enhanced through the existence and protection of water in the system otherwise known as “above cap water”.	n/a	Take and use licences are issued for the take and use of both unregulated surface water and groundwater. The considerations relating to the issue of a take and use licence under sections 40 and 53 of the Victorian Water Act apply to both surface water and groundwater licences. The matters identified in paragraphs (7)(c)(iii), (iv), (v) and (vi) and (7) (f) of Column 3 of Victoria’s North and Murray Index Table in response to section 10.26(1) of the Basin Plan apply to groundwater and require the Minister (or delegate) when licensing of groundwater to consider the potential environmental impacts on surface water and groundwater systems in addition to potential impacts on groundwater dependent ecosystems. The material in Column 5 of Victoria’s North and Murray Index Table in response to Part 4 of the Basin Plan outlines how Victoria’s water resource management and licensing framework responds to risks and manages potential impacts on environmental watering and groundwater dependent ecosystems. The responses to sections 10.17, 10.18 and 10.19 of the Basin Plan work together with the responses to Part 6 of Chapter 10 of the Basin Plan in Victoria’s North and Murray Water Resource Plan to provide a holistic framework for supporting environmental watering of priority environmental assets and priority ecosystem functions to ensure Victoria can deliver on meeting Basin Plan environmental watering objectives as provided in Chapter 8 of the Basin Plan. How risks to environmental watering and priority environmental assets and priority ecosystem functions were considered and mitigated is summarised in Section 5.3.4 , Section 5.4.4 and Section 5.5 of Victoria’s North and Murray Comprehensive Report. The full Risk Assessment Report is provided at Appendix B to Victoria’s North and Murray Comprehensive Report. Further, a discussion of how these risks were considered is outlined in Column 5 of Victoria’s North and Murray Index Table in response to Part 4 of Chapter 10 of the Basin Plan, in particular in response to section 10.22(b) of the Basin Plan.
		5. For the purposes of Victoria’s North and Murray Water Resource Plan, “above cap water” is considered to be: (a) water that remains in the system after water is taken under a water access right (excluding basic rights) (b) water that remains in the system by virtue of setting minimum passing flows or establishing baseflows through conditions on a water access right or rules in statutory management plans (c) water that is subject to extraction under a basic right (despite this extraction being considered when determining resource conditions limits for setting caps on other entitlements) (d) water that is subject to extraction for a range of emergency purposes such as firefighting even where it does not meet the definition of “emergency” under statute (e) water that may be subject to other instream uses such as recreational or hydro-generation, but which contributes to the environment including supporting the meeting of environmental objectives under the Basin Plan.	n/a	
		6. This “above cap water” in regulated and unregulated systems provides multiple benefits under Victoria’s framework and includes the following (see also Notes 1 and 6): (a) provides base flows for delivery of water (consumptive and environment) including for instream use by fish farms or electricity generators for example; and (b) provides support for ongoing river health (including managing any water quality issues), and (c) supports environmental values and health of water ecosystems; and (d) provides a baseline which informs the setting of environmental watering objectives and watering requirements which are determined by the catchment management authorities. The availability of this water informs Victorian and Commonwealth environmental water holders’ decisions as to how held environmental water is utilised to meet objectives and requirements in Victoria’s North and Murray water resource plan area; and (e) support for instream use (does not include diversions from the system) by Traditional Owners (in support of outcomes identified in response to Part 14 of the Basin Plan) and recreational users.	n/a	Temporary qualifications by nature involve a temporary change in water sharing arrangements in a given system and generally reduce one user’s or class of users’ rights to water to provide more water to another user or class of user. For example, a qualification of rights may involve temporarily increasing an urban water corporation’s access to water in a waterway for urban supplies by reducing the required minimum passing flows downstream of the relevant harvesting point, which is a condition of the urban water corporation’s bulk entitlement. Another qualification may involve temporarily reducing rural water users’ access to water in one system to increase an urban water corporation’s access to water in another connected system. The arrangements will apply for a determined period of time.

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		7. The “above cap water” is protected by Victoria’s water resource management framework in the following way (see also Note 2): (a) the setting of resource condition limits under a permissible consumptive volume (PCV) under section 22A of the <i>Water Act 1989</i> (Vic) which limits the volume of water that can be issued under entitlements for consumptive use (can apply in regulated and unregulated systems). In Victoria’s North and Murray Water Resource Plan area this process is largely overtaken by the SDLs prescribed under the Basin Plan except where catchment specific limits need to be specified; and (b) requirements to impose conditions relating to the time, place and rate of take on authorisations to take water (applies in regulated and unregulated systems) (see Note 3); (c) requirements under sections 33J (water shares), 40 (bulk entitlements), 53 (take and use licences), of the <i>Water Act 1989</i> (Vic) to consider the following before issuing a water access right: (i) the permissible consumptive volume, if any; (ii) the existing and projected quality of water; (iii) any adverse effect the allocation or use of water will have on other users or a waterway or aquifer; (iv) the maintenance of the environmental water reserve in accordance with the environmental water reserve objective (v) the need to protect the environment, including the riverine and riparian environment; (vi) the proper management of the waterway and its surrounds or of the aquifer. (See Notes 4 and 7) (d) the setting and protection of minimum passing flows (i) in regulated systems, through requirements to deliver minimum passing flows as a condition of a bulk entitlement under section 43 of the <i>Water Act 1989</i> (Vic) or through a restriction on the take of water in a statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) for a water supply protection area declared under section 27 of the <i>Water Act 1989</i> (Vic) (ii) in unregulated systems, through restrictions on the take of water applied under a take and use licence or a condition of a bulk entitlement or through a restriction on the take of water in a statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) for a water supply protection area declared under section 27 of the <i>Water Act 1989</i> (Vic) (e) the establishment of the environmental water reserve under section 4A of the <i>Water Act 1989</i> (Vic) to ensure that water (including any above cap water identified as part of the environmental water reserve, planned environmental water or any held environmental water) within the reserve is managed to meet the long-term environmental objectives under section 4B of the <i>Water Act 1989</i> (Vic) (see Note 5); (f) the declaration of a water supply protection area under section 27 of the <i>Water Act 1989</i> (Vic) where there is an identified risk to surface water or groundwater, the area is then managed through prescriptions under a statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic).	n/a	

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		8. To meet the requirements of section 1026(1) of the Basin Plan, Victoria commits to the following obligations, column 4 of this row identifies the party responsible for meeting the relevant obligation outlined below:		
		(a) the Victorian Environmental Water Holder (VEWH) must, in the performance of its functions and the exercise of its powers, ensure that environmental watering occurs in a way that is consistent with the environmental watering plan and the Basin-wide environmental watering strategy and contributes to the achievement of the objectives in Part 2 of Chapter 8 of the Basin Plan. This does not prevent the VEWH from causing additional environmental watering to occur to meet local and Basin Plan environmental watering objectives.	VEWH	
		(b) in performance of its functions and the exercise of its powers, the VEWH must have regard the relevant Long-Term Watering Plan for the water resource plan area.	VEWH	
		(c) the Department must develop or amend the Long-Term Watering Plan for the relevant surface water plan area including establishing or updating environmental watering requirements for identified priority environmental assets and priority ecosystem functions in accordance with Chapter 8 of the Basin Plan and considering both regulated and unregulated surface water systems.	Department	
		9. In the management of minimum passing flows water corporations consider the take and use of water for domestic and stock purposes under section 8 of the <i>Water Act 1989</i> (Vic) by: (a) in a regulated system, establishing monitoring points along the system to measure passing flows and adjusting delivery of water to ensure passing flows are maintained after domestic and stock use is extracted; (b) in unregulated systems, assessing the volume of water that might be taken under section 8 of the <i>Water Act 1989</i> (Vic) in considering any trigger levels for restricting take under a take and use licence; (c) managing authorisations to install works on a waterway under section 67 of the <i>Water Act 1989</i> (Vic) which may include conditions that pumps are not constructed at a level that would allow extraction below the minimum baseflows required for the system.	n/a	

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		10. References to sections of the <i>Water Act 1989</i> (Vic) provided in response to section 10.26(1) of the Basin Plan do not have the effect of importing the sections referenced into the accredited material. Note 1: reference to “above cap water” for the purposes of responding to the Basin Plan in Victoria’s North and Murray Index Table refers to water that includes water that remains in the system after meeting entitlements, flows specified in bulk entitlements or environmental entitlements as minimum passing flows which may also be identified as “systems water” and water that remains in the system where water users (see Table A Victoria’s North and Murray Index Table for a list of water access rights relevant to this Plan) have not taken their full volume from the system. It should be noted that risks to “system water” were identified as being lower than the risks to other types of water see Part 2.1 (Northern Victoria water resource plan area) and Part 2.3 (Victorian Murray water resource plan area) of Victoria’s North and Murray Risk Assessment at Appendix B of Victoria’s North and Murray Comprehensive Report. Note 2: the tools identified in paragraph (5) above are tools that may be utilised under the Victorian framework but are not necessarily used in each catchment or for each resource in Victoria’s North and Murray water resource plan area. Note 3: see response to section 10.08(2) of the Basin Plan above which requires holders of a water access right (entitlement) to comply with the conditions of that right. See also response to section 10.11(1) of the Basin Plan which sets out rules to prevent actual take does not exceed permitted take. Note 4: for the process relating to the amendment under the <i>Water Act 1989</i> (Vic) of bulk entitlements see Figure 7-3 and for environmental entitlements see Figure 7-4, note the conditions on a take and use licence relating to restrictions – must be complied with – note the interaction with the section 10.08(2) of the Basin Plan obligation. Note 5: the environmental water reserve under 4A of the <i>Water Act 1989</i> (Vic) and the environmental water reserve objective under section 4B of the <i>Water Act 1989</i> (Vic) do not have the effect of defining above cap water as planned environmental water for the purposes of section 6 of the Water Act 2007 (Cth) or section 10.09(1) of the Basin Plan. Water may be part of the environmental water reserve for the purposes of the <i>Water Act 1989</i> (Vic) and will support the environmental objective however, it cannot be characterised as ‘planned environmental water’ as more narrowly defined in section 6 of the Water Act 2007 (Cth) which specifies that planned environmental water is water that cannot be taken or used for any other purpose. Above cap water may be taken and used for multiple purposes, including for example, providing base flows (not just for environmental benefit but for system management reasons) and domestic and stock use. See Section 12.4.2.2 of Victoria’s North and Murray Comprehensive Report for more information about planned environmental water under Victoria’s water resource management framework. Note 6: for the purposes of paragraph (4) above, sections 33J and section 40 of the <i>Water Act 1989</i> (Vic) apply to regulated systems and section 40 and section 53 of the <i>Water Act 1989</i> (Vic) apply to unregulated systems. Note 7: section 53 of the <i>Water Act 1989</i> (Vic) as referred to in paragraph (5)(c) above includes the requirement to have regard to the matters in paragraphs (b) to (m) of section 40 of that Act.	n/a	

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		Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of the Comprehensive Report. 1. The delivery or use of planned environmental water identified in this Index in response to section 10.09(1) of the Basin Plan is consistent with the environmental watering plan and the Basin-wide environmental watering strategy and relates to the objectives outlined in the Basin-wide environmental watering strategy as outlined in Table 1 of Appendix E to Victoria's North and Murray Comprehensive Report. 2. The existence of this planned environmental water is protected under section 10.28 of the Basin Plan.	n/a	Planned environmental water is provided through instruments that regulate water resource management in Victoria under the Victorian Water Act. The provision of planned environmental water is also supported by measures under the Victorian Water Act such as the Environmental Water Reserve and offences for taking water without authorisation. These would be considered 'rules and arrangements' relating to the planned environmental water. The rules and arrangements relating to the planned environmental water identified in Table 2 of Appendix E to Victoria's North and Murray Comprehensive Report are identified for the purposes of section 10.09(1) of the Basin Plan. As identified in Table 1 of Appendix E to Victoria's North and Murray Comprehensive Report PEW under the Upper Ovens River WSPA Management Plan is prescribed through rules and information in the Management Plan. Table 8 of that Plan identifies the Ovens River environmental flow objectives under various summer low flow scenarios. The Long-Term Watering Plans do not contain a description of how Victoria's PEW meets environmental watering objectives of Chapter 8 of Basin Plan as Victoria and the MDBA were still in discussions regarding the identification of PEW at the time of finalising the Victorian Murray and Northern Victoria Long-Term Watering Plans. Following accreditation of Victoria's North and Murray Water Resource Plan, the Northern Victoria Long-Term Watering Plan and the Victorian Murray Long-Term Watering Plan will be reviewed and updated to more specifically address how PEW supports environmental objectives as per the requirements in Chapter 8 of the Basin Plan. This will more clearly link PEW with Basin Plan objectives and targets through Victoria's environmental watering requirements for priority environmental assets and priority ecosystem functions.
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. No planned environmental water has been identified in the Victorian Murray water resource plan area.	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This requirement is not relevant as it relates to the development of the environmental watering plan, and the Basin-wide environmental watering strategy, which apply to surface water only. The requirements for the groundwater SDL resource units have been met through meeting the requirements in Parts 3 and 4 of Chapter 10 of the Basin Plan. This is in accordance with MDBA Position Statement 6D.	n/a	
10.26(2)	For the purposes of subsection (1), the water resource plan must be prepared having regard to: (a) the most recent version of the long-term watering plan prepared in accordance with the requirements of Division 3 of Part 4 of Chapter 8; and (b) the views of local communities, including bodies established by a Basin State that express community views in relation to environmental watering.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	Victoria's North and Murray Water Resource Plan was developed having regard to the current version of the long-term watering plans for the water resource plan area and the views of local communities. The views of local communities identified during consultation on Water for Victoria, the Northern Victoria Long-Term Watering Plan, the Victorian Murray Long-Term Watering Plan, and during the development of Victoria's North and Murray Water Resource Plan were taken into account in the preparation of and during the development of Victoria's North and Murray Water Resource Plan. Following accreditation of Victoria's North and Murray Water Resource Plan, the Northern Victoria Long-Term Watering Plan and the Victorian Murray Long-Term Watering Plan will be reviewed and updated to more specifically address requirements in Chapter 8 of the Basin Plan and more clearly link Basin Plan objectives and targets with Victoria's environmental watering requirements for priority environmental assets and priority ecosystem functions. This is currently done through specific environmental water management plans; however further work may be done to more clearly specify how the method for selecting priority environmental assets and priority ecosystem functions has been applied in developing the long-term watering plans. Environmental water management plans can be found at - https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/environmental-water/environmental-water-management-plans

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		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This requirement does not apply to groundwater.	n/a	The long-term watering plans for the water resource plan areas apply to surface water only. Further, there is no groundwater held environmental water extracted for an environmental purpose in this water resource plan area.
10.27(1)	This section applies if (a) there are 2 water resource plan areas that contain surface water; and (b) there is a surface water connection between the 2 areas.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of the Comprehensive Report. The Northern Victoria water resource plan area is connected to the Victorian Murray water resource plan area.		As identified in response to section 10.05(b) of the Basin Plan above, the Northern Victoria water resource plan area and the Victorian Murray water resource plan area are considered to have a surface water connection between the two areas. Therefore section 10.27 of the Basin Plan applies to the Northern Victoria water resource plan area and Victorian Murray water resource plan area under Victoria's North and Murray Water Resource Plan. This requirement does not apply to groundwater. As identified above in Column 5 for the response to section 10.26 of the Basin Plan VEWI is the Victorian body responsible for managing environmental watering and causing the delivery of held environmental water in consultation with CEWH and CMAs. Section 12.7.4 of Victoria's North and Murray Comprehensive Report outlines how coordinated watering occurs including in respect of the River Murray under the Murray-Darling Basin Agreement. In respect of coordinated watering Part 5 of the Northern Victoria Long-Term Watering Plan and the Victorian Murray Long-Term Watering Plan regarding the coordination of environmental watering outline how VEWI coordinate with environmental delivery partners in carrying out environmental watering. Figure 4-1 of Victoria's North and Murray Comprehensive Report identifies the significant connections between water resource plan areas including those connections to South Australia and New South Wales.
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The Victorian Murray water resource plan area is connected to the following water resource plan areas: (a) Northern Victoria water resource plan area; and (b) Via the River Murray: (i) South Australian River Murray (SW6) (ii) New South Wales Murray and Lower Darling (SW8).	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This requirement does not apply to groundwater as no environmental water has been identified for the Goulburn-Murray water resource plan area.	n/a	
10.27(2)	The water resource plan for each of the areas must provide for the coordination of environmental watering between the 2 areas.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. When the VEWI undertakes environmental watering in accordance with the obligation under section 10.26 of the Basin Plan, VEWI must ensure that environmental watering in the Victorian Murray water resource plan area and the Northern Victoria water resource plan area is coordinated to ensure that the environmental watering objectives of connected plan areas can also be achieved. Note: the connected water resource plan areas are identified in response to section 10.27(1) of the Basin Plan in Column 3 of Victoria's North and Murray Index Table.	VEWI	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This requirement does not apply to groundwater.	n/a	

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10.28	A water resource plan must ensure that there is no net reduction in the protection of planned environmental water from the protection provided for under State water management law immediately before the commencement of the Basin Plan.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of the Comprehensive Report. 1. The protection of the planned environmental water identified in this Index in response to section 10.09(1) of the Basin Plan is provided by the relevant bulk entitlement or management plan that specifically provides for the commitment or preservation of that water for environmental purposes. There has been no change to the rules relating to planned environmental water since 2012 in the following instruments: (a) Bulk Entitlement (Ovens System – Goulburn-Murray Water) Order 2004 (b) Upper Ovens River Water Supply Protection Area Water Management Plan (2011) 2. As there has been no change to the instruments that protect the identified planned environmental water there has been no net reduction in the protection of planned environmental water. Nothing in Victoria’s North and Murray Water Resource Plan lessens the protection of planned environmental water. 3. The Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004 was amended in 2017 to provide for an extreme events measure under clause 12.4 of that Order in accordance with requirements under Part 13 of Chapter 10 of the Basin Plan. To temporarily reduce minimum environmental flows, the entitlement holder (Goulburn-Murray Water) must first agree with the waterway manager (Goulburn Broken Catchment Management Authority): the reduction sought; the period to which it will apply; monitoring; and any mitigation which is required. This is not considered to be a reduction in the protection of planned environmental water as the total long-term average volume of the planned environmental water would be maintained. 4. To ensure there is no net reduction in the protection of planned environmental water, in exercising its discretion under clause 12.4 of the Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004 (Broken BE) Goulburn-Murray Water must (a) keep a record of the modifications made to the volume of water passed as environmental flows in accordance with clause 12.4 of the Broken BE; (b) keep a record of the total volume of water which would have been passed in accordance with the rules in the bulk entitlement (which constitutes the planned environmental water) over a rolling two-year period; (c) calculate the difference between the modified volume that is passed and the volume of water that would otherwise have been passed in accordance with the rules in the Broken BE; (d) make the volume calculated as set out in paragraph available for release as agreed with the waterway manager.	n/a	No changes have been made to the instruments, being the Bulk Entitlement (Ovens System – Goulburn-Murray Water) Order 2004 and the Upper Ovens River Water Supply Protection Area Water Management Plan (2011), in relation to planned environmental water which would reduce the protection of that water. The Environmental Water Reserve under section 4A of the Victorian Water Act operates differently to section 6 of the Commonwealth Water Act in that it does not require water that is captured by the reserve to be used for the environment to the exclusion of all other purposes. Water within the above cap pool may form part of the Environmental Water Reserve where that water is identified has contributing to environmental outcomes. Victoria is undertaking work to clarify the application of section 4A of the Victorian Water Act and therefore the operation of the environmental water reserve objective under section 4B of the Victorian Water Act. Acknowledging that there may be some uncertainties about when the environmental water reserve captures this above cap water, we note that it is intended for all above cap water (to the extent that it isn’t being used for an alternative purpose) to contribute to long-term environmental outcomes. Despite above cap water contributing to long-term environmental outcomes and objectives it may also be taken or used for other purposes. These purposes include both extraction under certain circumstances, such as firefighting, or instream uses such as recreational or hydropower. Drought response measures have been introduced under the Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004, however this is not considered as eroding the protection of planned environmental water. The instrument still provides for the same volume of water as planned environmental water, however, it identifies how the system manager will respond to water shortages. Given the discretionary nature of clause 12.4 of the Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004, it is proposed to provide certainty as to how environmental impacts will be mitigated. Until the Bulk Entitlement can be amended, the obligation in paragraph 4 of column 3 specifies how Goulburn-Murray Water will account for and mitigate changes in flow. As there is a ‘or natural’ provision in the Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004, the actual total volume of passing environmental flows required over a year would differ depending on climatic conditions so a ‘long-term average’ for passing flows would not be meaningful. Rather ‘The total volume of environmental water which would have been passed in accordance with the rules in the bulk entitlement (which constitutes the PEW) over a rolling two-year period would be maintained’. The net result is that there is no volumetric change in the volume of passing environmental flows over a two-year period, there would just be a temporal change that is, when the flows were passed. This would be ensured by the mandatory requirement of accumulation of any foregone passing flows for release at a later time as determined by the Goulburn Broken Catchment Management Authority. A two-year rolling period would be important, as one period is December to May so any accumulated flows may not be able to be released within the water year. Clauses 12.1 and 12.3 of the Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004 provide for the minimum and maximum environmental flows that must be maintained in identified reaches of the Broken River at specified times of the water year. Under clause 12.4 of the Bulk Entitlement these environmental flows may be temporarily modified by agreement between Goulburn-Murray Water and the Goulburn Broken Catchment Management Authority who must agree on: the purpose of any modification; the reduction or increases to be applied; the period of time the modification will apply; and what mitigation is required. The requirement to make the water available under paragraph (4)(d) of the obligation in Column 3 relates to how the water will be released, including the timing and volume of any release. The waterway manager will provide advice on the timing and volume of a release to ensure environmental objectives are supported by the flow of water. The relevant waterway strategy identifies the relevant environmental objectives for the system and informs the decisions of the waterway manager.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		5. The waterway manager, in agreeing to the volume and timing of release in accordance with (4)(a) must do so in accordance with the relevant Environmental Water Management Plan that establishes the long-term environmental objectives that will be supported by the planned environmental water.	waterway manager	The period of time the modification will apply, including the trigger to revert back to minimum environmental flows as specified in sub-clause 121 or maximum environmental flows as specified in sub-clause 12.3, as applicable. Further discussion on the role of catchment management authorities as waterway managers is outlined in Section 12.3.2 of Victoria's North and Murray Comprehensive Report. Discussion of State environmental water planning including waterway strategies is outlined in Section 12.6 of Victoria's North and Murray Comprehensive Report. See Section 12.4.2.3 of Victoria's North and Murray Comprehensive Report for further discussion on the continued protection of planned environmental water.
		6. The two-year period under (4)(b) does not apply where extreme dry conditions, which prohibit the ability to deliver accumulated flows, exist beyond the two-year period. Goulburn-Murray Water must account for the reduction during the extreme dry period and make the volume calculated in accordance with (4)(c) above for that period available as per (4)(d) and (5) above.	water corporation	
		7. For the purposes of (6) above the extreme dry period ends when water availability increases so that passing flows can be restored, and the accumulated amount calculated under (4)(c) above can be made available.	n/a	
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This requirement is not relevant as no planned environmental water was identified in the Victorian Murray water resource plan area.	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. There is no groundwater PEW, as defined by section 6 of the <i>Water Act</i> 2007 (Cth), and therefore section 10.28 of the Basin Plan does not apply.	n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 7	Water quality objectives			
10.29	A water resource plan must include a water quality management plan (WQM Plan). The WQM Plan must: (a) for water resource plan areas made up of only surface water SDL resource units—be made in accordance with Division 2; (b) for water resource plan areas made up of only groundwater SDL resource units—be made in accordance with Division 3; (c) for water resource plan areas made up of both surface water SDL resource units and groundwater SDL resource units—be made in accordance with: (i) Division 2 in relation to surface water SDL resource units (as if a reference in Division 2 to the water resource plan area were a reference to the surface water SDL resource units of the water resource plan area); and (ii) Division 3 in relation to groundwater SDL resource units (as if a reference in Division 3 to the water resource plan area were a reference to the groundwater SDL resource units of the water resource plan area).	Victoria’s North and Murray water resource plan area The parts of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report as outlined in response to sections 10.30 to 10.35B of the Basin Plan as outlined in Column 3 of Victoria’s North and Murray Index Table and the text in Column 3 in response to sections 10.35C and 10.35D of the Basin Plan constitute Victoria’s North and Murray Water Quality Management Plan.	n/a	This requirement is met as the accredited text references Appendix A to Victoria’s North and Murray Comprehensive Report containing the Water Quality Management Plan made in accordance with Part 7 of Chapter 10 of the Basin Plan.
Division 2 - Surface Water				
10.30	The WQM Plan must identify the causes, or likely causes, of water quality degradation in the water resource plan area having regard to the key causes of water quality degradation identified in Part 2 of Chapter 9 and set out in Schedule 10.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. The causes of water quality degradation in the water resource plan area are listed and discussed in Table 3 in Part 4.3 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report.	n/a	This requirement is met as the accredited text identifies Table 3 of Victoria’s North and Murray Water Quality Management Plan, at Appendix A to Victoria’s North and Murray Comprehensive Report which includes an explanation of how key causes were considered. In accordance with the Basin Plan requirements, Victoria has conducted a Risk Assessment Report for the five water resource plan areas, and has had regard to the current and future risks to the condition and continued availability of water resources in the development of Victoria’s North and Murray Water Resource Plan. The process provided an overview of the risk factors across the water resource plan areas, and the results from the Risk Assessment Report were amalgamated across several levels. The causes of risk to water quality presented in the preliminary Risk Assessment Report are not the same as the causes of water quality degradation in the Basin Plan, but were regarded in the identification of the causes, or likely causes of water quality degradation. Part 4.3 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Water Quality Management Plan contains further information.
10.31	If a risk of a kind mentioned in paragraph 10.41(2)(d) has been identified in relation to the water resources of the water resource plan area, the WQM Plan must explain why measures addressing the risk have or have not been included in the water resource plan.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Part 4.4 of the Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report identifies risks related to the condition (quality) of water resources and explains why measures addressing the risk have or have not been included in the water resource plan.	n/a	This requirement is met as Part 4.4 of the Water Quality Management Plan maps the risks to the associated measures and clarifies which measures have or have not been included. The risks are also identified in the Risk Assessment Report at Appendix B of Victoria’s North and Murray Comprehensive Report. Victoria’s approach to identifying causes and likely causes for the purposes of section 10.30 of the Basin Plan was to consider any relevant water quality degradation and identifying what has or is likely to have caused any identified degradation.
10.32(1)	The WQM Plan must identify the water quality target values for the water resource plan area.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Water quality targets have been identified in response to section 10.32(2) of the Basin Plan in Victoria’s North and Murray Index Table.	n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.32(2)(a)	The water quality target values are the following: (a) for fresh water-dependent ecosystems—the applicable target values referred to in section 9.16;	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. The water quality target values identified are those are set out in Part 4.6.1 of the Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. The alternative targets identified for fresh water-dependent ecosystems will be as effective in achieving the objectives in Part 3 of Chapter 9 in accordance with section 10.32(4)(c)(ii) of the Basin Plan.	n/a	For the purposes of section 10.32 of the Basin Plan, Victoria has adopted alternative targets for fresh water-dependent ecosystems (lakes and wetlands non-Ramsar) and fresh water-dependent ecosystems (Ramsar) as identified in Part 4.6.1 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. The alternative targets are specified as 10.32(4)(c)(ii) applies. There are three Ramsar sites in the Victoria’s North and Murray water resource plan area: the Barmah Forest Ramsar site, the Gunbower Forest Ramsar site and the Kerang Wetlands Ramsar Site. In addition to these targets, as part of Victoria’s measure to implement Victoria’s obligations under BSM2030, Victoria has six end-of-valley salinity targets as identified in Table 10 of Part 4.6.4 .
10.32(2)(b)	The water quality target values are the following: (b) for irrigation water—the target values for water quality characteristics set out in section 9.17;	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. The water quality target values identified are those are set out in Part 4.6.2 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. The alternative targets identified for irrigation water will be as effective in achieving the objectives in Part 3 of Chapter 9 in accordance with section 10.32(4)(c)(ii) of the Basin Plan.	n/a	For the purposes of section 10.32 of the Basin Plan, Victoria has adopted an alternative target for irrigation water as identified in Part 4.6.2 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. The targets are specified as they meet the requirements of section 10.32(4)(c)(ii) of the Basin Plan.
10.32(2)(c)	The water quality target values are the following: (c) for water used for recreational purposes—the values set out in section 9.18.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. The water quality target values identified are those identified in Part 4.6.3 Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report in Table S.7 and in Table S.8 in Schedule 1 of Appendix A . The alternative targets identified for water used for recreational purposes will be as effective in achieving the objectives in Part 3 of Chapter 9 in accordance with section 10.32(4)(c)(ii) of the Basin Plan.	n/a	For the purposes of section 10.32 of the Basin Plan, Victoria has adopted an alternative target for recreational purposes as identified in Part 4.6.3 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. The targets are specified as they meet the requirements of section 10.32(4)(c)(ii) of the Basin Plan.
10.32(3)	However, if the objectively determined actual value of a water quality characteristic at a site is better than the target value identified in subsection (2), then the target value is that better value.	Victoria’s North and Murray water resource plan area This section does not contain a requirement and informs the response to section 10.32(2) of the Basin Plan.	n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION		
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10.32(4)	The WQM Plan may specify an alternative water quality target value if: (a) it is consistent with the water quality objectives in Part 3 of Chapter 9; and (b) it is determined in accordance with the procedures set out in the ANZECC Guidelines; and (c) either: (i) the alternative target value provides a better level of protection than the value that would apply under subsection (2) or (3), as applicable; or (ii) the WQM Plan sets out reasons why the alternative target value will be as effective in achieving the objectives in Part 3 of Chapter 9; or (iii) the WQM Plan sets out reasons why the target value in subsection (2) or (3), as applicable, is inappropriate for the water resource plan area; and (d) for a water resource that is also covered by a water resource plan area of another Basin State—it is developed in consultation with that State.	Victoria's North and Murray water resource plan area This matter informs the response for 10.32(2) of the Basin Plan.	n/a	The following parts of Victoria's North and Murray Water Quality Management Plan at Appendix A to Victoria's North and Murray Comprehensive Report outline how the requirements of 10.32(4)(a), 10.32(4)(b) and 10.32(4)(c)(ii) of the Basin Plan have been met in setting the targets in SEPP (Waters) as alternative targets for the purposes of responding to section 10.32(2) of the Basin Plan; 10.32(2)(a) targets for fresh water–dependent ecosystems: Part 4.6.1.1 10.32(2)(b) targets for irrigation water: Part 4.6.2.1 10.32(2)(c) targets for recreational water: Part 4.6.3.1 Section 10.32(4)(d) of the Basin Plan only applies to developing targets for the Victorian Murray water resource plan area, as the Victorian Murray water resource plan area is covered by a water resource plan area of another Basin State. The discussion of how alternative targets were developed in consultation with other States is provided in Part 4.6.5 of Appendix A .	
10.33(1)	The WQM Plan must specify measures to be undertaken in or in relation to the water resources of the water resource plan area that contribute to the achievement of the objectives set out in: (a) section 9.04 (Objectives of water-dependent ecosystems); and (b) section 9.05 (Objectives for raw water for treatment for human consumption); and (c) section 9.06 (Objective for irrigation water); and (d) section 9.07 (Objective for recreational water quality); and (e) section 9.08 (Objective to maintain good levels of water quality); unless there are no such measures that can be undertaken cost-effectively.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Measures to be undertaken that contribute to the achievement of the objectives set out in sections 9.04 to 9.08 of the Basin Plan are set out in Part 4.5 of Victoria's North and Murray Water Quality Management Plan at Appendix A to Victoria's North and Murray Comprehensive Report.	Minister for Water	Victoria has done a detailed review to identify and specify measures for each of the Northern Victoria and Victorian Murray water resource plan areas that will contribute to the achievement of the Basin Plan's water quality objectives. Two significant measures that will contribute to the achievement of water quality objectives under section 10.33 of the Basin Plan for the Northern Victorian and Victorian Murray water resource plan areas are set out in Part 4.5 and are: - implementation of the State Environment Protection Policy (Waters) - implementation of Victoria's commitments under the Basin Salinity Management Strategy 2030	
10.33(2)	The measures must be prepared having regard to: (a) the causes, or likely causes, of water quality degradation identified in accordance with section 10.30; and (b) target values identified in accordance with section 10.32; and (c) the targets in Division 4 of Part 4 of Chapter 9.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. No accredited text is needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	The measures prepared for the purpose of section 10.33(1) of the Basin Plan were prepared having regard to the causes and likely causes of water quality degradation as identified for the purpose of section 10.30 of the Basin Plan and the target values identified for the purpose of section 10.32 of the Basin Plan and the targets in Division 4 of Part 4 of Chapter 9 of the Basin Plan. Consideration of the measures is described in Part 4.5.3 and Part 4.5.4 of Victoria's North and Murray Water Quality Management Plan at Appendix A to Victoria's North and Murray Comprehensive Report.	
10.33(3)	The measures may include land management measures.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Land management measures have not been included in the Water Quality Management Plan prepared under Part 7 of the Basin Plan.	n/a		
10.34	The WQM Plan must identify the sites in the water resource plan area at which the target values for irrigation water apply.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 9 of Victoria's North and Murray Water Quality Management Plan at Appendix A to Victoria's North and Murray Comprehensive Report identifies the extraction points where the irrigation water target applies.	n/a		

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10.35	The measures specified in the WQM Plan must be developed having regard to: (a) the impact those measures (including the absence of adequate measures) may have on the ability of another Basin State to meet water quality targets; and (b) any adverse impacts those measures may have on Basin water resources in the other Basin State.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. No accredited text needed for a requirement to ‘have regard to’. Explanation of how regard was had is in Column 5.	n/a	The Water Quality Management Plan included at Appendix A to Victoria’s North and Murray Comprehensive Report has been developed having regard to the impact of any measures on the ability of another Basin State to meet water quality targets and any adverse impacts the measures may have on the Basin water resources in the other Basin State. Consideration of the impact on another Basin State is outlined in Part 4.5.5 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. The Victorian Murray water resource plan area is connected to the New South Wales Murray and Lower Darling water resource plan area and the South Australian River Murray water resource plan area. See Part 4.5.5.1 for discussion relating to Victorian Murray water resource plan area and consideration of the impact of New South Wales and South Australia. The Northern Victoria water resource plan area is not considered to be connected to the water resource plan areas of other Basin states this is explained in Part 4.5.5.2 .	
Division 3 – Groundwater			n/a		
10.35A	The WQM Plan must identify the causes, or likely causes, of water quality degradation in the water resource plan area having regard to the key causes of water quality degradation identified in Part 2 of Chapter 9 and set out in Schedule 10.	Goulburn–Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn–Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Part 5.2 of Appendix A to Victoria’s North and Murray Comprehensive Report identifies two possible causes of degradation relating to the future risk to the quality of groundwater.	n/a	The groundwaters in the Goulburn–Murray water resource plan area has not experienced significant degradation. As previously described the chemical composition of Victoria’s groundwater is varied in relation to salinity levels. The areas of high groundwater salinity in the west of the state are not a matter of degradation, but rather the natural state of the system. Although there has been no measured degradation in the Goulburn–Murray water resource plan area to date, there are current processes which could potentially lead to some level of decline in the quality of groundwater during the life of Victoria’s North and Murray Water Resource Plan (see Part 5.3.1.1). Based on the future risk of degradation occurring (outlined in Part 5.3.1), two possible causes of degradation in the Goulburn–Murray: Sedimentary Plain SDL resource unit are identified: - the use of groundwater for irrigation purposes at locations where highly saline upper aquifer water drains to the lower aquifer - changes in hydraulic gradients inducing saline groundwater into areas of fresher groundwater These possible causes of future groundwater degradation are due to drawdown of groundwater levels or pressures inducing saline groundwater from connected areas that are naturally saline moving either laterally or vertically into areas of fresher groundwater. The measures outlined in Part 5.51 in response to section 10.35D of the Basin Plan will address these likely causes. See Part 5.2 of Victoria’s North and Murray Water Quality Management Plan in Appendix A to Victoria’s North and Murray Comprehensive Report.	
10.35B(1)	1. The WQM Plan must identify the water quality target values for the water resource plan area.	Goulburn–Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn–Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Water quality targets have been identified in response to section 10.35B(2) of the Basin Plan in Victoria’s North and Murray Index Table.	n/a		
10.35B(2)	2. The water quality target values are the following: (a) for fresh water-dependent ecosystems—the applicable target values referred to in section 916;	Goulburn–Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn–Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. The water quality targets are those set out in Part 5.4 of Victoria’s North and Murray Water Quality Management Plan in Appendix A to Victoria’s North and Murray Comprehensive Report.	n/a	Part 5.4 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report outlines the use of the targets in SEPP (Waters) as alternative targets for fresh water-dependent ecosystems.	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.35B(2)	2. The water quality target values are the following: (b) for irrigation water—the target values for water quality characteristics set out in section 9.17;	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. The water quality targets are those set out in Part 5.4 of Victoria's North and Murray Water Quality Management Plan in Appendix A to Victoria's North and Murray Comprehensive Report.	n/a	These do not apply as no groundwater is distributed by an irrigation infrastructure operator for the purpose of irrigation.
10.35B(2)	2. The water quality target values are the following: (c) for water used for recreational purposes—the values set out in section 9.18.	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Groundwater is not used for recreational purposes in the Goulburn-Murray water resource plan area and therefore no values will be applied for groundwater in Victoria's North and Murray Water Resource Plan Water Quality Management Plan.	n/a	
10.35B(3)	3. However, the WQM Plan may specify alternative water quality target values if they are consistent with the water quality objectives in Part 3 of Chapter 9.	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. In response to section 10.35B(2) of the Basin Plan, alternative targets consistent with the objectives in Part 3 of Chapter 9 have been identified.	n/a	Alternative water quality target values are adopted for fresh water-dependent ecosystems in response to Basin Plan section 10.35B(2)(a). Part 5.4 of Victoria's North and Murray Water Quality Management Plan at Appendix A to Victoria's North and Murray Comprehensive Report outlines the use of the targets in SEPP (Waters) as alternative targets for fresh water-dependent ecosystems.

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10.35D	The WQM Plan for the following water resource plan areas must include rules or measures that are designed to ensure that the objective set out in section 10.35C is met: (a) the NSW Murray-Darling Basin Porous Rock water resource plan area, in relation to the Western Porous Rock, Gunnedah-Oxley Basin MDB and Sydney Basin MDB SDL resource units; (b) the Goulburn-Murray water resource plan area, in relation to the Goulburn-Murray: Sedimentary Plain SDL resource unit.	Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray. Sedimentary Plain SDL resource unit. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. Victoria's North and Murray Water Resource Plan ensure the objectives set out in section 10.35C of the Basin Plan are met through: (a) the rule contained in Victoria's North and Murray Water Resource Plan in response to section 10.35C of the Basin Plan that applies to all water resources in the Goulburn-Murray water resource plan area; and (b) the measures as identified in paragraph (2) in response to section 10.35D of the Basin Plan. 2. The measures to ensure the objectives in section 10.35C of the Basin Plan are met for the Goulburn-Murray: Sedimentary Plain SDL resource unit are: (a) the implementation of State Environmental Protection Policy - <i>SEPP (Waters)</i> - particularly relating to the protection of groundwater beneficial uses under Part 3 of Division 3 of that policy; (b) the Minister will impose conditions relating to the time, place and rate of take for groundwater extraction in conditions on a take and use licence under section 56 of the <i>Water Act 1989</i> (Vic) or under a works licence under section 67 of the <i>Water Act 1989</i> (Vic) as relevant; (c) in response to changes in risks to the maintenance of groundwater quality and the impacts of groundwater extraction on groundwater dependent environmental assets, the application of the rules under Victoria's North and Murray Water Resource Plan in response to Part 4 of Chapter 10 of the Basin Plan; (d) maintenance of a register of State observation bores; (e) scheduled groundwater level readings from identified bores; (f) establishment of targeted groundwater salinity monitoring program, including requirements for the collection of samples and recording of salinity levels, under statutory management plans approved under section 32A of the <i>Water Act 1989</i> (Vic) were risks to groundwater quality are identified; (g) where there is a decline in water quality, the Minister must investigate the cause of the decline in water quality and determine whether: (i) a targeted groundwater salinity monitoring program is required, or additional monitoring is required; (ii) restrictions on the take of groundwater from that area should be applied to prevent the continued deterioration of groundwater quality; or (iii) a water supply protection area should be declared in accordance with section 27 of the <i>Water Act 1989</i> (Vic), to cause a statutory management plan to be prepared.	n/a	The measures identified in response to section 10.35D of the Basin Plan meet the requirements as they identify how Victoria will ensure that the objectives in section 10.35C of the Basin Plan are met. The measures align with the objectives of section 10.35C as follows: - setting conditions relating to the time, place and rate of extraction from an aquifer on water access rights or associated authorisations support the management of potential impacts of extraction on the structural integrity of an aquifer and the condition of groundwater resources. Conditions are imposed either on the take and use licence that authorises the take of groundwater or on the works licence which authorises the construction and operation of the bore through which the extraction occurs. - Management of the place and rate of extraction also mitigates risks to neighbouring impacts on environmental assets and other water users which can mitigate possible causes of groundwater quality degradation (see Section 7.4.2.6 of Victoria's North and Murray Comprehensive Report for more information on neighbouring impacts) - maintenance of a register of State observation bores (for more information of State observation bores see below) - scheduled monitoring requirements to ensure water resource managers have up to date information about groundwater levels in order to respond to impacts on structural integrity or groundwater levels that may have effects on elevated levels of salinity or other types of water quality degradation. Under statutory management plans, groundwater monitoring can occur either quarterly, monthly or more frequently as required to respond to risks - establishment of targeted groundwater salinity monitoring programs under statutory management plans, including the collection of samples. A measure is not considered necessary for the determination of resource conditions limits to meet the objectives of section 10.35C of the Basin Plan. The setting of resource condition limits is fundamental to Victoria's entitlement framework as outlined in Section 7.4 of Victoria's North and Murray Comprehensive Report. Additionally, the operation of responses to sections 10.08(2), 10.11(1), 10.37, 10.38 and 10.39 of the Basin Plan outlined in Victoria's North and Murray Index Table provide for protections against the take exceeding resource condition limits. See Column 5 for further discussion of how these components of Victoria's North and Murray Water Resource Plan will operate. A measure has been included to have regard to resource condition limits when setting restrictions on take and use licences or granting new or transferring existing take and use licences. Resource condition limits for the purpose of section 10.35D (2) include permissible consumptive volumes (declared under section 22A of the Victorian Water Act), prescriptions in WSPA plans relating to limits on take, trigger levels, restrictions imposed on take and use licences, intensity rules and trade zone limits rules. These resource conditions maintain groundwater levels and hydraulic relationships which can prevent the ingress of saline groundwater into areas of less saline groundwater. Monitoring of groundwater quality will allow the Minister to assess whether there has been a decline in water quality that would require investigation of the cause of the decline (as specified in 10.35D(g)). Any investigation will consider the causes of the decline and the risks to the beneficial uses of the groundwater as defined in Table 2 of the State Environment Protection Policy (Waters). CI 43 in SEPP (Waters) specifies the obligation for management of extraction risks to waters: Water corporations, where the Minister has delegated powers and functions in respect to the administration of licences under the Water Act 1989, must ensure that their licensing decisions do not pose a risk to beneficial uses through reducing the quality and quantity of the adjoining waters. Victoria already provides for a register of sites monitored by State observation bores. The primary purpose of the State Observation Bores Network (SOBN) is to collect groundwater data for observational purposes. This data can be used for research and other informative measures, to improve the access and management of groundwater. A list of sites within the SOBN can be found at http://data.water.vic.gov.au/static/htm. Monitoring through the SOBN can occur outside a water supply protection area. The surface water and groundwater data contained in Water Measurement Information System (WMIS) is collected through the Regional Water Monitoring Partnerships. There are currently 41 organisations within these Partnerships, covering state government (DELWP), Commonwealth government (Bureau of Meteorology and Murray-Darling Basin Authority), water corporations, catchment management authorities and local government (councils).	

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		(h) restrictions on taking groundwater and the issuing or transfer of licences for the taking of groundwater in the Goulburn-Murray: Sedimentary Plain SDL resource unit must be informed by any resource condition limit specified under a permissible consumptive volume declaration under section 22A of the <i>Water Act 1989</i> (Vic) or in a statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) for a water supply protection area declared under section 27 of the <i>Water Act 1989</i> (Vic).	Minister	WMIS is the primary access point to search, discover and download surface water (water level, flow and water quality) and groundwater (water level and water quality) monitoring data. WMIS now contains real time data (less than 1 hour old) data for all telemetered surface water gauges and groundwater bores. - The measures outlined in response to section 10.35D of the Basin Plan are reflected in: - Lower Campaspe Valley WSPA Groundwater Management Plan (prescription 4) - Loddon Highlands WSPA Groundwater Management Plan (prescription 5) - Katunga WSPA Groundwater Management Plan (prescriptions 5 and 6) - Upper Ovens River WSPA Water Management Plan (prescription 49 with prescriptions 2-11 reflecting the requirements under the rules relating to statutory management plans in response to Part 4 of Chapter 10 of Basin Plan. In accordance with the measure under (2)(g) in Column 3 of Victoria's North and Murray Index Table in response to section 10.35D of the Basin Plan identifies that where the groundwater monitoring identifies a decline in the groundwater quality in a particular, aquifer or area.
		3. The operation of the response to section 10.08(2), 10.11(1), and, where groundwater is traded, Part 8 of Chapter 10 of the Basin Plan in Victoria's North and Murray Water Resource Plan has the effect of ensuring that resource conditions limits are not exceeded.	n/a	
		4. References to sections of the <i>Water Act 1989</i> (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only. Note: the measure under (2)(h) above reflects the rule included in Victoria's North and Murray Water Resource Plan in response to section 10.21 of the Basin Plan.	n/a	

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Part 8	Trade of water access rights				
10.36	This Part does not apply to water access rights of a kind that are not able to be traded under State water management law.	Victoria's North and Murray water resource plan area This matter informs the interpretation of Part 8 of Chapter 10 of the Basin Plan and does not contain a water resource plan requirement.	n/a	Refer to Table A and Table B attached to Victoria's North and Murray Index Table for details about tradability of water access rights in Victoria. See Figure 7-7 and Figure 7-11 in Section 7.4.2 of Victoria's North and Murray Comprehensive Report regarding considerations in determining temporary or permanent transfer of entitlement.	
10.37(1)	A water resource plan must set out the circumstances in which trade between 2 locations within a groundwater SDL resource unit is permitted. In setting out the circumstances, a water resource plan must ensure that each condition set out in section 12.24 will be met in relation to the proposed trade.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 and Figure 2-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to the surface water component of Victoria's North and Murray Water Resource Plan.	n/a	This requirement is met as the circumstances identified in Column 3 of this row ensure the conditions set out in section 12.24 of the Basin Plan are met. The process for determining a transfer (trade) of a take and use licence (groundwater water access right) using a desktop assessment process and involves the following: - Assessment of sufficient hydraulic connectivity through a hydrogeological resource assessment or as indicated in a statutory management plan. The assessment of hydraulic connectivity is outlined below. The holder (or potential holder) of a take and use licence (water holder) will know whether there is sufficient hydraulic connectivity based on a hydrogeological assessment they are required to commission where one has not occurred previously, or upon advice from the water corporation or by virtue of a published statutory management plan. If lack of sufficient hydraulic connectivity is a reason for refusing the trade, the applicant (water holder or potential water holder) will be notified of the lack of sufficient hydraulic connectivity - Identification of a permissible consumptive volume is published and an applicant (water holder or potential water holder) can request information about current permissible consumptive volumes and current levels of take in addition to finding the information on the Victorian Water Register. - The Victorian Water Act provides for a groundwater trade to be made by a transfer of the relevant take and use licence. It requires traded licences to maintain their essential characteristics such as volume, term and conditions (noting that take and use licences do not have the characteristics of high or low reliability). Note also the application of <i>Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems</i> (Minister for Water, 2015) identified in response to Part 4 of Chapter 10 of Basin Plan. - Consideration of third party impacts occurs on all assessments. Consideration of the potential impacts on other users is required under section 40(1)(d)(i) of the Victorian Water Act and consideration of the needs of other potential applicants is required under section 40(1)(m) of the Victorian Water Act. Consideration of third-party impacts are discussed in more detail in Section 7.4.2.6 of Victoria's North and Murray Comprehensive Report. While making the assessment the relevant water corporation will: - Identify to the applicant (water holder or potential water holder) any medium to high risks to the resource or third parties identified in the process prior to completing the process to determine whether the applicant wishes to withdraw their application, amend their application to reduce the risk or provide the additional analysis requested - Where an application is refused the water corporation will advise the applicant and provide information requested by the applicant. Where an application relates to a high risk, a Statement of Reasons is provided. Each SDL resource unit has been established based on hydrogeological and terrain similarities. Within each SDL resource unit, groundwater systems are actively managed through groundwater management area (GMA) local plans and water supply protection area (WSPA) plans. The boundaries of these plans are set to encompass the common and connected aquifers within each SDL resource unit.	

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		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report 1. Trade between two locations within a single SDL resource unit in the Goulburn-Murray water resource plan area is permitted in the following circumstances: (a) if the two locations are within the same geology as defined by the SDL groundwater unit where sufficient hydraulic connectivity is demonstrated by the relevant hydrogeological resource assessment or statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) as appropriate; and (b) if the relevant permissible consumptive volume declared under section 22A of the <i>Water Act 1989</i> (Vic) is not exceeded; and (c) except for in the Upper Ovens River Water Supply Protection Area, for the transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and (d) in the Upper Ovens River Water Supply Protection Area, for the permanent transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and (e) where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water and measures are in place to address any adverse effect. 2. Figure 7-7 of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer (trade) of a take and use licence under the <i>Water Act 1989</i> (Vic) and demonstrates how the conditions set out in section 12.24 of the Basin Plan align with the Victorian framework. Reference to the <i>Water Act 1989</i> (Vic) in Figure 7-7 of Victoria's North and Murray Comprehensive Report does not form part of the response and is included for reference only. 3. References to sections of the <i>Water Act 1989</i> (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only. Note 1: Section 12.27 of the Basin Plan clarifies that the requirements of Chapter 12 of the Plan, including trade within a groundwater SDL unit (section 12.24 of the Basin Plan), trade between groundwater SDL units (section 12.25 of the Basin Plan), and trade between groundwater and surface water (section 12.26 of the Basin Plan) are not intended to prevent a restriction being imposed on a trade of a water access right under State water management law because a person has committed an offence or failed to pay fees or charges. State water management law includes the <i>Water Act 1989</i> (Vic) and regulations and other instruments made under that Act. Note 2: permissible consumptive volumes declared under section 22A of the <i>Water Act 1989</i> (Vic) have the effect of setting a resource condition limit for the resource to which the declaration applies. Note 3: See response to section 10.18 (3) which applies a rule under paragraph (1) of that response relating to the consideration of risks to high value groundwater dependent ecosystems relating to the transfer of a take and use licence. This rule applies the <i>Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems</i> (Minister for Water, 2015). See the discussion in response to Part 4 in Column 5 of Victoria's North and Murray Index Table for more information on the application of this policy and the rule.	n/a	Trade in groundwater is achieved by transferring the whole or part of a take and use licence. Figure 7-7 in Section 7.4.2.1 of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer of a take and use licence under the Victorian Water Act in further detail. Figure 7-6 shows how the circumstances under section 12.24 of the Basin Plan align with the Victorian framework and ensure that trade cannot occur where the circumstances of section 12.24 of the Basin Plan do not exist. Figure 7-11 identifies how the requirements of Chapter 12 of Basin Plan align with the content of Victoria's North and Murray Water Resource Plan in response to Part 8 of Chapter 10 of the Basin Plan in addition to demonstrating how the requirements under Victoria's Water Act align with those requirements. See Section 7.4.2.8 of Victoria's North and Murray Comprehensive Report for further explanation of trades between two locations within a groundwater SDL resource unit in the Goulburn-Murray water resource plan area. Reference to Figure 7-6 in Column 3 does not have the effect of importing the sections of the Victorian Water Act referenced in the diagram into the accredited material. Trade within the Goulburn-Murray: Highlands (GS8b), Goulburn-Murray: Sedimentary Plain (GS8c) and Goulburn-Murray: deep (GS8d) SDL resource units is permitted as described in Victoria's North and Murray Comprehensive Report. However, while trade is permitted within the Goulburn-Murray: Shepparton Irrigation Region SDL Resource Unit (GS8a) as there is sufficient hydraulic connectivity, trade is typically not supported as the aim of groundwater management within this resource unit is to maximise groundwater extraction to provide salinity and shallow watertable control. Sufficient Hydraulic Connectivity Assessment: For discussion of significant hydraulic connectivity in and to the Goulburn-Murray water resource plan area see the response to section 10.05(b) in Column 3 and 5 of Victoria's North and Murray Index Table. Sufficient hydraulic connectivity is considered to exist in a groundwater system through which groundwater may flow, which has discrete boundaries, and which has areas of groundwater recharge and discharge. It may include a single aquifer, a group of connected aquifers, or groundwater and surface water elements in conjunction, that are connected by a groundwater flow path. Sufficient hydraulic connectivity has been demonstrated between points within: - the Goulburn-Murray: Sedimentary Plain SDL resource unit, as these aquifers are continuous and connected across the resource unit, - the Goulburn-Murray: Highlands SDL resource unit where these are found within groundwater catchments defined in the <i>Victoria Groundwater Management framework (Proposed Boundaries for Groundwater Catchments)</i> (DSE, 2012) as these connected through the flow paths along the catchment; and - the Goulburn-Murray: Highlands SDL resource unit between adjoining groundwater catchments defined in the <i>Victoria Groundwater Management framework (Proposed Boundaries for Groundwater Catchments)</i> (DSE, 2012) as these are sufficiently connected for trade purposes. These are broadly consistent with the Goulburn-Murray: Highlands SDL resource unit as defined in "The proposed Groundwater Baseline and Sustainable Diversion Limits: methods report, MDBA publication no: 16/12". While sufficient hydraulic connectivity has not been demonstrated or established between all locations within an SDL resource unit it is proposed that Victoria's North and Murray Water Resource Plan is enabling of trade to support development of trading zones as understanding of hydraulic connectivity is improved. The effect of paragraph (a) in the accredited text in Column 3 is to require the decision makers to turn their mind to sufficient hydraulic connectivity when determining whether a transfer of a groundwater take and use licence should be approved. Failure to consider whether sufficient hydraulic connectivity is established would result in the decision maker acting inconsistently with Victoria's North and Murray Water Resource Plan which is an offence under section 59 of the Commonwealth Water Act and which would be enforceable by the MDBA. Furthermore, consistency with water resource plans must be reported under Matter 19 of Schedule 12 to the Basin Plan.

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		Note 4: The effect of the circumstance identified in paragraph (d) is that in the Upper Ovens River Water Supply Protection Area (WSPA), where groundwater is permanently traded upstream, a downstream full year licence cannot be traded and converted to a winter-fill licence upstream. The ‘upstream trading rule’ in the Upper Ovens River WSPA Water Management Plan, however, only permits trade of a downstream full year licence to an upstream water user if the licence is converted into a winter-fill licence. Accordingly, for upstream trade of full year licences to continue, the licence will need to be converted to a winter-fill licence prior to being traded to comply. Goulburn-Murray Water will need to identify a process for managing this type of trade prior to approving a trade in the Upper Ovens River Water Supply Protection Area to ensure decisions are consistent with Victoria’s North and Murray Water Resource Plan and Chapter 12 of the Basin Plan.		In determining whether a transfer (or trade) of a groundwater take and use licence can occur the delegated authorising authority must assess the hydrogeological setting before a transfer can proceed. Regardless of whether the ability to trade has already been established between two locations, a hydrogeological resource assessment will always be undertaken or referred to in respect of each individual trade. One component of this assessment is whether there is sufficient hydraulic connectivity between the two locations to support the transfer. Examination of aquifer interactions and local and regional groundwater flow patterns helps to establish connection. Hydrogeological resource assessments are discussed in more detail at Section 7.4.2.2 of Victoria’s North and Murray Comprehensive Report. The relevant hydrogeological resource assessment may include an assessment prepared for a previous licence issue or transfer. An assessment will be updated if the circumstances of the transfer (trade) are different or the information is out of date and an updated assessment is required. Therefore, it is not necessarily required that a new hydrogeological assessment occur for each transfer (trade). Equally where a statutory management plan is in place an assessment has been undertaken in respect of the resources within the declared water supply protection area to support the development of the relevant statutory management plan. That technical assessment will be relied upon where relevant for applications to trade groundwater within the declared water supply protection area Permissible Consumptive Volume Where relevant, resource condition limits are set through permissible consumptive volumes (PCVs) declared under section 22A of the Victorian Water Act. A PCV declaration essentially determines the consumptive cap for the specified resource and operates to limit the issuing of new entitlements. The Minister (or delegate) cannot issue a new take and use licence if it will result in the relevant PCV being exceeded. PCVs are declared for every groundwater management area and water supply protection area except under the Upper Ovens River WSPA Water Management Plan. Maintaining characteristics of the water access right The matter outlined in section 12.24(c) of the Basin Plan is not relevant in Victoria as trade can only occur in a manner that transfers an existing licence to another user. Further, timing for extractions is not a condition on take and use licences for groundwater. While there may be unique conditions on individual licences the characteristics of each type of entitlement does not change between users. It is understood that for the purposes of Basin Plan, changes from all-year licence to winter-fill will constitute a change to the timing characteristics of a water access right. This typically does not occur. The exception to this is the unique circumstance in the Upper Ovens River WSPA Water Management Plan which only permits trade to an upstream water user (noting that groundwater and surface water are treated as the same under this Plan) who can take under winter-fill licence. Water is not available under the resource condition limit under an all-year authorisation to take upstream without impacting on reliability of water for other users or without increasing the risk of adverse impacts on the environment. The upstream trading rule, which results in a winter-fill licence, ensures that there are no undesirable upstream impacts on summer flows that may affect the reliability of water users upstream. It also improves the reliability for water users downstream during the summer months and it reduces adverse environmental impacts upstream, where summer flows are likely to be less than at the downstream location. Trade in the Upper Ovens River WSPA Water Management Plan area is relevant to section 10.39 of the Basin Plan as it relates to trade of groundwater to surface water and vice versa. Following the trade of water, the conditions that apply to the take and use of that water after the trade, cannot be changed after the trade is given effect. The reliability cannot be affected by trading the entitlement. Further, the volume of the entitlement is subject to the specific trade. Water users in Victoria can trade the whole or Part of their entitlement. This means that a water user will trade a specified volume to another person. One exception is trade occurring under the Upper Ovens River WSPA Water Management Plan which provides for a 20% rule for downstream users. This applies to surface water trade and is relevant to trade between surface water and groundwater SDL resource units in Victoria’s North and Murray water resource plan area under section 10.39 of the Basin Plan. This is discussed in more detail in Column 5 of Victoria’s North and Murray Index Table response to section 10.39(2) of the Basin Plan.

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				Impact on third parties Section 12.24(d) of the Basin Plan requires measures to be in place to address the impact on third parties because of trade, on water availability in relation to a water access right held by a third party. Third party impacts are assessed as part of the relevant hydrogeological resource assessment where the impact of the change in extraction is assessed based on neighbour, local and regional impacts. The impact on third parties is managed through extensive consultation, assessment and right of appeal to the Victorian Civil and Administrative Tribunal.
10.37(2)	If the water resource plan applies a conversion rate to meet the condition in paragraph 12.24(d), the water resource plan must either: (a) specify the conversion rate; or (b) set out the way in which the conversion rate will be determined from time to time and made generally available.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. This matter is not relevant to the surface water component of Victoria’s North and Murray Water Resource Plan. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report 1. In the Goulburn-Murray water resource plan area a 20 percent conversion rate applies if specified in the relevant statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) for a water supply protection area declared under section 27 of the <i>Water Act 1989</i> (Vic). 2. References to sections of the Water Act do not have the effect of importing the sections referenced into the accredited material but are included for reference only.	n/a	
10.38(1)	A water resource plan must set out the circumstances in which trade between 2 groundwater SDL resource units is permitted. In setting out the circumstances, a water resource plan must ensure that each condition set out in section 12.25 will be met in relation to proposed trade.	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. This matter is not relevant to the surface water component of Victoria’s North and Murray Water Resource Plan.	n/a	

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		Goulburn-Murray water resource plan area – Goulburn-Murray: Highlands and Goulburn-Murray: Sedimentary Plain SDL resource units For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray, Highlands and Goulburn-Murray: Sedimentary Plain SDL resource units in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. - Trade between two groundwater SDL resource units within Victoria's North and Murray water resource plan area is permitted in the following circumstances: - the two locations are within the Goulburn-Murray: Sedimentary Plain SDL resource unit and the Goulburn-Murray: Highlands SDL resource unit and sufficient hydraulic connectivity between the two locations has been demonstrated by the relevant hydrogeological resource assessment or statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic) where appropriate; and - if the relevant permissible consumptive volume declared under section 22A of the <i>Water Act 1989</i> (Vic) is not exceeded; and - if the volume to be traded is specified, noting that in Victoria measures are in place to ensure that the water access right to be traded will maintain its characteristics of timing, reliability and volume; and - where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water and measures are in place to address any adverse effect. - Where trade occurs in the above circumstances it will be recorded on the Victorian Water Register. Figure 7-7 of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer (trade) of a take and use licence under the Water Act and demonstrates how the conditions set out in section 12.25 of the Basin Plan align with the Victorian framework. Reference to the <i>Water Act 1989</i> (Vic) in Figure 7-7 of Victoria's North and Murray Comprehensive Report does not form part of the response and is included for reference only. - References to sections of the <i>Water Act 1989</i> (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only. Note 1: Section 12.27 of the Basin Plan clarifies that the requirements of Chapter 12 of the Plan, including trade within a groundwater SDL unit (section 12.24 of the Basin Plan), trade between groundwater SDL units (section 12.25 of the Basin Plan), and trade between groundwater and surface water (section 12.26 of the Basin Plan) are not intended to prevent a restriction being imposed on a trade of a water access right under State water management law because a person has committed an offence or failed to pay fees or charges. State water management law includes the <i>Water Act 1989</i> (Vic) and regulations and other instruments made under that Act. Note 2: Permissible consumptive volumes declared under section 22A of the <i>Water Act 1989</i> (Vic) have the effect of setting a resource condition limit for the resource to which the declaration applies.	n/a	See discussion in Column 5 in response to section 10.37 of the Basin Plan regarding the process for assessing trade and the assessment of sufficient hydraulic connectivity, resource condition limits, maintaining characteristics of the water access right (take and use licence) and measures to address third party impacts. Below is an outline of the connectivity between two SDL resource units within the Goulburn-Murray water resource plan area. This requirement is met as the circumstances identified in Column 3 of this row ensure the conditions set out in section 12.25 of the Basin Plan are met. Trade into or out of two groundwater SDL resource units (Goulburn-Murray: Highlands and Goulburn-Murray: Sedimentary Plain SDL resource units is permitted). The Goulburn-Murray: Sedimentary Plain SDL unit and the upgradient Goulburn-Murray: Highlands SDL unit are hydraulically connected at their boundary. For example, the Deep Lead aquifers contained in the Highlands SDL resource unit are hydraulically-connected to the Deep Lead aquifers present within the Sedimentary Plain SDL resource unit. Across the Central Victorian Mineral Springs Groundwater Management Area, Hagerty and Webb (2008) describe the results of water sampling and isotopic analysis that shows that the highlands Deep Lead aquifer is rapidly recharged through the overlying basalt aquifer. They also show the strong connection between the groundwater systems and surface water. Groundwater discharge dominates streamflow at low flows. Groundwater resource assessments and numerical modelling studies have also highlighted the interconnection between the Sedimentary Plain and Highlands SDL resource units; along the highland fringes and in the alluvial sediments within the river valleys of the Ovens, Broken, Goulburn, Campaspe and Loddon valleys and their tributaries. While sufficient hydraulic connectivity has not been demonstrated or established between all locations between two SDL resource units, it is proposed that Victoria's North and Murray Water Resource Plan is enabling of trade to support development of trading zones as understanding of hydraulic connectivity is improved. The effect of paragraph (a) in the accredited text in Column 3 is to require the decision makers to turn their mind to sufficient hydraulic connectivity when determining whether a transfer of a groundwater take and use licence should be approved. Failure to consider whether sufficient hydraulic connectivity is established would result in the decision maker acting inconsistent with Victoria's North and Murray Water Resource Plan which is an offence under section 58 of the Commonwealth Water Act and enforceable by the MDBA. Furthermore, consistency with water resource plans must be reported under Matter 19 of Schedule 12 to the Basin Plan. Regardless of whether the ability to trade has already been established between two locations via a previously approved trade, a hydrogeological assessment will always be undertaken in respect of each individual trade (either based on previous or new technical analysis) see Section 7.4.2.1 and Section 7.4.2.2 of Victoria's North and Murray Comprehensive Report. Individual statutory plans and local management plans have been developed across priority areas within the Sedimentary Plain SDL resource unit to support effective management of the groundwater resource. Some plans identified defined management zones with maximum licence volume limits for each, to provide a greater ability to manage the resource at the local scale and to reduce local impacts to neighbouring groundwater users, including the environment. All plans allow groundwater trade to occur if it does not cause the sum of total entitlement to exceed the permissible consumptive volume nor exceed any cap which may apply to the management zone (where present); and that it does not cause unacceptable groundwater interference or water quality impacts to environmental or consumptive users in the local area. Trade between two SDL resource units is permitted where the two locations are within the Goulburn-Murray: Sedimentary Plain SDL resource unit and the Goulburn-Murray: Highlands SDL resource unit, as these SDL resource units are considered to have sufficient hydraulic connectivity.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Note 3: See response to section 10.18 (3) of the Basin Plan which applies a rule under paragraph (1) of that response relating to the consideration of risks to high value groundwater dependent ecosystems relating to the transfer of a take and use licence. This rule applies the <i>Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems</i> (Minister for Water, 2015). See the discussion in response to Part 4 in Column 5 of Victoria's North and Murray Index Table for more information on the application of this policy and the rule.		See the discussion in Column 5 above in response to section 10.37 of the Basin Plan for: - A discussion of resource condition limits as relates to 12.25(b) of the Basin Plan as discussed in reference to section 12.24(b) of the Basin Plan - A discussion of maintaining the characteristics of a water access right as relates to section 12.25(d) of the Basin Plan as discussed in reference to section 12.24(c) of the Basin Plan - A discussion of impact on third parties as relates to section 12.25(e) of the Basin Plan as discussed in reference to section 12.24(d) of the Basin Plan. In response to the condition in section 12.25(c) of the Basin Plan all trade is accounted for on the Victorian Water Register. Figure 7-7 in Section 7.4.2.1 of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer of a take and use licence under the Victorian Water Act in further detail. Figure 7-7 and Figure 7-11 shows how the circumstances under section 12.25 of the Basin Plan align with the Victorian framework and ensure that trade cannot occur where the circumstances of section 12.25 of the Basin Plan do not exist. Reference to Figure 7-7 in Column 3 of this Index does not have the effect of importing the sections of the Victorian Water Act referenced in the diagram into the accredited material. See Section 7.4.2.9 of Victoria's North and Murray Comprehensive Report for further explanation of trades between two groundwater SDL resource units in the Goulburn-Murray water resource plan area.
		Goulburn-Murray water resource plan area – Shepparton Irrigation Region and deep For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray. Shepparton Irrigation Region and the Goulburn-Murray: deep SDL resource units in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Trade is not permitted into or out of the Goulburn-Murray: Shepparton Irrigation Region or Goulburn-Murray: deep SDL resource units in the Goulburn-Murray water resource plan area.	n/a	Trade between the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit and neighbouring Goulburn-Murray SDL resource units is not permitted, as the objective of the Shepparton Irrigation Region GMA plan is to encourage groundwater extraction to provide salinity and shallow watertable control. Trade into or out of the Goulburn-Murray: deep SDL resource unit is not permitted, given the poor hydraulic connectivity between this unit and the overlying aquifer layers.
10.38(2)	If the water resource plan applies a conversion rate to meet the condition in paragraph 12.25(e), the water resource plan must either: (a) specify the conversion rate; or (b) set out the way in which the conversion rate will be determined from time to time and made generally available.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to the surface water component of Victoria's North and Murray Water Resource Plan.	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to Victoria's North and Murray Water Resource Plan.	n/a	This requirement is met as no conversion rates are applied in Victoria's North and Murray Water Resource Plan. A trade cannot be authorised in Victoria in circumstances where the trade will adversely impact water available to a third party. As identified for the purposes of section 10.38(1) of the Basin Plan, trade cannot occur if it results in an adverse impact on third parties.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.39(1)	A water resource plan must set out the circumstances in which trade between a groundwater SDL resource unit and a surface water SDL resource unit is permitted. In setting out the circumstances, a water resource plan must ensure that each condition set out in section 12.26 will be met in relation to proposed trade.	Victoria’s North and Murray water resource plan area - Trade between a groundwater SDL resource unit and a surface water SDL resource unit within Victoria’s North and Murray water resource plan area is permitted in the following circumstances: - the trade occurs in areas considered to have sufficient hydraulic connectivity as recognised in a statutory management plan approved under section 32A of the <i>Water Act 1989</i> (Vic); and - if the relevant permissible consumptive volume declared under section 22A of the <i>Water Act 1989</i> (Vic) is not exceeded; and - except for in the Upper Ovens River Water Supply Protection Area, for the transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and - in the Upper Ovens River Water Supply Protection Area, for the permanent transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and - where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water and measures are in place to address any adverse effect. - Where trade occurs in the above circumstances it will be recorded on the Victorian Water Register. Figure 7-7 of Victoria’s North and Murray Comprehensive Report depicts the process for determination of a transfer (trade) of a take and use licence under the <i>Water Act 1989</i> (Vic) and demonstrates how the conditions set out in section 12.26 of the Basin Plan align with the Victorian framework. Reference to the <i>Water Act 1989</i> (Vic) in Figure 7-7 of Victoria’s North and Murray Comprehensive Report does not form part of the response and is included for reference only. - References to sections of the <i>Water Act 1989</i> (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only. Note 1: Section 12.27 of the Basin Plan clarifies that the requirements of Chapter 12 of the Plan, including trade within a groundwater SDL unit (section 12.24 of the Basin Plan), trade between groundwater SDL units (section 12.25 of the Basin Plan), and trade between groundwater and surface water (section 12.26 of the Basin Plan) are not intended to prevent a restriction being imposed on a trade of a water access right under State water management law because a person has committed an offence or failed to pay fees or charges. State water management law includes the <i>Water Act 1989</i> (Vic) and regulations and other instruments made under that Act. Note 2: Permissible consumptive volumes declared under section 22A of the <i>Water Act 1989</i> (Vic) have the effect of setting a resource condition limit for the resource to which the declaration applies.	n/a	See discussion in Column 5 in response to section 10.37 of the Basin Plan regarding the process for assessing trade and the assessment of sufficient hydraulic connectivity, resource condition limits, maintaining characteristics of the water access right (take and use licence) and measures to address third party impacts. Below is an outline of the connectivity between two SDL resource units within the Goulburn-Murray water resource plan area. Trade between surface water and groundwater is permitted where there is a high degree of connection recognised for the resource. Currently there is one area where groundwater to surface water trade is permitted: the Upper Ovens River Water Supply Protection Area (WSPA). This WSPA area contains significant groundwater resources within the alluvial sediments which are in close hydraulic connection to the main rivers and streams of the area. The WSPA has been split into two management zones: Zone 1 covers the extend of the highly permeable river alluvium and associated hillslope colluvium, with Zone 2 comprising the less conductive fractured bedrock which is not significantly hydraulically connected to the stream systems. In the Upper Ovens River WSPA Water Management Plan, the rules for transfers of entitlement are based around the following principles: - Groundwater and surface water in Zone 1 have consistent rules - Trade upstream can occur as Winter-take only - Trade of all-year licences can occur downstream only and subject to loss of 20%. - Trade/convert from Zone 1 all–year groundwater to surface water but not surface water to groundwater - Shifting entitlement from Zone 1 all–year to Winter–take or Zone 2 benefits summer flow and is supported. Where relevant, condition limits are also set through a permissible consumptive volume order declared under section 22A of the Victorian Water Act. A PCV declaration essentially determines the consumptive cap for the specified resource and operates to limit the issuing of new entitlement volume. The Minister (or delegate) cannot issue a new take and use licence if it would result in the relevant permissible consumptive volume being exceeded. The Upper Ovens River WSPA does not have a permissible consumptive volume set on groundwater resources as the limit on issuing groundwater and surface water licences are prescribed in the Upper Ovens River WSPA Management Plan. An “all-year” groundwater licence cannot be issued if the combined “all-year” surface water and groundwater licences in Zone 1 exceed 14,546 ML/yr. Licensing in Zone 1 is effectively limited by the surface water cap on all year licences. In response to the matters outlined in section 12.26(d) of the Basin Plan, Zone 1 (which includes surface water and groundwater) in the Upper Ovens River WSPA where trade occurs is viewed as a combined unit. Therefore, the water access rights (take and use licences) in the area have substantially similar characteristics and those characteristics would be maintained to the extent possible after the trade (i.e. surface water flow rates would not apply to groundwater take). The Upper Ovens is considered a combined unit because the aquifer and river systems are in close connection and comprise coarse sand and gravels and some clay. This area has a long history of impacts to the watertable from surface water extraction and stream depletion through excessive pumping of groundwater close to the river. Measures to ensure the maintenance of characteristics of water access rights (take and use licences) are outlined in the Upper Ovens River WSPA Management Plan https://www.g-mwater.com.au/water-resources/ground-water/management/upperovenswspa the Upper Ovens Transfer Rules (https://www.g-mwater.com.au/downloads/gmw/Groundwater/Upper_Ovens_WSPA/FACT_SHEET_-_TRANSFER_RULES_FOR_THE_UPPER_OVENS_RIVER_WATER_MANAGEMENT_PLAN.pdf).

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Note 3: See response to section 10.18 (3) which applies a rule under paragraph (1) of that response relating to the consideration of risks to high value groundwater dependent ecosystems relating to the transfer of a take and use licence. This rule applies the <i>Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems</i> (Minister for Water, 2015). See the discussion in response to Part 4 in Column 5 of Victoria’s North and Murray Index Table for more information on the application of this policy and the rule. Note 4: The effect of the circumstance identified in paragraph (d) is that in the Upper Ovens River Water Supply Protection Area (WSPA), where groundwater is permanently traded upstream, a downstream full year licence cannot be traded and converted to a winter-fill licence upstream. The ‘upstream trading rule’ in the Upper Ovens River WSPA Water Management Plan, however, only permits trade of a downstream full year licence to an upstream water user if the licence is converted into a winter-fill licence. Accordingly, for upstream trade of full year licences to continue, the licence will need to be converted to a winter-fill licence prior to being traded to comply. Goulburn-Murray Water will need to identify a process for managing this type of trade prior to approving a trade in the Upper Ovens River Water Supply Protection Area to ensure decisions are consistent with Victoria’s North and Murray Water Resource Plan and Chapter 12 of the Basin Plan.		See the discussion in Column 5 above in response to section 10.37 of the Basin Plan for: • A discussion of resource condition limits as relates to 12.26(b) of the Basin Plan as discussed in reference to section 12.24(b) of the Basin Plan • A discussion of maintaining the characteristics of a water access right as relates to section 12.26(d) of the Basin Plan as discussed in reference to section 12.24(c) of the Basin Plan • A discussion of impact on third parties as relates to section 12.26(e) of the Basin Plan as discussed in reference to section 12.24(d) of the Basin Plan. Figure 7-7 in Section 7.4.2.1 of Victoria’s North and Murray Comprehensive Report depicts the process for determination of a transfer of a take and use licence under the Victorian Water Act in further detail. Figure 7-7 shows how the circumstances under section 12.26 of the Basin Plan align with the Victorian framework and ensure that trade cannot occur where the circumstances of section 12.26 of the Basin Plan do not exist. Reference to Figure 7-7 in Column 3 of this Index does not have the effect of importing the sections of the Victorian Water Act referenced in the diagram into the accredited material. Figure 7-11 identifies how the requirements of Chapter 12 of Basin Plan align with the content of Victoria’s North and Murray Water Resource Plan in response to Part 8 of Chapter 10 of the Basin Plan in addition to demonstrating how the requirements under Victoria’s Water Act align with those requirements.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.39(2)	If the water resource plan applies a conversion rate to meet the condition in paragraph 12.26(e), the water resource plan must either: (a) specify the conversion rate; or (b) set out the way in which the conversion rate will be determined from time to time and made generally available.	Victoria's North and Murray water resource plan area 1. In Victoria's North and Murray water resource plan area a 20 per cent conversion rate applies if specified in the relevant statutory management plan approved under section 32A of the Water Act 1989 (Vic) for a water supply protection area declared under section 27 of the <i>Water Act 1989</i> (Vic). 2. References to sections of the Water Act do not have the effect of importing the sections referenced into the accredited material but are included for reference only.	n/a	In considering an application for trade, regard must be had to any adverse impact the trade would have on water available to a third party (as identified for the purposes of section 10.39 (1)) of the Basin Plan. Given its combined surface water and groundwater focus, the Upper Ovens River WSPA Water Management Plan (https://www.g-mwater.com.au/water-resources/ground-water-management/upperovenswspace) applies the current State-wide surface water trading rule whereby a loss factor of 20% is applied for downstream trades of all-year licences. The loss factor is a current requirement for all surface water plans across northern Victoria and is designed to prevent third party impacts from excessive demand on downstream entitlements. Under Basin Plan this loss factor meets the characteristics of a "conversion rate" for the purposes of section 10.39(2) of the Basin Plan. The way in which a conversion rate will be determined from time to time and made generally available is outlined (as required under section 10.39(2)(b) of the Basin Plan) is outlined in the accredited text of Column 3 of Victoria's North and Murray Index Table in response to section 10.39(2) of the Basin Plan. In the Upper Ovens River WSPA Water Management Plan, the rules for transfers of entitlement are based around the following principles: 1. Groundwater and surface water in Zone 1 have consistent rules 2. Trade Upstream can occur as Winter-take only 3. Trade of all-year licences can occur Downstream only and subject to loss of 20%. 4. Trade/convert from Zone 1 all-year Groundwater to Surface water but not Surface water to Groundwater 5. Shifting entitlement from Zone 1 all-year to Winter-take or Zone 2 benefits summer flow and is supported Given its combined surface water and groundwater focus, the Upper Ovens River WSPA Water Management Plan (https://www.g-mwater.com.au/water-resources/ground-water-management/upperovenswspace) in Management Zone 1, surface water licences and groundwater licences are interchangeable in recognition of the high level on interconnection between these resources although rules have been developed to manage the impacts of taking water on flows in the waterways. The Upper Ovens River WSPA Water Management Plan applies a surface water trading rule whereby a loss factor of 20% is applied for downstream trades of all-year licences. The effect of this 20% loss factor is that as part of the permanent or temporary downstream transfer of a licence to take water from unregulated water systems (including groundwater under this Management Plan), the Minister (or delegate) may impose a condition in the Upper Ovens River WSPA Water Management Plan area that the buyer is only entitled to receive less than 80% of the licence volume transferred by the seller. The reduction in licence volume from the seller to the downstream buyer is implemented to account for evaporation, seepage and other losses which would occur in the system between the seller's upstream extraction point and the buyer's downstream extraction point. Without this deduction the buyer would be taking a greater net volume of water out of the system than the seller. Meaning the effect of the rule is to maintain the relative volume of the water access right (licence) between upstream and downstream users given the difference between availability. Without this rule the buyer would have a negative impact on the overall resource availability for all entitlement holders including potential adverse impacts on the environment. This is a general rule to manage potential impacts on water availability for all licence holders and is in line with 12.18(b). The rule is applied uniformly because the impact of taking water from the surface water system or the groundwater system is essentially the same, even though there may be time lag effects in relation to groundwater extractions. Therefore, the rule will apply to groundwater to groundwater trades and groundwater to surface water trades. The application of this rule is to ensure that levels of take remain within the resource condition limit across the management area.

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Part 9	Approaches to addressing risks to water resources			
10.40	In this Part: <i>risk</i> means a risk listed in a water resource plan in accordance with subsection 10.41(4). <i>level of risk</i> has the meaning given in AS/NZS ISO 31000:2009 Risk Management—Principles and Guidelines.	Victoria’s North and Murray water resource plan area This matter informs the interpretation of <i>risk</i> and <i>level of risk</i> and does not contain a water resource plan requirement.	n/a	
10.41(1)	A water resource plan must be prepared having regard to current and future risks to the condition and continued availability of the water resources of the water resource plan area.	Victoria’s North and Murray water resource plan area No accredited text needed for a requirement to ‘have regard to’. Explanation of how regard was had is in Column 5.	n/a	Victoria’s North and Murray Water Resource Plan was prepared having regard to the current and future risks to the condition and continued availability of the water resource in the water resource plan area as explained in Part 2 of Victoria’s North and Murray Risk Assessment Report at Appendix B to Victoria’s North and Murray Comprehensive Report. Current and future risk is defined at Part 2 of the Victoria’s North and Murray Risk Assessment Report at Appendix B to Victoria’s North and Murray Comprehensive Report. Given the WRP is based on Victoria’s existing framework and the existing rules and arrangements under the Victorian Water Act were considered including the impact of those arrangements on connected resources outside Victoria’s North and Murray water resource area. Current risks represent those threats and causes being experienced now and future risks represent threats and causes proposed by scenarios of a possible future. Importantly the scenarios cover a range of possible future situations and are not ‘forecasts’ of a most likely future. The scenarios each represent a possible future. Victoria’s North and Murray Risk Assessment Report has not combined these scenarios to form one overall future scenario. Each scenario has been assessed independently to identify the risk associated with that cause and related scenario. Scenarios have also been identified at the Water Resource Plan area scale to ensure their relevance to the causes and threats that will potentially drive risks in each area. As a result, current risks are dealt with under Victoria’s North and Murray Risk Assessment Report through the initial identification of possible risks. Future risks are identified through the scenarios. A conservative approach has been applied to the identification of current risks whereby it is assumed that a ‘stress tested’ future risk identified through the application of a future scenario is also assumed to also be a current risk for the purpose of identifying strategies to address these risks now and in the future. In other words, risks identified in the risk tables are both current and future. In identifying risks under Victoria’s North and Murray Risk Assessment, all possible risks to the condition and availability of water in Victoria were identified. All existing policy and practice were applied to those risks to determine <i>residual risk</i>. Victoria’s North and Murray Risk Assessment is based on the current level of risk assuming existing policy and practice are in place. In this respect, the risk assessment identifies the level of residual risk under current arrangements in Victoria. Residual risks are those which exist after the application of Victoria’s existing water resource management rules, strategies, policies and arrangements. The residual risks identified are ongoing risks that require ongoing monitoring and reassessment to determine the best way to manage them over time. For example, climate change which is an ongoing issue. The application of a strategy to treat or mitigate an identified risk will not have the effect of creating a new risk given Victoria’s framework requires decision makers to consider the environment, water quality and third-party impacts. If there is a trade-off between the treatment of two risks, the point at which the trade-off is made and the deterioration of condition or availability in a specified circumstance is accepted the occurrence of that deterioration is no longer considered a risk to the system.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.41(2)	Without limiting subsection (1), the risks include (where applicable): (a) risks to the capacity to meet environmental watering requirements; and (b) risks arising from the matters referred to in subsection 10.20(1); and (c) risks arising from potential interception activities; and (d) risks arising from elevated levels of salinity or other types of water quality degradation.	Victoria's North and Murray water resource plan area In preparing Victoria's North and Murray Risk Assessment Report for Victoria's North and Murray Water Resource Plan, the matters identified in section 10.41(2) of the Basin Plan were considered.	n/a	Part 2 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report includes the risks set out in this subsection. Reference below to "Appendix B" is reference to Appendix B to Victoria's North and Murray Comprehensive Report. Given Victoria's North and Murray Water Resource Plan is based on Victoria's existing framework and the existing rules and arrangements under the Victorian Water Act were considered under the Risk Assessment including the impact of those arrangements on connected resources outside Victoria's North and Murray water resource plan area, the Risk Assessment does not consider the risks associated with the implementation of Victoria's North and Murray Water Resource Plan. For example, it is identified that existing arrangements such as SCBEWC (identified in Strategy 3 and 5) and the management of the Southern-connected Murray System (identified in Strategy 23) are discussed in Victoria's North and Murray Risk Assessment at Appendix B to Victoria's North and Murray Comprehensive Report. Risks to the capacity to meet environmental watering requirements in the Northern Victoria water resource plan area are outlined in Part 3.2.2.1 (surface water availability risks) in Table 3.2.10 to Table 3.2.13, Part 3.2.2.2 (surface water condition risks) in Table 3.2.14 to Table 3.2.18 and Part 3.2.6 (priority environmental assets and ecosystem functions) in Table 3.2.14 to Table 3.2.18 of Victoria's North and Murray Risk Assessment Report at Appendix B. Risks to the capacity to meet environmental watering requirements in the Victorian Murray water resource plan area are outlined in Part 3.4.2.1 (surface water availability risks) in Table 3.4.9 to Table 3.4.11, Part 3.4.2.2 (surface water condition risks) in Table 3.4.12 to Table 3.4.16 and Part 3.4.6 (priority environmental assets and priority ecosystem functions) in Table 3.4.33 to Table 3.4.36 of Victoria's North and Murray Risk Assessment Report at Appendix B. For groundwater see Part 3.3.2.1 (groundwater availability) in Table 3.3.4 and Part 3.3.6.1 (Part 4 Basin Plan matters) in Table 3.3.18 and Table 3.3.19 of Victoria's North and Murray Risk Assessment Report at Appendix B. Part 3.3.6.2 of Victoria's North and Murray Risk Assessment Report at Appendix B identifies that the productive base of groundwater systems was assessed in terms of the ability of the aquifer to provide water for environmental and consumptive purposes in the context of damage to the structural form of the aquifer arising from take across environmental or consumptive users. No medium or higher-level risks associated with changes to the structural form were identified. Risks arising from potential interception activities are discussed at Part 3.2.7 for the Northern Victoria water resource plan area in Table 3.2.11 (availability) and Table 3.4.41 (condition), at Part 3.4.7 for the Victoria Murray water resource plan area in Table 3.4.38 (availability) and Table 3.4.39 (condition) and Part 3.3.7 for groundwater in Table 3.3.21 (availability) and Table 3.3.22 (condition) in Victoria's North and Murray Risk Assessment Report at Appendix B. Risks arising from elevated levels of salinity or other types of water quality degradation for surface water are discussed for the Northern Victoria water resource plan area at Part 3.2.1.2 (consumptive use in Table 3.2.5 to Table 3.2.9), Part 3.2.2.2 (environmental uses in Table 3.2.10 to Table 3.2.18), Part 3.2.3.2 (Aboriginal uses in Table 3.2.19 to Table 3.2.28), Part 3.2.4.2 (recreational/social uses in Table 3.2.29 to Table 3.2.33) and Part 3.2.5.1 (critical human water needs in Table 3.2.34). For the Victorian Murray water resource plan area at Part 3.4.1.2 (consumptive use in Table 3.4.4 to Table 3.4.8), Part 3.4.2.2 (environmental uses in Table 3.4.12 to Table 3.4.16), Part 3.4.3.2 (Aboriginal uses in Table 3.4.22 to Table 3.4.26), Part 3.4.4.2 (recreational/social uses in Table 3.4.28 to Table 3.4.30) and Part 3.4.5.2 (critical human water needs in Table 3.4.32) of Victoria's North and Murray Risk Assessment Report at Appendix B. For groundwater this is discussed at Part 3.3.1.2 (consumptive uses in Table 3.3.2 and Table 3.3.3), Part 3.3.3.2 (Aboriginal uses in Table 3.3.10 to Table 3.3.14), Part 3.3.5.2 (critical human water needs in Table 3.3.17) of Victoria's North and Murray Risk Assessment Report at Appendix B. No groundwater risks were identified for environmental uses or recreation/social uses. In respect of section 10.41(2)(b) of the Basin Plan see also the discussion in response to section 10.20 of the Basin Plan in Victoria's North and Murray Index Table.

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10.41(3)	In identifying risks for the purposes of subsection (1), regard must be had to: (a) risks identified in section 4.02; and (b) any guidelines published by the Authority in relation to risk identification and Risk Assessment Report.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	How regard has been given, in identifying risks for subsection (1), is explained in Part 2 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report.
10.41(4)	The water resource plan must list the risks identified for the purposes of subsection (1).	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.1.1 in Part 2.1 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan. Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.3.1 in Part 2.3 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.2.1 in Part 2.2 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan.	n/a	This water resource plan requirement has been met as the text in Column 3 of this row identifies where a list of risks identified for the purposes of section 10.41(1) of the Basin Plan can be found in Victoria's North and Murray Comprehensive Report.
10.41(5)	The water resource plan must assess each risk.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.1.1 in Part 2.1 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan. Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.3.1 in Part 2.3 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan.	n/a	This water resource plan requirement has been met as the text in Column 3 of this row identifies where a list of risks identified for the purposes of section 10.41(1) of the Basin Plan are assessed in Victoria's North and Murray Comprehensive Report.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report Table 2.2.1 of Part 2.2 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan.	n/a	
10.41(6)	The water resource plan must define the level of risk of each risk, using the following categories: (a) low; (b) medium; (c) high; (d) if it is considered appropriate, any additional category.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.1.1 in Part 2.1 of Victoria's north and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan. Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.3.1 in Part 2.3 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report Table 2.2.1 in Part 1.1 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report lists the risks identified for the purposes of section 10.41(1) of the Basin Plan.	n/a	This water resource plan requirement has been met as the text in Column 3 of this row identifies where the level of risk is defined for each risk identified for the purposes of section 10.41(1) of the Basin Plan in Victoria's North and Murray Comprehensive Report. Note: response to Part 5 of Chapter 10 of the Basin Plan above.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.41(7)	The water resource plan must describe the data and methods used to identify and assess the risks.	Victoria’s North and Murray water resource plan area A description of the data used to identify and assess the risks is at Schedule 1 of Victoria’s North and Murray Risk Assessment Report at Appendix B. Methods used to identify and assess the risks is contained in Part 1 of Victoria’s North and Murray Risk Assessment Report at Appendix B. The high risk identified with runoff dam interception has been subsequently downgraded following an update to the modelling. This risk level is not reflected in the response to Part 5 of the Basin Plan under section 10.23(1) of the Basin Plan. When more accurate data is available for assessment of interception by runoff dams, Victoria’s North and Murray Risk Assessment will be revised. The modelling used to inform whether a significant impact under Part 5 exists has been updated since undertaking the risk assessment. The data and methods used to respond to Part 5 are outlined in Section 11.41.5 (runoff dams) and Section 12.4.31 (commercial plantations).	n/a	This water resource plan requirement has been met as the text in Column 3 of this row identifies where the data and methods used to identify and assess the risks are in Victoria’s North and Murray Comprehensive Report. The modelling used to underpin the risk assessment relating to interception of water by runoff dams has been updated since completing the risk assessment. The revised modelling is still undergoing review to improve certainty regarding the estimated levels of water interception. For this reason, the revised modelling has been applied in assessment of interception for the purposes of Part 5 of Chapter 10 of the Basin Plan as outlined at Section 11.41.5 of Victoria’s North and Murray Comprehensive Report. The risk assessment as outlined in this Appendix has not been updated to reflect the new modelling at the time of submission of Victoria’s North and Murray Water Resource Plan. As identified in Victoria’s North and Murray Comprehensive Report at Section 11.4.1.5, it is estimated that the capacity of runoff dams across the Northern Victoria water resource plan area could increase by 11.3GL over 10 years based on a conservatively high estimate of 0.55% rate of growth. Victoria’s North and Murray Risk Assessment Report (see Appendix B of Victoria’s North and Murray Comprehensive Report) identified a medium to very low risk associated with growth in runoff dams during the period to 2029. However, the risk was based on information that has been superseded by modelling work that occurred after the completion of the risk assessment. Victoria proposes to update the risk assessment for runoff dams when the uncertainty associated with estimates of take can be reduced. See Part 3.2.7, Part 3.3.7 and Part 3.4.7 of Appendix B to Victoria’s North and Murray Comprehensive Report. A comparison of the figures used for Victoria’s North and Murray Risk Assessment in Appendix B and the revised figures is provided in Table 11-7 (Victorian Murray water resource plan area) and Table 11-8 (Northern Victoria water resource plan area) in Victoria’s North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.41(8)	The water resource plan must describe any quantified uncertainties in the level of risk attributed to each risk, including the results of any sensitivity analysis.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.1.2 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report contains any quantified uncertainties and the results of any sensitivity analysis for the risks identified for the purposes of section 10.42 of the Basin Plan. The results of the sensitivity analysis are contained in Column 5 of Table 3.2.1 to Table 3.2.44 for the Northern Victoria water resource plan area of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report. Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.3.2 in Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report contains any quantified uncertainties and the results of any sensitivity analysis for the risks identified for the purposes of section 10.42 of the Basin Plan. The results of the sensitivity analysis are contained in Column 5 of Table 3.4.1 to Table 3.4.41 for the Victorian Murray water resource plan area of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report. Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Table 2.2.2 in Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report contains any quantified uncertainties and the results of any sensitivity analysis for the risks identified for the purposes of section 10.42 of the Basin Plan. The results of the sensitivity analysis are contained in Column 5 of Table 3.3.1 to Table 3.3.24 in Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report.	n/a	This requirement is met as the text in Column 3 of this row identifies the part of Victoria's North and Murray Risk Assessment Report where the quantified uncertainties in the level of risk attributed to each risk, including the results of any sensitivity analysis.
10.42(a)	A water resource plan must describe: (a) each risk which is defined in accordance with subsection 10.41(6) as having a medium or higher level of risk	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Each risk that is defined as having a medium or higher level of risk is described Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report in the following Table 3.2.1 to Table 3.2.44.	n/a	This water resource plan requirement has been met as the text in Column 3 of this row identifies where each risk defined as having a medium or higher level of risk is in Victoria's North and Murray Comprehensive Report. The risk rating is identified in Column 1 of Table 3.2.1 to Table 3.2.44 (Northern Victoria water resource plan area) and Table 3.4.1 to Table 3.4.41 (Victorian Murray water resource plan area) of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report. Note: high risks identified with runoff dam interception has been subsequently downgraded following an update to the modelling. This risk level is not reflected in the response to Part 5 of the Basin Plan under section 10.23(1) of the Basin Plan. When more accurate data is available for assessment of interception by runoff dams, Victoria's North and Murray Risk Assessment will be revised. See response to Part 5 of Chapter 10 of the Basin Plan above.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.42(b)	A water resource plan must describe: (b) factors that contribute to those risks.	Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Each risk that is defined as having a medium or higher level of risk is described Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report in Table 3.4.1 to Table 3.4.41 .	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Each risk that is defined as having a medium or higher level of risk is described in Table 3.3.1 to Table 3.3.24 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report.	n/a	This requirement is met as the text in Column 3 of this row identifies where each risk defined as having a medium or higher level of risk is in Victoria's North and Murray Comprehensive Report. The risk rating is identified in Column 1 of Table 3.3.1 to Table 3.3.24 of Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report.
		Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. For each risk that is defined as having a medium or higher level of risk the factors that contribute to those risks are outlined in the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report in Columns 2, 3 and 4 of Table 3.2.1 to Table 3.2.44 for the Northern Victoria water resource plan area	n/a	This requirement is met as the part of Victoria's North and Murray Risk Assessment Report identified in Column 3 of this row identifies factors contributing to each risk defined as having a medium or higher level of risk are in Victoria's North and Murray Comprehensive Report. The factors contributing to the risk are identified in Columns 2, 3 and 4 of Table 3.2.1 to Table 3.2.44 (Northern Victoria water resource plan area) and Table 3.4.1 to Table 3.4.41 (Victorian Murray water resource plan area) of the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report.
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. For each risk that is defined as having a medium or higher level of risk the factors that contribute to those risks are outlined in the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report in Columns 2, 3 and 4 of Table 3.4.1 to Table 3.4.41 for the Victorian Murray water resource plan area.	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Each risk that is defined as having a medium or higher level of risk is described in Columns 2, 3 and 4 of Table 3.3.1 to Table 3.3.24 of the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report.	n/a	This requirement is met as the part of Victoria's North and Murray Risk Assessment Report identified in Column 3 of this row identifies factors contributing to each risk defined as having a medium or higher level of risk are in Victoria's North and Murray Comprehensive Report. The factors contributing to the risk are identified in Columns 2, 3 and 4 of Table 3.3.1 to Table 3.3.24 of the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.43(1)	If a water resource plan defines a risk in accordance with subsection 10.41(6) as having a medium or higher level of risk, the water resource plan must either: (a) describe a strategy for the management of the water resources of the water resource plan area to address the risk in a manner commensurate with the level of risk; or (b) explain why the risk cannot be addressed by the water resource plan in a manner commensurate with the level of risk.	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. A strategy is described for each risk that is defined as having a medium or higher level of risk in the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report. Table 4.2.1 provides a description of each strategy and Column 6 of the Table 3.2.1 to Table 3.2.44 identify the strategies relevant to the risks. In addition to the strategies identified in Appendix B to Victoria's North and Murray Comprehensive Report, the rules identified in response to sections 10.18 and 10.19 of the Basin Plan contained in Column 3 of Victoria's North and Murray Index Table considered sufficient to respond to consequences of risks arising from changes to the timing and location of demand. Additional rules are not considered necessary in addition to the strategies identified in relation to these risks in Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report.	Department	This requirement is satisfied as the text in Column 3 of this row identifies a strategy to address each risk that is defined as having a medium or higher risk and where these strategies are set out in Victoria's North and Murray Comprehensive Report. Factors contributing to each risk defined as having a medium or higher level of risk is in Victoria's North and Murray Comprehensive Report. The strategies identified in Column 6 to respond to the identified risks are outlined in detail in Table 4.2.1 of the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report. Table 4.2.1 must be read in conjunction with Columns 2, 3 and 4 of Table 3.2.1 to Table 3.2.44 (Northern Victoria water resource plan area) and Table 3.4.1 to Table 3.4.41 (Victorian Murray water resource plan area) to understand the strategies to address the risks identified in Victoria's North and Murray Risk Assessment Report.
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. A strategy is described for each risk that is defined as having a medium or higher level of risk in the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report. Table 4.2.1 provides a description of each strategy and Column 6 of the Table 3.4.1 to Table 3.4.41 identify the strategies relevant to the risks. In addition to the strategies identified in Appendix B to Victoria's North and Murray Comprehensive Report, the rules identified in response to sections 10.18 and 10.19 of the Basin Plan contained in Column 3 of Victoria's North and Murray Index Table considered sufficient to respond to consequences of risks arising from changes to the timing and location of demand. Additional rules are not considered necessary in addition to the strategies identified in relation to these risks in Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report.	Department	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. A strategy is described for each risk that is defined as having a medium or higher level of risk in the Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report. Table 4.2.1 provides a description of each strategy and Column 6 of Table 3.3.1 to Table 3.3.24.		
			Department	This requirement is met as the text in Column 3 of this row identifies a strategy to address each risk that is defined as having a medium or higher risk and where these strategies are set out in Victoria's North and Murray Comprehensive Report. Factors contributing to each risk defined as having a medium or higher level of risk are in Victoria's North and Murray Comprehensive Report. The strategies identified in Column 6 to respond to the identified risks are outlined in detail in Table 4.2.1 of the Northern Victoria Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report. Table 4.2.1 must be read in conjunction with Table 3.3.1 to Table 3.3.24 to understand the strategies to address the risks identified in Victoria's North and Murray Risk Assessment Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.43(2)	If the water resource plan identifies a risk which relates to a matter dealt with by a requirement in another Part of this Chapter, the strategy must take account of that requirement.	Victoria's North and Murray water resource plan area Table 4.2.1 of Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report details each risk strategy identified in response to the risks. Table 3.2.1 to Table 3.4.4.1 identify whether the strategy applies to a surface water or groundwater risks. No strategies are required to address matters that have a low risk and therefore it is not relevant to this requirement to consider requirements in Chapter 10 of the Basin Plan relating to matters identified as a low risk in Victoria's North and Murray Risk Assessment Report. Part 4, 5 and 7 also contain provisions to deal with risks. How those specific risks have been addressed is outlined in Column 3 and Column 5 of those Parts of Victoria's North and Murray Index Table.	n/a	See Table 4.2.1 in Victoria's North and Murray Risk Assessment Report at Appendix B of Victoria's North and Murray Comprehensive Report for details each risk strategy. Victoria's North and Murray Risk Assessment Report was undertaken based on the regulatory framework, policies and strategies in place in Victoria in 2016. The assessment has also been based on the assumption that the Basin Plan is in place and that the Basin Plan does not in itself represent or impose a threat to the continued availability and condition of the water resources. In other words, Victoria's North and Murray Risk Assessment Report assumed that the Basin Plan and the component strategies identified within it for managing risk are in place including the requirements of Chapter 10. Management strategies have been developed for Victoria's North and Murray Water Resource Plan to address the risks assessed as medium and high and to meet the Chapter 10, Basin Plan requirements. Addressing these residual risks will be achieved through a combination of state-based policy and program development, collaboration with regional water managers and engagement with regional stakeholders and interstate water planning agencies. Medium and high-level risks identified through Victoria's North and Murray Risk Assessment Report require ongoing adaptive management, further gathering of information to better understand the risk or both the strategies cited in Table 4.2.1. See response in Index Table above to sections 10.22(b), 10.23, 10.31 of the Basin Plan above for discussion of relevant risks. How other requirements of Chapter 10 of the Basin Plan were considered when developing strategies is identified in the explanation of the strategy where Chapter 10 considerations are relevant. The Commonwealth Water Act requires Victoria to act consistently with Basin Plan (see section 35) and water resource plans (see section 59). Therefore, when implementing the strategies identified in Victoria's North and Murray Risk Assessment Report, the requirements of Basin Plan and the relevant water resource plan must be taken into account. Nothing identified in Victoria's North and Murray Risk Assessment Report is inconsistent with the requirements of Basin Plan or the content of Victoria's North and Murray Water Resource Plan.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material	
10.43(3)	A water resource plan must be prepared having regard to: (a) the strategies listed in subsection 4.03(3); and (b) any guidelines published by the Authority in accordance with section 4.04.	Victoria’s North and Murray water resource plan area No accredited text needed for a requirement to ‘have regard to’. Explanation of how regard was had is in Column 5.	n/a	This requirement is met as Victoria’s North and Murray Water Resource Plan was developed having regard to the strategies listed in section 4.03(3) of the Basin Plan in the following way: - when developing Columns 2, 3 and 4 of Table 3.2.1 to Table 3.2.44 (Northern Victoria water resource plan area) and Table 3.4.1 to Table 3.4.41 (Victorian Murray water resource plan area) and Table 3.3.1 to Table 3.3.24 (Goulburn-Murray water resource plan area) of Appendix B to Victoria’s North and Murray Comprehensive Report regard was given to the strategies listed in section 4.03(3) of the Basin Plan, which were analysed and matched up with the corresponding relevant Victorian strategies. Regard was also given to the Part 9 guidelines developed by the MDBA. - section 4.03(3)(a)(i) was considered when developing the Northern Victoria and Victorian Murray Long-Term Watering Plans which is incorporated as a strategy to address environmental watering risks and also informs the obligation under section 10.26 of the Basin Plan. - section 4.03(3)(a)(ii) the water quality management plan developed in accordance with Part 7 of Chapter 10 was developed having regard to the water quality and salinity management plan. The Water Quality Management Plan addresses the risks identified relating to water quality matters. - section 4.03(3)(iii) water trading rules were considered when responding to Part 8 of Chapter 10 in addition to considering appropriate strategies for managing risks relating to water availability in Victoria’s North and Murray Risk Assessment Report - section 4.03(3)(a)(iv) water resource planning informs the strategies relating to water availability - section 4.03(3)(b) was developed using the best available knowledge and information in consultation with relevant stakeholders. Additionally, various strategies to address risk such as the sustainable water strategies require consultation under the Victorian Water Act or Water for Victoria which was developed in consultation with relevant stakeholders. - section 4.03(3)(c) promotes risk-based approach to water resource planning and management by including Victoria’s North and Murray Risk Assessment Report and linking outcomes of Victoria’s North and Murray Risk Assessment Report to various Victorian policies and strategies - section 4.03(3)(d) as outlined in Victoria’s North and Murray Comprehensive Report Water for Victoria outlines the policy for managing Victoria’s water to optimise shared benefits. This has informed Victoria’s approach to managing consumptive and environmental water and supports the meeting of Aboriginal and Recreational uses in Victoria’s North and Murray Risk Assessment Report. - section 4.03(3)(e) regard was had to monitoring and evaluation of the implementation of the Basin Plan through the response to Part 10 of Chapter 10 Basin Plan and through strategies identified in Table 4.2.1 of Victoria’s North and Murray Risk Assessment Report. - section 4.03(3)(f) regard was had to risks arising with non-compliance with water law. A low risk was identified. Obligations on water users in the Northern Victoria Water Resource Plan reflect obligation in State law for which there is an effective enforcement regime. - section 4.03(3)(g) as is outlined in Victoria’s North and Murray Comprehensive Report, Water for Victoria outlines key Victorian government policy for water management. Included is increased communication with communities in making water resource management decisions. This has informed development of the strategies to address Victoria’s North and Murray Risk Assessment Report. - section 4.03(3)(h) promotes increased knowledge of the impact of interception activities through identification of further work to assess the impact and proposed consideration of impacts of these activities through sustainable water strategies identified in Victoria’s North and Murray Risk Assessment Report. - section 4.03(3)(i) - Victoria’s North and Murray Water Resource Plan identifies in response to Part 10 opportunities to improve measurement of groundwater and surface water and the policies of Water for Victoria for improved monitoring and measurement are identified. The WGMP improves knowledge of the causes of water quality degradation and the effects of water quality on environmental assets and ecosystem functions	

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Part 10	Measuring and monitoring			
10.44(a)	A water resource plan must include the following information in relation to each class of water access right relating to the water resources of the water resource plan area: (a) the best estimate of the total long-term annual average quantity of water taken that is measured;	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. In respect of the relevant class of water access right available in the Northern Victoria water resource plan area, the best estimate long-term annual average quantity of water taken that is measured is as follows: (a) bulk entitlements: 1,784,030ML (b) take and use licences: 34,930ML (c) runoff dams (licensed): 74,164ML Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report 1. In respect of the relevant class of water access right available in the Victorian Murray water resource plan area, the best estimate long-term annual average quantity of water taken that is measured is as follows: (a) bulk entitlements: 1,669,595ML (b) take and use licences: 13,356ML (c) runoff dams (licensed): 9,362ML Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. In respect of the relevant class of water access right available in the Goulburn-Murray water resource plan area, the best estimate long-term annual average quantity of water taken that is measured for take and use licences is 435,841 ML.	n/a	This requirement is met as the accredited text in Column 3 that provides the volumes of water that is measured. Table 15-1 of Chapter 15 of Victoria's North and Murray Comprehensive Report also outlines total volume of water that is measured and identifies the individual water access rights relevant to this matter. The volumes identified in Table 15-1 of Chapter 15 of Victoria's North and Murray Comprehensive Report are the best estimate of the long-term annual average of water taken from surface water that is measured. This is the BDL for take from a regulated river or a watercourse (excluding basic rights) and the BDL for take from runoff dams (excluding basic rights). For take from a regulated river or a watercourse (excluding basic rights) the best estimate is given as to the proportion of the BDL attributed to bulk entitlements and the proportion of the BDL attributed to take and use licences. The volumes in Table 15-1 may vary slightly from those in Table 3 of Appendix C to Victoria's North and Murray Comprehensive Report due to rounding.
10.44(b)	A water resource plan must include the following information in relation to each class of water access right relating to the water resources of the water resource plan area: (d) the best estimate of the total long-term annual average quantity of water taken that is not measured;	Northern Victoria water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Northern Victoria water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. In respect of the relevant class of water access right available in the Northern Victoria water resource plan area, the best estimate long-term annual average quantity of water taken that is not measured is as follows: (a) basic rights: 17,134ML (b) runoff dams (basic rights): 74,043ML (c) take and use licences: 4,940ML	n/a	

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		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report 1. In respect of the relevant class of water access right available in the Victorian Murray water resource plan area, the best estimate long-term annual average quantity of water taken that is not measured is as follows: (a) basic rights: 9,166ML (b) runoff dams (basic rights): 11,285ML (c) take and uses licences: 1,750ML	n/a	
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. In respect of the relevant class of water access right available in the Goulburn-Murray water resource plan area, the best estimate long-term annual average quantity of water taken that is not measured is 16,400ML (basic rights).	n/a	This requirement is met as the only water access right available for take from groundwater in the Goulburn-Murray water resource plan area is a take and use licence and take under a basic right (domestic and stock). Therefore, the volume not measured relates solely to take under basic rights. The best estimate of the long-term annual average of water taken that is measured in the BDL for take from an aquifer excluding basic rights. The method used to determine the volumes in Table 15-1 of Chapter 15 of Victoria's North and Murray Comprehensive Report is the method for determining BDL.
10.44(c)	A water resource plan must include the following information in relation to each class of water access right relating to the water resources of the water resource plan area: (d) how the quantities under paragraphs (a) and (b) were calculated;	Victoria's North and Murray water resource plan area The quantities identified under sections 10.44(a) and 10.44(b) of the Basin Plan were calculated in accordance with the methods for determining the baseline diversion limit as prescribed by the Basin Plan.	n/a	This requirement is met as the accredited text refers to the method for determining BDL.
10.44(d)	A water resource plan must include the following information in relation to each class of water access right relating to the water resources of the water resource plan area: (e) the proportion of the quantity referred to in paragraph (a) that is measured in accordance with standards for measuring agreed by the Basin States and the Commonwealth.	Victoria's North and Murray water resource plan area The Australian Standard for meters for non-urban water supply (AS 4747) is the standard referred to in the Murray-Darling Basin Compliance Compact. Victoria is a signatory to the Compliance Compact and will require that all new and replacement meters are compliant with AS4747, subject to any exemptions to be determined by Victoria (as permitted under Compliance Compact Action 32(v)). For the purposes of the Murray-Darling Basin Plan s10.44(d), AS4747 is the agreed standard endorsed between the Basin States and the Commonwealth. It is not currently possible to estimate the proportion of water taken that is measured by different classes of meters. Improvements will be made to data management systems and the proportion of take will be available and reported from 2020/21. Victoria has made commitments in Victoria's North and Murray Water Resource Plan to measures to maintain and where practicable improve the proportion of take that is measured, and the standard to which take is measured, in response to section 10.45(1) of the Basin Plan.	n/a	In 2009 the Council of Australian Governments agreed to a national framework for non-urban water metering which consists of a metrological assurance framework and implementation of national standards. Consistent with the national framework, the Basin Compliance Compact is aimed at achieving comprehensive coverage of meters compliant with the Australian standard. The Compliance Compact requires each Basin State to publish a metering policy and implementation plan addressing meter accuracy, meter coverage, transmission of data, highest risk take, and a timetable for the installation of meters and telemetry. Percentage of volumes metered was identified in the Murray-Darling Basin Authority review of 2017. This volume of metered take is in accordance with Victoria's current metering policy. Until the regulatory impact assessment is completed and exemptions are published in accordance with the Actions in Part 3 of the Basin Compliance Compact the proportion of take measured in accordance with the standard agreed under the Basin Compliance Compact cannot be determined.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.45(1)	A water resource plan must specify measures for maintaining and, if practicable, improving: (a) the proportion of take that is measured in the water resource plan area (b) the standard to which take is measured.	Victoria's North and Murray water resource plan area 1. Victoria has committed to the following measures under Water for Victoria for maintaining and, where practicable, improving the proportion of take that is measured in the water resource plan area, and the standard to which take is measured by: (a) the Implementation Plan under the Basin Compliance Compact to improve metering against the National Standard for metering in accordance with the approved exemptions published in under Action 31 (including Actions 31 - 3.5) and supported by Actions VIC 31-37 by December 2019 (subject to revised timeframes negotiated with the MDBA) (b) maintenance of stream gauges by water corporations and DELWP according to national standards over the next 7 years (c) installation and maintenance of meters by water corporations according to national standards over the next 7 years (d) upgrades to non-urban metering according to the National Metering Standards for Non-Urban Water Meters consistent with the Victorian Policy for non-urban water metering and the state-wide implementation plan over the next 7 years (e) continued investment in ongoing statewide surface water and groundwater monitoring networks over the next 7 years (f) investment in infrastructure upgrades and new technologies to improve the quality, accuracy and timeliness of monitoring data over the next 7 years; and (g) investigation into the introduction of a reasonable use limit for domestic and stock rights to improve monitoring and reporting of the quantity of water used under these rights over the next 7 years.	Department Goulburn- Murray Water	This requirement is met as the accredited text in Column 3 outlines Victoria's proposed measures for maintaining and, where practicable, improving the standard to which take is measured. The Victorian Government has made these commitments in Water for Victoria: Water Plan (Actions 8.4 and 8.11) to improve water use information (DELWP 2016). These measures will improve the standard to which take is measured by increasing metering and monitoring efforts, so that more accurate and transparent information regarding take is available. Investment in infrastructure will improve the quality of the data available. Further information on maintaining and improving the proportion of take that is measured and the standard to which take is measured can be found in Section 15.5 and Section 15.6 of Victoria's North and Murray Comprehensive Report.
10.45(2)	The water resource plan must specify the timeframe for implementing the measures.	Victoria's North and Murray water resource plan area These measures will be implemented in the timeframes specified in Column 3 in response to section 10.45(1) of Victoria's North and Murray Index Table.	n/a	This requirement is met as the accredited text in Column 3 identifies a timeframe for continued improvement. The timeframe for implementing these measures is set out in Water for Victoria (DELWP 2016) and recognises that for the measures to realise continuous improvement, they must be implemented on an ongoing basis. The timeframe for implementation of this policy is 10 years.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.46(1)	A water resource plan must specify the monitoring of the water resources of the water resource plan area that will be done to enable the Basin State to fulfil its reporting obligations under section 1314. Reporting on the following matters of Schedule 12 will be informed by: (a) matter 4 - the effectiveness of management of risks will be informed by monitoring undertaken via the state observation bore network [add detail] (b) matter 11 and 14 - through salinity monitoring programs established under statutory management plans approved under section 32A of the Victorian Water Act	Victoria’s North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria’s North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. 1. Table 15-2 of Victoria’s North and Murray Comprehensive Report and Part 6 of Victoria’s North and Murray Water Quality Management Plan sets out the monitoring of the water resources of Victoria’s North and Murray water resource plan area that will be done to fulfil the reporting obligations under section 1314 of the Basin Plan. 2. The remaining four matters will be informed by the monitoring conducted for the purposes of the matters listed in Table 15-2 of Victoria’s North and Murray Comprehensive Report. These four matters relate to: (a) Matter 4 – the effectiveness of the management of risks to Basin water resources (informed by monitoring of Matters 8, 9 and 12) (b) Matter 10 – implementation of the environmental management framework (informed by Matter 8) (c) Matter 14 – the implementation of the water quality and salinity management plan including to the extent to which regard is had to the targets in Chapter 9 when making flow management decisions (informed by Matter 12) (d) Matter 18 – the efficiency and the effectiveness of the operation of water resource plans, including in providing a robust framework under a changing climate (informed by Matters 8, 9, 12 and 19).	Department	This requirement is met as Table 15-2 in Section 15.6 of Victoria’s North and Murray Comprehensive Report lists the matters under Schedule 12 of the Basin Plan that Victoria is responsible for reporting against and the monitoring that will be done to fulfil reporting obligations. Table 15-2 only relates to four core matters being Matters 8, 9, 12 and 19. The additional four matters Victoria is required to report on are informed by the monitoring that occurs under the four core matters (being Matters 4, 10, 14 and 18). The text outlines how these matters will be informed by the monitoring outlined in Table 15-2 of Victoria’s North and Murray Comprehensive Report. Table 15-2 includes reference to Part 6 of Victoria’s North and Murray Water Quality Management Plan to respond to reporting against Matter 12 of Schedule 12 of the Basin Plan. The text relating to Matter 8 of Schedule 12 is different from the text contained in the Northern Victorian LTWP and the Victorian Murray LTWP to account for updated information. Following accreditation of Victoria’s North and Murray Water Resource Plan the Northern Victorian LTWP and the Victorian Murray LTWP will be reviewed and updated where necessary. Following accreditation of Victoria’s North and Murray Water Resource Plan, the Northern Victoria Long-Term Watering Plan and the Victorian Murray Long-Term Watering Plan will be reviewed and updated to more specifically address requirements in Chapter 8 of the Basin Plan and more clearly link Basin Plan objectives and targets with Victoria’s environmental watering requirements for priority environmental assets and priority ecosystem functions.
		Goulburn-Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn-Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria’s North and Murray Comprehensive Report. Monitoring undertaken in accordance with approved Management Plans for declared water supply protection areas supports reporting requirements under section 1314 of the Basin Plan to report on matters listed in Schedule 12 to the Basin Plan. More specifically: - Matters 4, 8, 12, 14, and 18 - routine monitoring and data collection by the Groundwater Monitoring Partnership from the State Observation Bore Network including annual spring sampling program to analyse groundwater quality parameters - Matters 16 and 18 - Monitoring of take and use of groundwater via the Victorian Water Register and reported via the Victorian Water Accounts - Matter 14 - Existing monitoring relating to the Basin Salinity Management 2030 (BSM2030) to support reporting to the Ministerial Council and the Basin Officials Committee Matter 18 – reporting will be informed by the reporting on the matters identified above. - Matter 18 – reporting will be informed by the reporting on the matters identified above. Note: Obligations to undertake monitoring may be prescribed in statutory management plans in accordance with the obligation set out in response to section 10.35C of the Basin Plan in Victoria’s North and Murray Index Table.	n/a	For further information see response to section 10.35C of the Basin Plan and Part 5.5 of Victoria’s North and Murray Water Quality Management Plan at Appendix A to Victoria’s North and Murray Comprehensive Report. Victoria already provides for a register of sites monitored by State observation bores. The primary purpose of the State Observation Bores Network (SOBN) is to collect groundwater data for observational purposes. This data can be used for research and other informative measures, to improve the access and management of groundwater. A list of sites within the SOBN can be found at http://data.water.vic.gov.au/static.htm. Monitoring through the SOBN can occur outside a water supply protection area. The surface water and groundwater data contained in Water Measurement Information System (WMIS) is collected through the Regional Water Monitoring Partnerships. There are currently 41 organisations within these Partnerships, covering state government (DELWP), Commonwealth government (Bureau of Meteorology and Murray-Darling Basin Authority), water corporations, catchment management authorities and local government (councils). See also the discussion in Column 5 of Victoria’s North and Murray Index Table in response to section 10.35D of the Basin Plan for a discussion on monitoring in response to the rules and measures outlined in Column 3 of Victoria’s North and Murray Index Table for section 10.35D of the Basin Plan.
10.46(2)	Nothing in this section limits the capacity of the Basin State to conduct other monitoring of the water resources of a water resource plan area.	This informs the response to section 10.46(1) of the Basin Plan and does not contain a water resource plan requirement.	n/a	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 11	Reviews of water resource plans			
10.47	A water resource plan must require that if a review of the plan (or a part of the plan) is undertaken, the report of the review must be given to the Authority within 30 days after the report is completed.	Victoria's North and Murray water resource plan area If a review of this Plan is undertaken, the report of that review must be given to the Murray–Darling Basin Authority within 30 days after the report is completed.	Department	The requirement is met as the text in Column 3 of this row requires that a copy of the review report be provided to the MDBA within 30 days of the relevant report being completed. The circumstances in which a review may occur are outlined in Section 1.6 of Victoria's North and Murray Comprehensive Report.
10.47A	If a review of the relevant water resource plan in relation to any of the Western Porous Rock, Gunnedah–Oxley Basin MDB, Sydney Basin MDB or Goulburn–Murray. Sedimentary Plain SDL resource units is undertaken, the review must assess: (a) the effectiveness of the implementation of the rules of the water resource plan; and (b) the extent to which the rules achieve the objectives mentioned in sections 10.21 and 10.35C.	Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. This matter is not relevant to the SDL resource units in the Northern Victoria or Victorian Murray water resource plan area.	n/a	
		Goulburn–Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Goulburn–Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. 1. If a review of this Plan is undertaken in relation to the Goulburn–Murray: Sedimentary Plain SDL resource unit, the review must assess: (a) the effectiveness of the implementation of the rules of the water resource plan; and (b) the extent to which the rules achieve the objectives mentioned in sections 10.21 and 10.35C of the Basin Plan.	Department	The requirement is met as the text in Column 3 of this row requires that if a review of this Plan is undertaken in relation to the Goulburn–Murray: Sedimentary Plain SDL resource unit, the review must assess: - the effectiveness of the implementation of the rules of the water resource plan; and - the extent to which the rules achieve the objectives mentioned in sections 10.21 and 10.35C of the Basin Plan. The circumstances in which a review may occur are outlined in Victoria's North and Murray Comprehensive Report at Section 1.6.
10.48	A water resource plan must require a Basin State that proposes an amendment to the plan arising from a review to give the reasons for the amendment to the Authority.	Victoria's North and Murray water resource plan area If review of this Plan results in a proposed amendment to this Plan, the reasons for the amendment must be provided to the Murray–Darling Basin Authority. Note: Nothing in this clause is intended to detract from or frustrate the process for the accreditation of a proposed amendment under section 65 or section 66 of the <i>Water Act 2007</i> (Cth).	Department	This requirement is met as the text in Column 3 of this row requires that where an amendment is proposed following a review, the reasons for that amendment must be provided to the MDBA. Further information on the review process is contained in Section 1.6 of Victoria's North and Murray Comprehensive Report.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 12	Information used to prepare water resource plan			
10.49(1)	A water resource plan must be based on the best available information.	Victoria's North and Murray water resource plan area Victoria's North and Murray Water Resource Plan was prepared using the best available information for each component of the Plan that was available at the time of submission for accreditation.	n/a	This requirement is met as the text in Column 3 of this row identifies that Victoria's North and Murray Water Resource Plan was based on the best available information. A Risk Assessment (Appendix B to Victoria's North and Murray Comprehensive Report) was undertaken using the best available information. A full bibliography compiled for the Risk Assessment can be found at Schedule 1 to the Risk Assessment in Appendix B to Victoria's North and Murray Comprehensive Report. Victoria's North and Murray Comprehensive Report was prepared following the Risk Assessment and again used the best available information. A References list of the documents referenced in Victoria's North and Murray Comprehensive Report can be found before the Glossary in Victoria's North and Murray Comprehensive Report. Where relevant a discussion of the best available information is provided in Victoria's North and Murray Comprehensive Report. Examples of where best available information was used include annual determinations of permitted take and annual determinations of actual take in the Comprehensive Report and in the Methods Report at Appendix C to Victoria's North and Murray Comprehensive Report.
10.49(2)	The water resource plan must identify and describe the significant sources of information on which the water resource plan is based.	Victoria's North and Murray water resource plan area 1. Significant sources of information for Victoria's North and Murray Water Resource Plan are: (a) recent resource assessments conducted in Victoria (b) current legislative and non-legislative information (c) a specifically designed Risk Assessment Report (d) REALM and eWater Source modelling results of Baseline Diversion Limit (e) Sustainable Diversion Limit assessments (f) information gathered from consultation with the community and industry. 2. The References section contained in Victoria's North and Murray Comprehensive Report and in each Appendix to Victoria's North and Murray Comprehensive Report contains a list of the key sources of information used to develop Victoria's North and Murray Water Resource Plan.	n/a	This requirement is met by the text in Column 3 of this row and the reference section contained in Victoria's North and Murray Comprehensive Report. These identify and describe the significant sources of information on which the water resource plan is based. The Goulburn BDL/WRP model representation is the best available knowledge as at 30 April 2019. It is recognised though that there are some policy discrepancies that will need to be addressed and fixed through a model review process to be completed within two years – 30 April 2021. The References lists are contained in Victoria's North and Murray Comprehensive Report before the Glossary and in the Appendices where relevant.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.50	A water resource plan must identify any significant method, model or tool that has been used to develop the water resource plan.	Victoria's North and Murray water resource plan area 1. The significant methods, models and tools that have been used to develop Victoria's North and Murray Water Resource Plan are: (a) Environmental Water - FLOWS2 (b) REALM and eWater Source modelling results of Baseline Diversion Limit (c) Permitted Take - Draft MDB Groundwater Permitted Take Methodology Report (d) SDL Determination - SDL derived from RRAM and the proposed Basin Plan groundwater SDL (e) Commercial Plantations - SoilFlux (Jacobs, 2016), (HARC, 2016)) (f) Runoff Dams - STEDI (Spatial Tool for Estimating the Impact of Dams) version 1.2 (Sinclair Knight Merz, 2011), STEDI: Estimating the impact of farm dams on streamflow (User Manual) (Sinclair Knight Merz, 2011)) (g) Risk assessment method outlined in Part 2 of the Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report (h) Take under basic rights – model results for domestic and stock use (RMCG, 2011) (i) Victoria's North and Murray Surface Water BDL Re-estimates document, prepared April 2019.	n/a	This requirement is met by the text in Column 3 of this row and the reference section contained in Victoria's North and Murray Comprehensive Report. These identify and describe the significant sources of information on which the water resource plan is based. The References lists are contained in Victoria's North and Murray Comprehensive Report before the Glossary and in the Appendices where relevant.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 13	Extreme events			
10.51(1)(a)	A water resource plan must describe how the water resources of the water resource plan area will be managed during the following types of events: (a) an extreme dry period;	Victoria's North and Murray water resource plan area 1. Water corporations may reduce or restrict the delivery of water to rural customers where there is insufficient capacity in the system. Water corporations may reduce, restrict or discontinue the supply of water to towns where there is insufficient capacity to meet critical human needs. 2. Permanent water saving rules have been in place since the Millennium Drought which provide permanent restrictions on how drinking water can be used outside the home. Water corporations may also apply staged water restrictions as water availability reduces to further restrict the use of drinking water to protect the availability of water for critical human need long term. 3. The Minister requires water corporations, under a Statement of Obligations, to undertake short term and long-term planning of future water needs to ensure available water is managed to meet critical human needs within those events that can be predicted. This planning includes a drought response plan for urban systems, and emergency management plans. 4. Where the measures employed by water corporations are not sufficient to address the impacts of an extreme dry period, the Minister may declare a water shortage in an area or for a resource and temporarily qualify rights to temporarily change the water sharing arrangements in a system by reducing the water available to holders of a water access right in the area or resource. 5. Table 10-4 of Section 10.31.4 of Victoria's North and Murray Comprehensive Report also contains a range of short-term planning strategies to manage urban water during extreme dry periods.	n/a	This requirement is met as the accredited text describes how water resources will be managed in Victoria during an extreme dry period. Further detail regarding how restrictions are applied, and the planning undertaken to secure water availability for critical human need is outlined in Victoria's North and Murray Comprehensive Report at Section 10.3.2 . Drought response and contingency planning for water shortage is undertaken for both rural and urban water needs. More significant planning and oversight is required for ensuring the security of urban town supplies of drinking water. This is on the basis that entitlement holders (rural water users) are required to manage their own water availability risks and are given a range of tools to do this. Private domestic and stock water supply systems are not feasible in much of Victoria's North and Murray water resource plan area because of low and unreliable rainfall and lack of suitable groundwater.
		Victorian Murray water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victorian Murray water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report Section 10.3.3 of Victoria's North and Murray Comprehensive Report outlines the arrangements for managing extreme dry events in the River Murray under the Murray-Darling Basin Agreement.	n/a	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.51(1)(b)	A water resource plan must describe how the water resources of the water resource plan area will be managed during the following types of events: (b) a water quality event of an intensity, magnitude and duration that is sufficient to render water acutely toxic or unusable for established local uses and values;	Victoria's North and Murray water resource plan area 1. Where water is no longer fit for purpose due to a water quality event, some of the powers outlined for extreme dry events may also be used to respond to water quality events in order to protect the availability of water for critical human need. 2. Water corporations may reduce or restrict the delivery of water to rural customers where there is insufficient capacity in the system (water shortage). Water corporations may reduce, restrict or discontinue the supply of water to towns where the quality of the water does not meet the standards for authorised use. 3. In addition, the Environment Protection Authority Victoria has powers to issue remedial notices, pollution abatement notices, clean-up notices and directions for pollution-related events. 4. There is insufficient data relating to the impact of water quality events on a variety of users. Blue-green algae is the predominant water quality event and it is unclear what impact that has on domestic and stock use and irrigation. As identified in Victoria's North and Murray Risk Assessment there is insufficient information regarding Aboriginal values and uses of water to have an adequate strategy for management of the impacts of water quality events on their values and uses. As information about the impacts on these values improves, management strategies to respond to water quality events will be developed. 5. Water corporations develop management plans to manage risks to water resources. Throughout the region there are several reservoirs which offer access for recreational use. These are monitored for water quality by the respective managers who undertake monthly sampling for algal analysis over the summer period when these lakes are in high use. Where risks to the water quality are identified the public is immediately notified of the risks and restrictions on access may occur to prevent harm to individuals as a result of contact with contaminated water.	n/a	This requirement is met as it describes how water is managed during a water quality event. Water corporations are responsible for managing water quality issues as they relate to protecting the integrity of water resources. Details about management of water resources during a water quality event are set out in Section 10.3 of Victoria's North and Murray Comprehensive Report. Where there is a water quality event that relates to pollution, the Environment Protection Authority Victoria (EPA) is responsible for managing the pollution. The powers the EPA has to address pollution events are described further in Section 10.3.4.1 of Victoria's North and Murray Comprehensive Report.
		Victoria's North (surface water) water resource plan area For the purposes of section 10.04(3) of the Basin Plan this response applies to all the water resources in the Victoria's North (surface water) water resource plan area. A map of these water resources is contained at Figure 1-1 of Victoria's North and Murray Comprehensive Report. Cyanobacteria (also known as blue-green algae) is the predominant water quality event that can occur in Victoria. Responses to cyanobacteria events relate to recreational use and public health and safety. Emergency response roles and responsibilities are set out in the <i>Blue-Green Algae Circular: Management Plan 2016-17</i> (2015) and relate to establishing a process to ensure appropriate communications and planning for cyanobacteria events. Water corporations coordinate the management of major outbreaks while local water managers (water corporations, catchment management authorities, local councils, Parks Victoria, Alpine Resort Management Boards and private companies) monitor and manage local blooms under their own emergency plans.	n/a	
10.51(1)(c)	A water resource plan must describe how the water resources of the water resource plan area will be managed during the following types of events: (c) any type of event that has resulted in the suspension of a statutory regional water plan in the past 50 years (including a transitional water resource plan or interim water resource plan).	Victoria's North and Murray water resource plan area This matter is not relevant to Victoria's North and Murray Water Resource Plan because: (a) Victoria does not have statutory regional water plans; and (b) there are no powers to suspend transitional water resource plans or interim water resource plans under the Victorian regulatory framework.	n/a	

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.51(2)	If an event of a type listed in subsection (1) would compromise a Basin State's ability to meet critical human water needs in the water resource plan area, the water resource plan must set out measures to meet critical human water needs during such an event.	Victoria's North and Murray water resource plan area The response to section 10.51(1)(a) and 10.51(1)(b) of the Basin Plan in Column 3 of Victoria's North and Murray Index Table sets out the existing measures within the Victorian water management framework which serve to protect critical human water needs in Victoria's North and Murray water resource plan area. As these existing measures are sufficient, it is not necessary to specify additional measures in this WRP in response to this section. The situation described in section 10.51(1)(c) of the Basin Plan is not relevant to Victoria's North and Murray water resource plan area.	n/a	This requirement is met as it is not necessary to include measures to meet critical human water needs during an extreme event listed in section 10.51(1) of the Basin Plan as the management of water resources (as described in response to section 10.51(1)) of the Basin Plan is done in such as a way as to protect the continued supply of water to cities and towns to meet critical human needs. The powers available under the Victorian Water Act to respond to water shortages include circumstances where water availability is reduced because of drought or water quality events. As a result of the water resource management actions to address extreme dry or water quality events, there is a very low risk of a failure to meet critical human water needs during such an event. As such, no measures are being included in Victoria's North and Murray Water Resource Plan. This is exemplified by the ability of Victoria to manage its water resources during the Millennium Drought without resorting to Stage 4 water restrictions, which represents Victoria's understanding of managing water resources to meet critical human needs. For more information see the response to section 10.51(1) of the Basin Plan above and the information contained in Chapter 10 of Victoria's North and Murray Comprehensive Report which outlines how water is managed to ensure that at a minimum sufficient water is available to meet critical human water needs. Victorian water management arrangements are based on a risk mitigation model that restricts, reduces or discontinues supply or delivery of water before water levels are at a point where critical human needs cannot be met. Therefore, no additional measures are required in response to section 10.51(2) of the Basin Plan as an extreme dry period would be sufficiently managed under the arrangements and measures identified in response to section 10.51(1)(a) and (b) of the Basin Plan above.
10.51(3)	The water resource plan must provide that, if new scientific information suggests a change in the likelihood of an event of a type listed in subsection (1) occurring (for example, due to climate change), consideration must be given to whether, as a result of this new information, the water resources should be managed differently.	Victoria's North and Murray water resource plan area If new scientific information suggests a change in the likelihood of an event of a type listed in section 10.51(1) of the Basin Plan occurring, consideration will be given as to whether, as a result of this new information, the water resources should be managed differently.	Department	Water resources are managed through state legislation and policy which was formed using the best available information. All relevant documents are reviewed on a periodic basis to ensure that new information informs water resource management.

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Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
Part 14	Indigenous values and uses			
10.52(1)(a)	A water resource plan must identify: (a) the objectives of Indigenous people in relation to managing the water resources of the water resource plan area;	Victoria's North and Murray water resource plan area - For the purposes of section 10.52(1)(a) of the Basin Plan, the following objective of Indigenous people are identified in relation to managing the water resources of Victoria's North and Murray water resource plan area: - to develop respectful partnerships between Traditional Owners, Aboriginal Victorians and the Victorian Government to: - recognise Aboriginal values and objectives of water in Victorian water management, policy and planning - include Aboriginal values and traditional ecological knowledge in Victorian water management, policy and planning - facilitate Aboriginal access to water for economic development in Victorian water management, policy and planning - build capacity for Aboriginal participation in Victorian water management, policy development and planning. - The specific objectives for Traditional Owners represented by the Barapa Barapa Nation are identified in Column 1 of Table 8-1 and Column 2 of Table 8-3 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Dhudhuroa, Waywurru and Yaitmathang Nations are identified in Column 1 of Table 1.6.1 of Appendix F to Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Dja Dja Wurrung Nation are identified in Table 8-4 and Column 1 of Table 8-6 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the First Peoples of the Millewa-Mallee (Nyeri Nyeri, Ngintait and Latji Latji) are identified in Column 1 of Table 8-7 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Tati Tati Wadi Wadi Nation are identified in Column 1 of Table 8-8 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Taungurung Nation are identified in Column 1 of Table 8-10 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Wadi Wadi Nation are identified in Table 8-16 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Wamba Wamba Nation are identified in Column 1 of Table 8-19 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Weki Weki Nation are identified in Column 1 of Table 8-21 of Victoria's North and Murray Comprehensive Report. - The specific objectives for Traditional Owners represented by the Yorta Yorta Nation are identified in Column 1 of Table 8-23 of Victoria's North and Murray Comprehensive Report.	n/a	Contributions by individual Nations are provided in Section 8.3 and Appendix F to Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.52(1)(b)	A water resource plan must identify: (a) the outcomes for the management of the water resources of the water resource plan area that are desired by Indigenous people.	Victoria's North and Murray water resource plan area - For the purposes of section 10.52(1)(b) of the Basin Plan the following outcomes for the management of water resources of the Northern Victoria Basin Resources water resource plan area that are desired by Indigenous people are identified: - to partner with the water sector to make sure that the legislated objectives of the Victorian Environmental Water Holder consider identified Aboriginal water-related environmental outcomes - to incorporate traditional and ecological knowledge into water planning and management using Aboriginal Waterway Assessments and other tools developed by Traditional Owners - to achieve shared benefits in water resources - to be notified by water corporations when opportunities to access water entitlements arise - Sustainable Water Strategies to be prepared considering opportunities for access to water for economic development for Aboriginal Victorians. - The specific outcomes for Traditional Owners represented by the Barapa Barapa Nation are identified in Column 2 of Table 8-1 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Dhudhuroa, Waywurru and Yaitmathang Nations are identified in Column 2 of Table 1.6.1 of Appendix F to Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Dja Dja Wurrung Nation are identified in Table 8-5 and Column 2 of Table 8-6 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the First Peoples of the Millewa-Mallee (Nyeri Nyeri, Ngintait and Latji Latji) are identified in Column 2 of Table 8-7 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Tati Tati Wadi Wadi Nation are identified in Column 2 of Table 8-8 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Taungurung Nation are identified in Column 2 of Table 8-10 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Wadi Wadi Nation are identified in Table 8-17 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Wamba Wamba Nation are identified in Column 2 of Table 8-19 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Weki Weki Nation are identified in Column 2 of Table 8-21 of Victoria's North and Murray Comprehensive Report. - The specific outcomes for Traditional Owners represented by the Yorta Yorta Nation are identified in Column 2 of Table 8-23 of Victoria's North and Murray Comprehensive Report.	n/a	Contributions by individual Nations are provided in Section 8.3 and Appendix F to Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.52(2)	In identifying the matters set out in subsection (1), regard must be had to: (a) the social, spiritual and cultural values of Indigenous people that relate to the water resources of the water resource plan area (Indigenous values); and (b) the social, spiritual and cultural uses of the water resources of the water resource plan area by Indigenous people (Indigenous uses); as determined through consultation with relevant Indigenous organisations, including (where appropriate) the Murray Lower Darling Rivers Indigenous Nations and the Northern Murray–Darling Basin Aboriginal Nations.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	Contributions received for inclusion in Victoria's North and Murray Water Resource Plan were informed by the matters listed in section 10.52(2). Individual Traditional Owner groups determined whether those matters would be discussed and how those matters would be discussed. See Section 8.3 and Appendix F to Victoria's North and Murray Comprehensive Report for the contributions of the Traditional Owner groups relevant to Victoria's North and Murray Water Resource Plan. Specifically, values and uses can be seen through individual Traditional Owner contributions: - refer to Section 8.3.2.8 for Barapa Barapa values and uses of water resources - refer to Section 16.2 in Appendix F for Dhudhuroa, Waywurru and Yaitmathang values and uses of water resources - refer to Section 8.3.4.7 for Dja Dja Wurrung values and uses of water resources - refer to Section 8.3.5.7 for First Peoples of the Millewa-Mallee (Nyeri Nyeri, Ngintait and Latji Latji) values and uses of water resources - refer to Section 8.3.6.7 for Tati Tati Wadi Wadi values and uses of water resources - refer to Section 8.3.7.9 for Taungurung values and uses of water resources - refer to Section 8.3.8.2 for Wadi Wadi values and uses of water resources - refer to Section 8.3.9.5 for Wamba Wamba values and uses of water resources - refer to Section 8.3.10.5 for Weki Weki values and uses of water resources - refer to Section 8.3.11.5 for Yorta Yorta values and uses of water resources
10.52(3)	A person or body preparing a water resource plan may identify opportunities to strengthen the protection of Indigenous values and Indigenous uses in accordance with the objectives and outcomes identified under subsection (1), in which case the opportunities must be specified in the water resource plan.	Victoria's North and Murray water resource plan area 1. Opportunities to strengthen the protection of Aboriginal values and uses of water within Victoria's North and Murray water resource plan area include: (a) legislative changes to improve the ways that Traditional Owners and Aboriginal Victorians are engaged in water management and planning, and to improve incorporation of traditional ecological knowledge and Aboriginal water objectives and outcomes in decision making. (b) further engagement on the National Cultural Flows Research Project (released 2018) to identify opportunities to progress understanding of, and respond to, cultural flows in Victoria. (c) increased awareness of section 8A rights under the <i>Water Act</i> 1989 (Vic) and to increase the capacity of relevant Traditional Owner groups to access these rights in the future. (d) implementation of Aboriginal Participation Guidelines for catchment management authorities, which describe key principles and actions to support Aboriginal participation and inclusion. (e) creation of several Aboriginal water officer positions during the development of this water resource plan and seeking funding to ensure these positions continue to progress the identification and implementation of values, uses, objectives and outcomes identified in this plan. (f) continued implementation of the Water for Victoria Aboriginal Water Policy, as recommitted via the risk strategies and measures in this plan, to provide opportunities for further identification and protection of Aboriginal water values and uses in Victoria's North and Murray water resource plan area and to minimise or mitigate the high risks identified as much as practicable.	n/a	Opportunities to strengthen the protection of Indigenous Values and uses is discussed at Section 8.4.3 of Victoria's North and Murray Comprehensive Report.

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.53(1)	A water resource plan must be prepared having regard to the views of relevant Indigenous organisations with respect to the matters identified under section 10.52 and the following matters: (a) native title rights, native title claims and Indigenous Land Use Agreements provided for by the <i>Native Title Act 1993</i> in relation to the water resources of the water resource plan area; (b) registered Aboriginal heritage relating to the water resources of the water resource plan area; (c) inclusion of Indigenous representation in the preparation and implementation of the plan; (d) Indigenous social, cultural, spiritual and customary objectives, and strategies for achieving these objectives; (e) encouragement of active and informed participation of Indigenous people; (f) risks to Indigenous values and Indigenous uses arising from the use and management of the water resources of the water resource plan area.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	Section 8.3 and Section 8.4 of Victoria's North and Murray Comprehensive Report outline how these matters were had regard to. Contributions of the individual Nations also provide for information relating to the matters identified in section 10.53(1) of the Basin Plan. Contributions are provided in Section 8.2 of Victoria's North and Murray Comprehensive Report. Contributions received for inclusion in the Victoria's North and Murray Water Resource Plan were informed by the matters listed in section 10.53(1) of the Basin Plan. Individual Traditional Owner groups determined whether those matters would be discussed and how those matters would be discussed. Further discussion about Traditional Owner engagement is contained in Section 8.2 and Appendix F to Victoria's North and Murray Comprehensive Report and Appendix D to Victoria's North and Murray Comprehensive Report. The Victoria's North and Murray Water Resource Plan has been developed in response to the section 10.53 requirement of the Basin Plan in recognising existing legislative rights and is outlined in Section 8.4 of the Comprehensive Report. Views can be seen through individual Traditional Owner contributions: - refer to Section 8.3.2.2 for Barapa Barapa views on existing legislative requirements regarding Native Title and/or cultural heritage - refer to Part 1.2 in Appendix F for Dhudhuroo, Waywurru and Yaitmathang views on existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.4.2 for Dja Dja Wurrung views existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.5.2 for First Peoples of the Millewa-Mallee (Nyeri Nyeri, Ngintait and Latji Latji) views existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.6.2 for Tati Tati Wadi Wadi views existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.7.5 for Taungurung views on existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.8 for Wadi Wadi views existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.9.2 for Wamba Wamba views on existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.10.2 for Weki Weki views on existing legislative requirements regarding Native Title and/or cultural heritage - refer to Section 8.3.11.2 for Yorta Yorta views on existing legislative requirements regarding Native Title and/or cultural heritage Risks related to Aboriginal values and uses, and the strategies to address them are contained in Appendix B in Table 3.2.19 to Table 3.2.28 for the Northern Victoria water resource plan area Table 3.4.17 to Table 3.4.26 for the Victorian Murray water resource plan area and Table 3.3.5 to Table 3.3.14 for the Goulburn-Murray water resource plan area. Table 4.21 in Appendix B contains an explanation of the strategies identified to address these risks. MLDRIN was involved in the development of Victoria's North and Murray Risk Assessment in Appendix B and was a member of the Technical Advisory Group. See Part 4 of the Consultation Report at Appendix D to Victoria's North and Murray Comprehensive Report. Traditional Owner contributions in Section 8.2 also highlight risks to Aboriginal values and uses of water.
10.53(2)	In this section, registered Aboriginal heritage means Aboriginal heritage registered or listed under a law of a Basin State or the Commonwealth that deals with the registration or listing of Aboriginal heritage (regardless of whether the law deals with the listing of other heritage).	Victoria's North and Murray water resource plan area This matter assists in the interpretation of Part 14 of Chapter 10 of Basin Plan of the Basin Plan and does not contain a water resource plan requirement.	n/a	

FOR ACCREDITATION			NOT FOR ACCREDITATION	
Column 1 Basin Plan Section	Column 2 Basin Plan Requirement (Section 10.04(4)(a))	Column 3 Accredited response Sect 10.04(2) & (3)	Column 4 Person responsible Sect 10.06(2)	Column 5 Explanatory material
10.54	A water resource plan must be prepared having regard to the views of Indigenous people with respect to cultural flows.	Victoria's North and Murray water resource plan area No accredited text needed for a requirement to 'have regard to'. Explanation of how regard was had is in Column 5.	n/a	This requirement is met as Victoria's North and Murray Water Resource Plan was prepared having regard to the views of Indigenous people with respect to cultural flows Views can be seen through individual Traditional Owner contributions: - refer to Section 8.3.2.11 for Barapa Barapa views on cultural flows - refer to Part 1.6.3 in Appendix F for Dhudhuroa, Waywurru and Yaitmathang views on cultural flows - refer to Section 8.3.4.8 for Dja Dja Wurrung views on cultural flows - refer to Section 8.3.5.8 for First Peoples of the Millewa-Mallee views on cultural flows - refer to Section 8.3.6.8 for Tati Tati Wadi Wadi views on cultural flows - refer to Section 8.3.7 for Taungurung views on cultural flows - refer to Section 8.3.8.1 for Wadi Wadi views on cultural flows - refer to Section 8.3.9.8 for Wamba Wamba views on cultural flows - refer to Section 8.3.10.7 for Weki Weki views on cultural flows - refer to Section 8.3.11.7 for Yorta Yorta views on cultural flows See also Section 8.6 of the Comprehensive Report for discussion of cultural flows. Victoria is supportive of progressing the discussion of cultural flows through engagement on the National Cultural Flows Research Project and is included for accredited text for section 10.52(3) of the Basin Plan.
10.55	A water resource plan must provide at least the same level of protection of Indigenous values and Indigenous uses as provided in: (a) a transitional water resource plan for the water resource plan area; or (b) an interim water resource plan for the water resource plan area.	Victoria's North and Murray water resource plan area Victoria's North and Murray Water Resource Plan provides the same level of protection as provided in transitional water resource plans for the Victorian Murray, Northern Victoria and Goulburn-Murray water resource plan areas as it does not operate to limit any right to take water that may be available under section 8A of the <i>Water Act 1989</i> (Vic).	n/a	This requirement is met by the text contained in Column 3 of this row. As identified in Chapter 8 of the Comprehensive Report a significant program has been developed to encourage and empower Indigenous involvement in water resource management in addition to moving towards increased access to water. Victoria's North and Murray Water Resource Plan recognises the objectives and outcomes for water desired by Aboriginal communities in addition to identifying strategies to address the risks relating to Aboriginal water (see Victoria's North and Murray Risk Assessment Report at Appendix B to Victoria's North and Murray Comprehensive Report). The strategies, supported by the Victorian Government Aboriginal water policy outlined in the <i>Water for Victoria: Water Plan</i>, will identify opportunities to further strengthen the protection of Aboriginal values and uses of water.

Table A: Water Access Rights Victoria's North (surface water) water resource plan area—s.10.08(1) Basin Plan

- This table applies to the following SDL resource units:
- Victorian Murray SDL resource unit (SS2)
- Kiewa SDL resource unit (SS3)
- Ovens SDL resource unit (SS4)
- Goulburn SDL resource unit (SS6)
- Broken SDL resource unit (SS5)
- Campaspe SDL resource unit (SS7)
- Loddon SDL resource unit (SS8)

Item	Form of Take	Classes of Water Access Right (Entitlement)	Victorian Water Act ref ¹	Conditions and Characteristics (10.08(1)(c) BP)		Number of (Water Access Rights) Entitlements (10.08(1)(c) BP)	Proportion take measured
				Management	Trade		
1	Take from a watercourse (excluding take under basic rights)	Bulk entitlement	34A	No specified period of authorisation. May be held by a water corporation, a (power) generation company, the Minister administering the <i>Conservation, Forests and Lands Act 1987</i> , or the Victorian Environmental Water Holder. Entitlement is for one or more of volume, share of flow, or share of storage Obligations to release flows for environmental and primary entitlement holders, contribute funds to operation and maintenance and around metering, accounting and reporting. Section 43 of the <i>Water Act 1989</i> (Vic) lists the matters that may be specified in the entitlement. Once specified these are conditions on the bulk entitlement (water access right). Once issued, bulk entitlements are recorded on the Victorian Water Register.	Depending on bulk entitlement Order, can be transferred in whole or part May be sold in whole or part in specified circumstances Can assign (trade) whole or part of allocation under a bulk entitlement	39	100%
		Environmental entitlement	48A	No specified period of authorisation. May be held by the Victorian Environmental Water Holder. May be allocated to maintain the environmental water reserve in accordance with the environmental water reserve objective, or to improve environmental values and health of water ecosystems Can be one or more of maximum volume, share of flow or share of storage and is subject to seasonal determinations. May specify water accounting procedures, conditions and class of reliability (high or low reliability). Section 48J of the <i>Water Act 1989</i> (Vic) lists the matters that may be specified in the entitlement. Once specified these are conditions on the environmental entitlement (water access right). Once issued, environmental entitlements are recorded on the Victorian Water Register.	Can be transferred in whole or part. May be sold in whole or part in subject to specified process Can assign (trade) whole or part of allocation to specified persons	1	100%
		Take and use licence	51	Issued for a maximum of 15 years. Can be renewed for a maximum of 15 years at the end of the term. Authorises an annual maximum volume that may be taken under the licence. Is subject to standard conditions** including time, place and rate of take. Time, volume and rate can be limited through restrictions, rosters and bans. Section 56 of the <i>Water Act 1989</i> (Vic) identifies the matters for which the Minister may specify conditions on a take and use licence. Once specified, these conditions are contained in the relevant take and use licence (water access right).	Can be traded on temporary or permanent basis	As at 30 June 2018: 579 (Victorian Murray) 462 (Kiewa) 822 (Ovens) 1446 (Goulburn) 161 (Broken) 1536 (Campaspe) 311 (Loddon)	Take is metered on active licence greater than 10ML annual volume
2	Take from a watercourse under basic rights	Domestic and stock	8	No specified period of authorisation. The right to access depends on meeting the access specifications and the definition of domestic and stock use but otherwise does not have conditions.	Not applicable	13,228 ²	0%
		Traditional Owner statutory right	8A	No specified period of authorisation. Take and use for traditional purposes as provided in a land use activity agreement made under the <i>Traditional Owner Settlement Act 2010</i> . A person who is a member of a traditional owner group bound by the agreement has the right to take and use water on the land that is subject to the agreement, in accordance with terms and conditions of the agreement. Applies only where the member has access to a waterway or bore in the circumstances under section 8(1) of the <i>Water Act 1989</i> (Vic). There are no requirements under the <i>Water Act 1989</i> (Vic) on the exercise of this right.	Not applicable	As at 30 June 2012: 0	0%

1. This column identifying the relevant section in the Victorian Water Act does not form part of the accredited text

Item	Form of Take	Classes of Water Access Right (Entitlement)	Victorian Water Act ref ¹	Conditions and Characteristics (10.08(1)(c) BP)		Number of (Water Access Rights) Entitlements (10.08(1)(c) BP)	Proportion take measured
				Management	Trade		
3	Take from a regulated river (excluding take under basic rights)	Bulk entitlement	34A	No specified period of authorisation. May be held by a water corporation, a (power) generation company, the Minister administering the <i>Conservation, Forests and Lands Act 1987</i> , or the Victorian Environmental Water Holder. Entitlement is for one or more of volume, share of flow, or share of storage. Obligations to release flows for environmental and primary entitlement holders, contribute funds to operation and maintenance and around metering, accounting and reporting. Section 43 of the <i>Water Act 1989</i> (Vic) lists the matters that may be specified in the entitlement. Once specified these are conditions on the bulk entitlement (water access right). Once issued, bulk entitlements are recorded on the Victorian Water Register.	Depending on bulk entitlement Order, can be transferred in whole or part May be sold in whole or part in specified circumstances Can assign (trade) whole or part of allocation under a bulk entitlement	34	100%
		Environmental entitlement	48A	No specified period of authorisation. May be held by the Victorian Environmental Water Holder. May be allocated to maintain the environmental water reserve in accordance with the environmental water reserve objective, or to improve environmental values and health of water ecosystems. Can be one or more of maximum volume, share of flow or share of storage and is subject to seasonal determinations. May specify water accounting procedures, conditions and class of reliability (high or low reliability) Section 48J of the <i>Water Act 1989</i> (Vic) lists the matters that may be specified in the entitlement. Once specified these are conditions on the environmental entitlement (water access right).	Can be transferred in whole or part. May be sold in whole or part in subject to specified process Can assign (trade) whole or part of allocation to specified persons	7	100%
		Take and use licence	51	Issued for a maximum of 15 years. Can be renewed for a maximum of 15 years at the end of the term Authorises an express annual maximum volume that may be taken under the licence Is subject to standard conditions ² including time, place and rate of take Time, volume and rate can be limited through restrictions, rosters and bans Section 56 of the <i>Water Act 1989</i> (Vic) identifies the matters for which the Minister may specify conditions on a take and use licence. Schedule 2 of the <i>Minister's Policies for Take and Use Licences</i> contains standard licence conditions. Once specified, these conditions are contained in the relevant take and use licence (water access right).	Can be traded on temporary or permanent basis	As at 30 June 2018: Approximately 1500 rural licence holders	Take and use licences in Coliban Water's irrigation districts are 100% metered at the bulk offtake.
4	Take from a regulated river under basic rights	Water shares	33F	Issued in declared water systems only. No specified period of authorisation. Identifies the water system and, where relevant, the zone for which the water share is issued. Authorises total volume that may be taken under the allocation for the water share during the water season for which the water is allocated. May be classified as high or low reliability.	Can be transferred in whole or in part Allocations under a water may be transferred (in whole or in part) without transferring ownership of the water share Transfer (trade) of allocation under a water share may be made for a single water season or for a period of up to 20 years (limited term transfer)	As at 30 June 2018: 18,238 (Victorian Murray) 0 (Kiewa) 920 (Ovens) 18,142 (Goulburn) 484 (Broken) 520 (Campaspe) 696 (Loddon)	100%
		Domestic and stock	8	No specified period of authorisation. The right to access depends on meeting the access specifications and the definition of domestic and stock use but otherwise does not have conditions.	Not applicable	13,228 ³	0%
		Traditional Owner statutory right	8A	No specified period of authorisation. Take and use for traditional purposes as provided in a land use activity agreement made under the <i>Traditional Owner Settlement Act 2010</i> . A person who is a member of a traditional owner group bound by the agreement has the right to take and use water on the land that is subject to the agreement, in accordance with terms and conditions of the agreement. Applies only where the member has access to a waterway or bore in the circumstances under s.8(1) of the <i>Water Act 1989</i> (Vic). There are no requirements under the <i>Water Act 1989</i> (Vic) on the exercise of this right.	Not applicable	As at 30 June 2012: 0	0%

². This is indicative as no licence is issued for this form of take so the number of rights being used is estimated as the number of properties not on public land that intersect with a waterway. The estimate includes take from a regulated river under basic rights.

Item	Form of Take	Classes of Water Access Right (Entitlement)	Victorian Water Act ref ¹	Conditions and Characteristics (10.08(1)(c) BP)		Number of (Water Access Rights) Entitlements (10.08(1)(c) BP)	Proportion take measured
				Management	Trade		
5	Take by runoff dams (excluding under basic rights)	Take and use licence	51	Issued for a maximum of 15 years. Can be renewed for a maximum of 15 years at the end of the term. Authorises an express annual maximum volume that may be taken under the licence. Is subject to standard conditions ³ including time, place and rate of take Time, volume and rate can be limited through restrictions, rosters and bans Section 56 of the <i>Water Act 1989</i> (Vic) identifies the matters for which the Minister may specify conditions on a take and use licence. Once specified, these conditions are contained in the relevant take and use licence (water access right).	Can be traded on temporary or permanent basis	As at 30 June 2018: 199 (Victorian Murray) 201 (Kiewa) 494 (Ovens) 1204 (Goulburn) 515 (Broken) 365 (Campaspe) 769 (Loddon)	The volume taken by dams is not metered, but the volume used is metered for active licences with an annual volume >10ML.
		Registration licence		No specified period of authorisation. Applications for registration licences could be made between 1 July 2002 and 30 June 2003. Introduced requirement for authorisation for use of water from private dams for irrigation and commercial purposes based on history of take over previous 10 years A registration licence is enduring and is for an express annual maximum volume that may be taken under the licence Not subject to conditions. Once issued the registration licence is recorded on the Victorian Water Register. Can be converted to a section 51 take and use licence.	Stays with the land and cannot be traded other than on sale of land		
6	Take by runoff dams under basic rights	Domestic and stock	8	No specified period of authorisation. The right to access depends on meeting the access specifications and the definition of domestic and stock use but otherwise does not have conditions.	Not applicable	9,767 (Victorian Murray) ⁴ 4,092 (Kiewa) ⁴ 15,226 (Ovens) ⁴ 32,262 (Goulburn) ⁴ 10,902 (Broken) ⁴ 15,860 (Campaspe) ⁴ 26,298 (Loddon) ⁴	0%
		Traditional Owner statutory right		No specified period of authorisation. Take and use for traditional purposes as provided in a land use activity agreement made under the <i>Traditional Owner Settlement Act 2010</i> . A person who is a member of a traditional owner group bound by the agreement has the right to take and use water on the land that is subject to the agreement, in accordance with terms and conditions of the agreement. Applies only where the member has access to a waterway or bore in the circumstances under s.8(1) of the <i>Water Act 1989</i> (Vic). There are no requirements under the <i>Water Act 1989</i> (Vic) on the exercise of this right.	Not applicable		
7	Take by commercial plantation	No entitlement requirement	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Notes:

- a. An “Authority” referred to in this Table is a water corporation
- b. Bulk entitlements and environmental entitlements can also be for the take of:

i. water (other than recycled water) in the works of an Authority; or

ii. any other water, other than recycled water, to which an Authority has access.

³. This is indicative as no licence is issued for this form of take so the number of rights being used is estimated as the number of properties not on public land that intersect with a waterway. The estimate includes take from a regulated river under basic rights.

⁴. This is indicative as no licence is issued for this form of take so the number of rights being used is estimated.

Table B: Water Access Rights Goulburn-Murray water resource plan area—s.10.08(1) Basin Plan

This table applies to the following SDL Resource units:

- Goulburn-Murray: Shepparton Irrigation Region SDL resource unit (GS8a)
- Goulburn-Murray: Highlands SDL resource unit (GS8b)
- Goulburn-Murray: Sedimentary Plain SDL resource unit (GS8c)
- Goulburn-Murray: deep SDL resource unit (GS8d)

Item	Form of Take	Classes of Water Access Right (Entitlement)	Victorian Water Act ref ⁴	Conditions and Characteristics (10.08(1)(c) BP)		Number of (Water Access Rights) Entitlements (10.08(1)(c) BP)	Proportion take measured
				Management	Trade		
1	Take from groundwater (excluding under basic rights)	Bulk entitlement	34A	No specified period of authorisation. May be held by a water corporation, a (power) generation company, the Minister administering the <i>Conservation, Forests and Lands Act 1987</i> , or the Victorian Environmental Water Holder. Entitlement is for volume. Obligations around metering, accounting and reporting. Section 43 of the <i>Water Act 1989</i> (Vic) lists the matters that may be specified in the entitlement. Once specified these are conditions on the bulk entitlement (water access right). Once issued the instrument is recorded on the Victorian Water Register.	Depending on bulk entitlement Order, can be transferred in whole or part May be sold in whole or part in specified circumstances Can assign (trade) whole or part of allocation under a bulk entitlement	0	Not applicable
2	Take from groundwater under basic rights	Take and use licence	51	Issued for a maximum of 15 years. Can be renewed for a maximum of 15 years at the end of the term Authorises an express annual maximum volume that may be taken under the licence Is subject to standard conditions ⁵ including time, place and rate of take Time, volume and rate can be limited through restrictions, rosters and bans	Can be traded on temporary or permanent basis	1033 (Shepparton Irrigation Region) 687 (Highlands) 1046 (Sedimentary Plain) 6 (deep)	93%
		Domestic and stock	8	No specified period of authorisation. The right to access depends on meeting the access specifications and the definition of domestic and stock use but otherwise does not have conditions	Not applicable	13,633 ⁶	0%
		Traditional Owner statutory right	8A	No specified period of authorisation. Take and use for traditional purposes as provided in a land use activity agreement made under the <i>Traditional Owner Settlement Act 2010</i> . A person who is a member of a traditional owner group bound by the agreement has the right to take and use water on the land that is subject to the agreement, in accordance with terms and conditions of the agreement. Applies only where the member has access to a waterway or bore in the circumstances under section 8(1) of the <i>Water Act 1989</i> (Vic). There are no requirements under the <i>Water Act 1989</i> (Vic) on the exercise of this right.	Not applicable	As at 30 June 2012: 0	0%

Notes:

- a. An “Authority” referred to in this Table is a water corporation
- b. Bulk entitlements and environmental entitlements can also be for the take of:
 - i. water (other than recycled water) in the works of an Authority; or
 - ii. any other water, other than recycled water, to which an Authority has access.

4. This column identifying the relevant section in the Victorian Water Act does not form part of the accredited text
5. Copy of standard section 51 licence conditions can be found on the Victorian Water Register
6. This is indicative as no licence is issued for this form of take so the number of rights being used is estimated

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Chapter 1. Introduction: Victoria implementing the Murray- Darling Basin Plan



1. Introduction: Victoria implementing the Basin Plan

This Chapter describes Victoria's approach to the preparation of water resource plans to meet the requirements of the Murray-Darling Basin Plan.

1.1 The Murray-Darling Basin Plan

The Murray–Darling Basin is Australia's largest river system. It reaches into Queensland, New South Wales, the Australian Capital Territory, South Australia and covers half of Victoria.

The Basin holds important social, cultural, economic and environmental values, supporting strong rural communities and economies, and generating about 40 percent of the nation's agricultural income. It includes diverse ecosystems, internationally recognised Ramsar wetlands, significant floodplains and river red gum forests.

The Murray–Darling Basin requires a unique management approach. In the past, cooperation between the Commonwealth, Victorian, New South Wales and South Australian governments has been determined under the 1915 *River Murray Waters Agreement* and the 1987 *Murray–Darling Basin Agreement*, which included the Australian Capital Territory and Queensland.

In 2007, the Commonwealth Government assumed a greater role in water management across the Murray-Darling Basin when it passed the Commonwealth Water Act. This Act integrated the management of water resources, including new limits on how much water can be taken from the Murray-Darling Basin's surface and groundwater systems. It established the independent Murray-Darling Basin Authority (MDBA), which was charged with preparing a Basin Plan.

The Basin Plan

The Basin Plan 2012 regulations set out how the Murray-Darling Basin's water resources will be managed and shared between all water users, including the environment.

The Basin Plan determines an average amount of water that can be extracted or taken annually from the Murray-Darling Basin for consumptive use (urban, industrial and agricultural). The volume determined is called the sustainable diversion limit (SDL), this is calculated as a long-term average. The SDL is a volume of extraction that will not have a negative impact on the natural environments and the functions of the rivers, waterways, groundwater and wetlands of the Basin.

- SDLs come into effect from 1 July 2019
- So that SDLs can be met, governments agreed that a long-term average annual volume of 2,750 gigalitres (GL) of water for the environment would be recovered across the Basin.
- Victoria's share is a long-term average annual volume of 1,075 GL, which is about 40 percent of total Basin water recovery
- Water will be recovered from surface water SDL resource units in Victoria's North and Murray water resource plan area. [Table 1-1](#) shows the water resource plan areas and SDL resource units covered by this report

1.2 Water resource plans

The Basin Plan aims to achieve healthy, working rivers that support productive and resilient water-dependent industries, healthy and resilient ecosystems and communities with access to sufficient and reliable water supplies.

The Basin Plan requires all Murray-Darling Basin states, including Victoria, to prepare water resource plans by June 2019. Victoria's North and Murray Water Resource Plan demonstrates how Victoria will meet the requirements identified in the Basin Plan. This plan has been prepared by the Department of Environment, Land, Water and Planning (DELWP).

The Murray-Darling Basin contains 20 surface water water resource plan areas and 22 groundwater water resource plan areas, as well as six combined groundwater and surface water water resource plan areas.

Victoria has five water resource plan areas—three surface water and two groundwater ([Figure 1-1](#)). These are:

- Victorian Murray (water resource plan area) (SW2)
- Northern Victoria (water resource plan area) (SW3)
- Wimmera–Mallee (surface water) water resource plan area (SW4)
- Goulburn–Murray (water resource plan area) (GW2)
- Wimmera–Mallee (groundwater) (GW3)

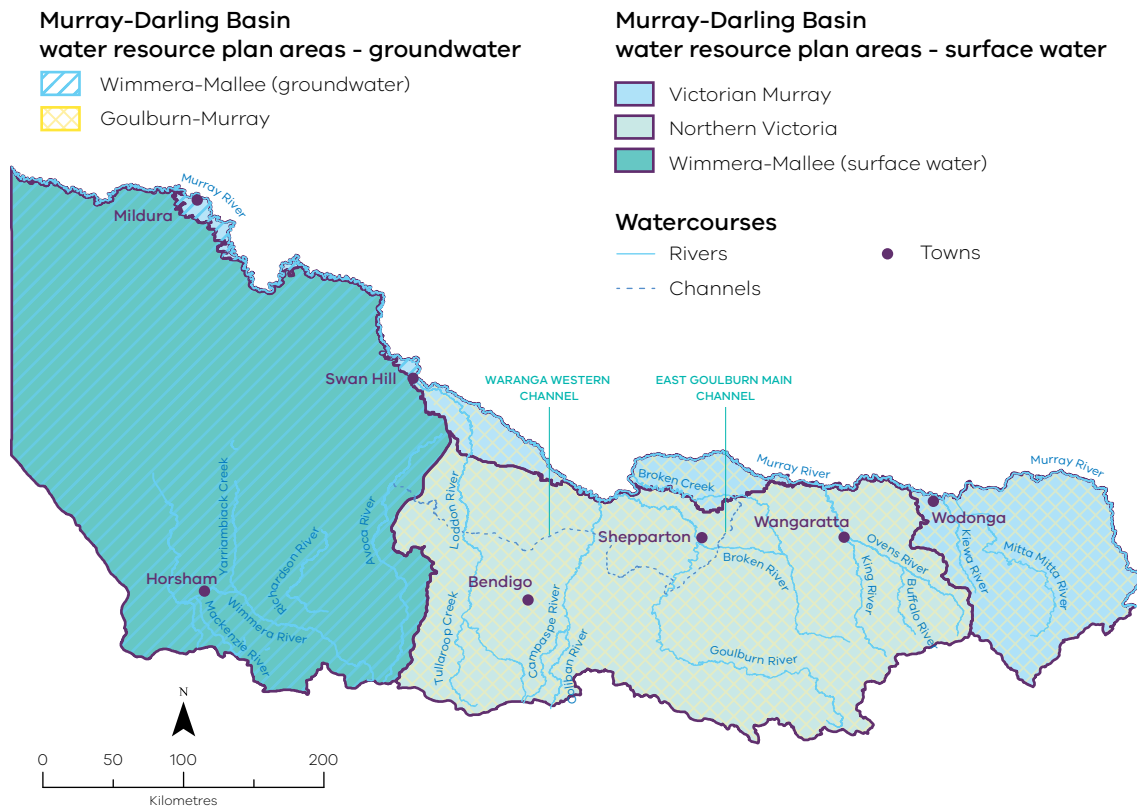


Figure 1-1: Victoria's water resource plan areas for groundwater and surface water

Chapter 10 of the Basin Plan outlines a series of requirements for states to cover in their water resource plans. These include:

- setting out the quantity of held environmental water and planned environmental water, and incorporating the rules and management arrangements associated with delivery and use of this water
- ensuring that environmental watering is consistent with the Basin-wide environmental watering strategy
- setting out how much water can be taken annually for consumptive use in a way that meets the SDL
- a plan to manage water quality standards
- setting out the circumstances when trade is allowed within and between groundwater SDL resource units and from groundwater to surface water SDL resource units
- outlining how water will be managed during extreme events
- identification of Traditional Owner objectives and outcomes for water resource management
- setting out how interception activities will be managed and monitored, including runoff dams, commercial plantations, mining activities and floodplain harvesting
- outlining the risks to water resources and strategies to address these risks

1.3 Sustainable Diversion Limits

The Basin Plan sets limits on the amount of water that can be taken for consumptive use from the Murray-Darling Basin. These are known as sustainable diversion limits (SDL) and come into effect from 1 July 2019.

SDLs aim to improve the condition of the natural environment of the Murray-Darling Basin, while recognising there must be a balance between water for the environment and water for communities, agriculture and industries. The overarching aim of the Basin Plan is to provide for a healthy working Murray-Darling Basin now and into the future.

The long-term annual average water use across the Murray-Darling Basin before the development of the Basin Plan has been estimated to be 13,623 GL. This is known as the baseline diversion limit (BDL). Basin states have agreed to reduce the total volume of water taken from the Murray-Darling Basin so this water can be returned to the environment. The Basin Plan SDLs replace the previous cap on diversions and set limits on the volume of water which can be extracted for consumptive purposes. The BDLs and SDLs are determined for each SDL resource unit and represent long-term average annual take, which in some instances is less than the total entitlement volume. This is explained further in [Chapter 9](#) and [Appendix C](#). To meet SDLs, governments are recovering water to be held and used by environmental water holders to improve the health of the Basin. Victoria's share is 1,075 GL, of which 1052.3 GL comes from Victoria's North and Murray water resource plan area.

Recovered water is used to improve the environmental health of the Murray-Darling Basin's rivers, wetlands and floodplains, and the habitats of plants and animals that rely on the river system. The effects of past environmental watering have already produced beneficial outcomes for river, wetland and floodplain ecosystems – like waterbird breeding events at Barmah Forest.

Environmental watering also has important social, cultural and economic benefits. It has been found to support recreational activities, sustain Country for Traditional Owners and improve water quality for farmers.

Water recovery

Under Basin Plan Victoria is required to recover 1,075.3GL from the consumptive pool for allocation to the environment. This water has been recovered through direct purchase of water entitlement by the Commonwealth Government, or the exchange of water entitlement for Government investment in efficient irrigation infrastructure.

Victoria will achieve its 1,075.3 water recovery target, with over 800 GL of water recovery via entitlements and a further 266.2 GL of Victoria's target will be offset through the SDL adjustment mechanism, whilst still ensuring environmental objectives are met. This is explained further in [Appendix C](#).

There are two key aspects of water recovery targets in the Basin Plan. These are local targets, known in the Basin Plan as a 'local reduction amount' and shared targets, known as a 'shared reduction amount'.

The Basin Plan sets out a local water recovery target for each SDL resource unit area, and these targets must be met by recovering water from within that area. In most cases the local recovery amount is the minimum recovery required within each SDL resource unit area to satisfy local environmental needs.

Shared targets apply to all basins in the water resource plan area and are in addition to the local targets (see [Table 1-1](#)). Shared targets are to contribute to environmental needs across the Basin and can be distributed between SDL resource units. A total shared reduction amount of 425.3 GL in the Southern Basin Victoria shared zone must be recovered.

The Southern Basin Victoria shared zone is made up of the following Victorian SDL resource units which align to the water resource plan area are:

- Victorian Murray

- Kiewa
- Ovens
- Broken
- Goulburn
- Campaspe
- Loddon

Surface water sustainable diversion limits

Victoria's core obligation under the Basin Plan for surface water in Victoria's North and Murray water resource plan area is to manage consumptive take annually to meet the long term average SDL for each SDL resource unit. The Plan must demonstrate how Victoria will determine the annual limit on consumptive take for each form of take in the system.

The methods for determining annual limits on take and the rules for ensuring actual take will be managed within these limits is outlined in [Chapter 9](#) and [Appendix C](#).

The Victorian groundwater SDL resource units in the Goulburn-Murray water resource plan area are:

- Goulburn-Murray: Shepparton Irrigation Region
- Goulburn-Murray: Highlands
- Goulburn-Murray: Sedimentary Plain
- Goulburn-Murray: deep

There are no reduction targets for groundwater take as the SDLs for groundwater are greater than the baseline diversion limits (see [Table 1-1](#)).

Groundwater sustainable diversion limits

Victoria's core obligation under the Basin Plan for groundwater in Victoria's North and Murray water resource plan area is to manage consumptive take annually to meet the long term average SDL for each SDL resource unit. The Plan must demonstrate how Victoria will determine the annual limit on consumptive take for each form of take in the system. For groundwater, average annual groundwater use in the Goulburn-Murray water resource plan area is currently less than 40 percent of the total volume of licence entitlements. Total annual groundwater use is well below Basin Plan SDLs, even including estimated domestic and stock use.

Where there is room under Victoria's permissible consumptive volumes (PCVs) and Basin Plan SDLs, Victoria can issue new groundwater entitlements in accordance with relevant groundwater management plans. New entitlements can also be issued in areas not included in groundwater management units and that do not have a PCV, as long as Basin Plan SDLs will not be exceeded.

The methods for determining annual limits on take and the rules for ensuring actual take will be managed within these limits is outlined in [Chapter 9](#) and [Appendix C](#).

Table 1-1: Water resource plan areas and SDL units covered by this document

	Water resource plan area		Surface water SDL resource unit		Estimated local SDL (GL/year) ^a	Local SDL reduction amount to achieve SDL (GL/year)	Shared reduction amount—Southern Basin VIC zone (GL/year)
	Name	Code	Name	Code			
Surface water	Victorian Murray	SW2	Victorian Murray	SS2	1,319.8	253.0	425.3
			Kiewa	SS3	27.7	0.0	
	Northern Victoria	SW3	Ovens	SS4	85.8	0.0	
			Broken	SS5	49.0	0.0	
			Goulburn	SS5	1,277.4	344.0	
			Campaspe	SS7	111.8	18.0	
			Loddon	SS8	127.6	12.0	
Groundwater	Goulburn–Murray	GW2	Goulburn–Murray: Shepparton Irrigation Region	GS8a	244.1	0.0	N/A
			Goulburn–Murray: Highlands	GS8b	50.5	(12.2) ^b	
			Goulburn–Murray: Sedimentary Plain	GS8c	203.5	0.0	
			Goulburn–Murray: deep	GS8d	20	(20) ^b	

a. Surface water SDLs are a long-term annual average. Water use from year to year will vary according to availability. In very dry conditions (low inflow) or when water storage levels are low, much less water than average will be available for use. In contrast, water use in wet years may exceed the average. Enforcement of SDLs begins from 1 July 2019. See [Appendix C](#) for further information and assumptions used to estimate the SDLs.

b. Brackets around a number indicate that this is a negative number

1.4 Victoria's approach to Victoria's North and the Murray Water Resource Plan

Victoria's North and Murray Water Resource Plan, sometimes referred to as the Northern Victoria Water Resource Plan, is Victoria's second and final plan to outline how the state will meet its Basin Plan requirements and comply with the SDLs. Victoria's first plan covered the Wimmera–Mallee surface and groundwater water resource plan areas.

Victoria's North and Murray Water Resource Plan covers the Victorian Murray water resource plan area, Northern Victoria water resource plan area and Goulburn–Murray water resource plan area in one document.

Victoria has comprehensively analysed the requirements under Chapter 10 of the Basin Plan and has determined that it is meeting most of its obligations through its existing water management framework. Victoria's North and Murray Water Resource Plan makes no changes to Victoria's existing water management framework.

The Plan proposes that some existing instruments are revised and improved to address high or medium risks identified in developing Victoria's North and the Murray Water Resource Plan. Any necessary changes to individual instruments will be made under Victoria's legislative framework, following stakeholder consultation.

Victoria's North and Murray Water Resource Plan was developed based on the best available information. The significant sources of information, methods, models and tools used to develop the Plan are identified in response to section 10.49(2) of the Basin Plan (see Index Table and below).

Basin Plan s10.49(1)

Victoria's North and Murray Water Resource Plan was prepared using the best available information for each component of the Plan that was available at the time of submission for accreditation.

<<end of accredited text for s10.49(1) of the Basin Plan>>

Basin Plan s10.49(2)

1. Significant sources of information for Victoria's North and Murray Water Resource Plan are:
 - a. recent resource assessments conducted in Victoria
 - b. current legislative and non-legislative information
 - c. a specifically designed Risk Assessment Report
 - d. REALM and eWater Source modelling results of Baseline Diversion Limit
 - e. Sustainable Diversion Limit assessments
 - f. information gathered from consultation with the community and industry.
2. The **References** section contained in Victoria's North and Murray Comprehensive Report and in each Appendix to Victoria's North and Murray Comprehensive Report contains a list of the key sources of information used to develop Victoria's North and Murray Water Resource Plan.

<<end of accredited text for s10.49(2) of the Basin Plan>>

**Basin Plan
s10.50:**

1. The significant methods, models and tools that have been used to develop Victoria's North and Murray Water Resource Plan are:
 - a. Environmental Water - FLOWS2
 - b. REALM and eWater Source modelling results of Baseline Diversion Limit
 - c. Permitted Take - Draft MDB Groundwater Permitted Take Methodology Report
 - d. SDL Determination - SDL derived from RRAM and the proposed Basin Plan groundwater SDL
 - e. Commercial Plantations - SoilFlux (Jacobs, 2016), (HARC, 2016))
 - f. Runoff Dams - STEDI (Spatial Tool for Estimating the Impact of Dams) version 1.2 (Sinclair Knight Merz, 2011), STEDI: Estimating the impact of farm dams on streamflow (User Manual) (Sinclair Knight Merz, 2011))
 - g. Risk assessment method outlined in Part 2 of the Victoria's North and Murray Risk Assessment Report at **Appendix B** to Victoria's North and Murray Comprehensive Report
 - h. Take under basic rights - model results for domestic and stock use (RMCG, 2011)
 - i. Victoria's North and Murray Surface Water BDL Re-estimates document, prepared April 2019.

<<end of accredited text for s10.50 of the Basin Plan>>

1.4.1 A single water resource plan for Victoria's North and Murray regions

Victoria's North and Murray Water Resource Plan includes Victoria's share of the River Murray, and its Victorian tributaries including the Mitta Mitta, Kiewa, Ovens, Broken, Goulburn, Campaspe and Loddon rivers. Major urban centres in the region include Wodonga, Wangaratta, Benalla, Shepparton, Bendigo, Echuca, Swan Hill and Mildura. See **Chapter 3** for a description of the landscape, people and economy of the area.

Victoria has chosen to prepare a single water resource plan rather than separate plans for the surface water and groundwater water resource plan areas because all water resource plan areas are managed under Victoria's water entitlement framework. A single water resource plan reflects the linked nature of the resource through the connections between surface water and groundwater and the connectivity of surface water through the Victorian water grid. It also reflects the link to the existing regional planning scales, whereby the water resource plan area broadly aligns with the extent of the *Northern Region Sustainable Water Strategy* (DSE, 2009).

1.4.2 A 'water source' basis

Victoria is taking a 'source-based' approach to water resource plans.

Even though some towns, irrigation areas and environmental assets such as wetlands may be located within the boundaries of the surface and/or groundwater water resource plan areas, they are not included in this plan if they source their water from outside the water resource plan area. Conversely, a water user located outside Victoria's North and Murray water resource plan area that sources water from a waterbody within the water resource plan area is included in this plan.

Components of Victoria's North and Murray Water Resource Plan

Victoria has prepared three documents related to Victoria's North and Murray Water Resource Plan:

1. a **comprehensive report** that includes content for formal accreditation and provides context and background information to support how Victoria meets each of the water resource plan accreditation clauses.
2. an **index table** that sets out how Victoria meets each of the sections in Chapter 10 of the Basin Plan.

The documents are available on the DELWP and MDBA websites.

1.4.3 Drafting water resource plans

Victoria has attempted where possible to draft the formal components of Victoria's North and Murray Water Resource Plan so that they do not exceed Commonwealth legislative powers.

To the extent that the Basin Plan or the Commonwealth Water Act is required to 'read down' this Water Resource Plan, see: section 15A and section 46 of the *Acts Interpretation Act 1901* (Cth), section 13 of the *Legislative Instruments Act 2003* (Cth) and section 11 of the Commonwealth Water Act.

This Water Resource Plan is taken, instead of imposing the obligation, to confer discretion on the state or state agency to do the thing, where:

- a. this water resource plan imposes an obligation on the state or a state agency; and
- b. the imposition of that obligation would contravene a constitutional doctrine restricting the obligations that the Commonwealth may impose on a state

This means that if the water resource plan seeks to require the Victorian Water Minister or a water corporation to do something not permitted because of constitutional limitations, that requirement will change from being an obligation to being at the discretion of the Minister or water corporation.

Victoria has made best efforts to draft obligations in Victoria's North and the Murray Water Resource Plan to avoid the application of the above clause.

Many terms used in Victoria's North and the Murray Water Resource Plan are used in the Basin Plan or the Commonwealth Water Act. Where such terms are defined in the Basin Plan or the Commonwealth Water Act, they have the same meaning in this Water Resource Plan, unless otherwise stated or the context indicates otherwise.

1.5 Accreditation and compliance

Victoria's North and Murray Water Resource Plan was prepared in accordance with the requirements of Chapter 10 of the Basin Plan.

Victoria's North and Murray Water Resource Plan becomes an enforceable instrument under the Commonwealth Water Act and Basin Plan upon accreditation. It will be used by the Commonwealth and the MDBA to enforce the following obligations under Victoria's North and Murray Water Resource Plan:

- a water resource plan must require a holder of a water access right to comply with the conditions of that right (under section 10.08(2) of Basin Plan)

- actual take must not exceed permitted take (under section 10.11(1) of the Basin Plan)
- to ensure the long-term annual average take for consumptive use under basic rights, by runoff dams or by commercial plantations does not exceed the level specified in column 2 of Schedule 3 for that form of take (under section 10.13(1) of the Basin Plan)
- to ensure environmental watering is not compromised by the operation of Victoria's North and Murray Water Resource Plan (under section 10.18(3), 10.19(3), 10.20(3) of the Basin Plan)
- to ensure environmental watering is consistent with Basin Plan objectives and the Basin environmental watering strategy (under section 10.26 of the Basin Plan)
- to ensure there has been no net reduction in the protection of planned environmental water (under section 10.28 of the Basin Plan)
- to maintain the water quality in groundwater SDL resource units and manage the impacts of increased salinity or other causes of water quality degradation (under section 10.35C of the Basin Plan)
- management of review and amendment of Victoria's North and Murray Water Resource Plan (under sections 10.47 and 10.48 of the Basin Plan)

MDBA enforcement powers are contained in Part 8 of the Commonwealth Water Act while the obligation to comply with the requirements of an accredited water resource plan is contained in sections 58 and 59 of the Commonwealth Water Act. This means that where an obligation is expressed in a water resource plan (the accredited text in this document), the person on whom the obligation is imposed may be subject to enforcement under the Commonwealth Water Act for non-compliance with that obligation. These obligations operate separately from any similar obligations under the Victorian Water Act. Action taken by Victorian statutory bodies for non-compliance with obligations reflected in a water resource plan does not prevent the MDBA from taking action under the Commonwealth Water Act.

1.6 Consultation

Many Victorian instruments that informed the water resource plan are subject to legislated consultation requirements to ensure Victoria's water entitlement framework and water management are aligned with community expectations. The Victorian Government's view is that most of its Basin Plan obligations are met by these existing instruments and tools. Victoria's approach to consultation with stakeholders and broader communities on its water entitlement framework, management and policy development is designed to accommodate local, regional and state-wide priorities and views and has helped inform the preparation of this plan.

The process for developing water resource plans provides a forum to discuss opportunities for improvements to the way Victoria manages water, but detailed consultation on improvements and changes to state-based instruments is managed more appropriately through the independent processes for the relevant instruments, strategies or policies.

Consultation on any future changes and any new Victorian instruments, strategies and policies relevant to meeting Basin Plan requirements will continue during the life of Victoria's North and Murray Water Resource Plan. See [Appendix D](#) for further information on the consultation undertaken in development of Victoria's North and Murray Water Resource Plan.

1.6.1 Who else is involved?

At the local level, water corporations and catchment management authorities (CMAs) have significant responsibilities to engage with their communities. Apart from standing customer or community consultative committees, there are many processes that require advice and benefit from participation by groups or committees on implementation, policy, community expectations and local knowledge including CMA led community consultation for the development of Regional Waterway Strategies, and water corporation led community consultation for the development of Urban Water Strategies.

The Victorian Government has provided \$22 million to deliver *Our Catchments, Our Communities* (DELWP & VCMC, 2016) from 2016–17 to 2019–20. The policy has a requirement to strengthen community engagement in catchment management.

1.6.2 Water security and risk analysis

Victoria has several planning tools to support water security for communities, agriculture, the environment, business and industry. Any proposed changes to tools have separate consultation process to improve access to information, increase transparency and guide decision-making in line with stakeholder and community expectations.

Long-term Water Resource Assessments are done every 15 years as prescribed by the Victorian Water Act. Every 10 years Victoria develops regional Sustainable Water Strategies which are statutory processes for long-term state-wide water resource planning in the state's four regions. These strategies identify threats to water availability in each region and outline policies and actions to help water users, water corporations and CMAs manage and respond to those threats over the next 50 years. As at the time of finalising this Report the *Northern Region Sustainable Water Strategy* is at the end of its first 10 year planning horizon. Consistent with the requirements of the Victorian Water Act, a review of the *Northern Region Sustainable Water Strategy* (DSE, 2009) is likely to commence at the end of 2019.

The Victorian Water Act details consultation processes that must be followed when regional Sustainable Water Strategies are prepared. The *Northern Region Sustainable Water Strategy* (DSE, 2009) was based on extensive consultation and was a 'temperature check' on community members' and stakeholders' concerns about the most pressing water issues.

The Victorian Waterway Management Strategy provides the policy direction for managing waterways to maintain or improve their condition and support their economic, environmental, social and cultural values this strategy is revised every eight years. The strategy is developed with an associated stakeholder and public consultation process.

In the early 1990s Victoria created bulk entitlements to provide clearly defined property rights to water and a basis for sharing water resources across entitlement holders, including the environment. Bulk Entitlement Orders describe the rights to water, financial obligations, passing flows, environmental obligations and water accounting requirements. Bulk entitlements have provided more surety, particularly in times of increasing water scarcity and increased demand. Any changes to bulk entitlements must follow a process outlined in Victorian Water Act and changes other than minor amendments require consultation.

Major policy documents such as *Water for Victoria* (2016) and *Our Water, Our Future* (DSE, 2004) depend on stakeholder and community contribution and review. Feedback, policy decisions, implementation and actions have been considered in the preparation of the water resource plan, including in the identification of strategies and measures to mitigate recognised risks.

In 2016–17, Victoria conducted a robust risk analysis for the water resource plan areas covered by this Plan. This involved stakeholder consultation including representation from water corporations, CMAs, the Victorian Environmental Water Holder, Murray Lower Darling Rivers Indigenous Nations and the Victorian Farmers Federation. Assessment of the risk analysis was conducted at the technical level, and again at executive level. The final risk report is contained in [Appendix B](#).

The preparation of the Water Resource Plan was guided by a Technical Advisory Group established to inform and review content during its development. Given that the Plan is a largely descriptive document that explains how Victoria's management of surface and groundwater resources meets Basin Plan requirements, it was important that Victoria test with the responsible government agencies the accuracy of this description, and any instruments or policy documents referred to as evidence.

A working group was also established to comment on and assist in the preparation of the Water Quality Management Plan ([Appendix A](#)). See [Part 3.2.3](#) in [Appendix D](#).

Consultation on Victoria's North and Murray Water Resource Plan was conducted through stakeholder briefings, public meetings and a public submissions process.

Detail on consultation carried out in preparing Victoria's North and Murray Water Resource Plan is contained in the Consultation Report ([Appendix D](#)).

1.7 Water resource plan review process

Victoria's North and Murray Water Resource Plan is valid for the following periods (whichever occurs first):

- when the Water Resource Plan ceases to have effect (see section 64 of the Commonwealth Water Act); or
- until three years after an amendment of the Basin Plan requires changes to water resource plan accreditation requirements; or
- until Victoria proposes amendments to state water resource management arrangements that materially affect the Plan

Basin Plan s10.47

If a review of this Plan is undertaken, the report of that review must be given to the Murray-Darling Basin Authority within 30 days after the report is completed.

<<end of accredited text for s10.47 of the Basin Plan>>

Basin Plan s10.47A

1. If a review of this Plan is undertaken in relation to the Goulburn-Murray: Sedimentary Plain SDL resource unit, the review must assess:
 - a. the effectiveness of the implementation of the rules of the water resource plan; and
 - b. the extent to which the rules achieve the objectives mentioned in sections 10.21 and 10.35C of the Basin Plan.

<<end of accredited text for s10.47A of the Basin Plan>>

Basin Plan s10.48

If review of this Plan results in a proposed amendment to this Plan, the reasons for the amendment must be provided to the Murray-Darling Basin Authority.

Note: Nothing in this clause is intended to detract from or frustrate the process for the accreditation of a proposed amendment under section 65 or section 66 of the *Water Act 2007* (Cth).

<<end of accredited text for s10.48 of the Basin Plan>>

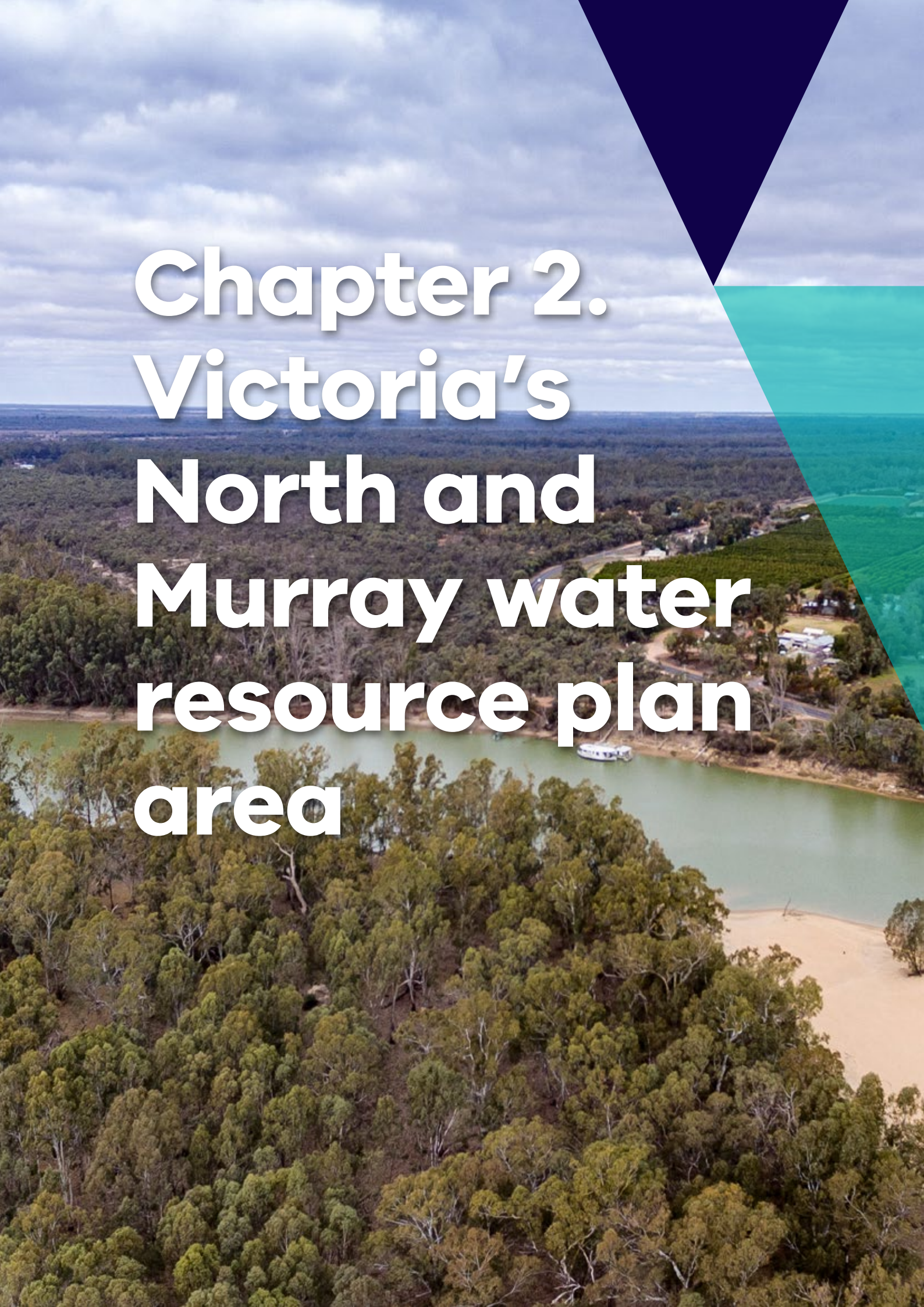
If the review requires amendments to the Water Resource Plan, the responsible Minister must undertake the following consultation in developing the changes:

- for small or technical changes (for example, updating references or correcting errors), the Minister (or Department of Environment, Land, Water and Planning (DELWP)) will consult key water industry stakeholders and publish notification of the changes on the DELWP and water corporation websites
- where changes are made to instruments formed under Victorian law that are identified in the Water Resource Plan, the statutory processes for consultation under the Victorian Water Act or the *Subordinate Legislation Act 1994* will be complied with

- where substantive (not small or technical) changes are made to the text of the Water Resource Plan, at least 28 days of public consultation will occur where the Minister considers there has not been sufficient consultation on a matter to which the amendment relates. This public consultation will allow for submissions to be made on the changes before seeking accreditation from the Commonwealth Minister for Water for the proposed amendments

The accreditation process under section 65 of the Commonwealth Water Act applies to changes to a water resource plan, except those identified in regulations made under section 66 of that Act.



An aerial photograph of a river flowing through a dense forest. The river is a light greenish-brown color, and a small white boat is visible on its surface. The surrounding forest is lush and green. In the background, there are some buildings and a road. The sky is filled with grey clouds. On the right side of the image, there are two large geometric shapes: a dark blue triangle pointing downwards and a teal triangle pointing upwards, which overlap each other and the landscape.

Chapter 2. Victoria's North and Murray water resource plan area



2. Victoria's North and Murray water resource plan area

This Chapter identifies and describes Victoria's North and Murray water resource plan area and meets requirements of Part 2 of Chapter 10 of the Basin Plan.

2.1 Basin Plan SDL resource units for Victoria's North and Murray Water Resource Plan

The Basin Plan establishes long-term average sustainable diversion limits for 110 surface and groundwater SDL resource units located across the Murray-Darling Basin.

The Victoria's North and Murray Water Resource Plan applies to:

Basin Plan s10.03(1)

Victorian Murray water resource plan area:

1. For the purposes of section 10.03(1) of the Basin Plan all water resources in the following SDL resource units are identified in Victoria's North and Murray Water Resource Plan and the Victorian Murray water resource plan area in accordance with section 6.02 and Schedule 2 of the Basin Plan:
 - a. Victorian Murray (SS2)
 - b. Kiewa (SS3).

Northern Victoria water resource plan area:

1. For the purposes of section 10.03(1) of the Basin Plan all water resources in the following SDL resource units are identified in Victoria's North and Murray Water Resource Plan and the Northern Victoria water resource plan area in accordance with section 6.02 and Schedule 2 of the Basin Plan:
 - a. Ovens (SS4)
 - b. Goulburn (SS6)
 - c. Broken (SS5)
 - d. Campaspe (SS7)
 - e. Loddon (SS8).

Goulburn-Murray water resource plan area:

1. For the purposes of section 10.03(1) of the Basin Plan all water resources in the following SDL resource units are identified in the Goulburn-Murray (groundwater) water resource plan area in accordance with section 6.02 and Schedule 4 of the Basin Plan:
 - a. Goulburn-Murray: Shepparton Irrigation Region (GS8a) all groundwater in the Shepparton Irrigation Region Water Supply Protection Area to a depth of 25 metres below the land surface;

- b. Goulburn-Murray: Highlands (GS8b) all groundwater in the outcropping Palaeozoic rocks (or the in-situ weathered horizon where it is within 5 metres of the surface) from the land surface to 200 metres below the surface;
- c. Goulburn-Murray: Sedimentary Plain (GS8c) all groundwater from the land surface to 200 metres below the surface or 50 metres below the base of the Tertiary sediments, whichever is the deeper, excluding groundwater in Item 2;
- d. Goulburn-Murray: deep (GS8d) all groundwater, excluding groundwater in items 2, 3 and 4.

Note 1: Shepparton Irrigation Region Water Supply Protection Area has been revoked and is now the *Shepparton Irrigation Region Groundwater Management Area*.

Note 2: References to items are references to items in Schedule 4 to the Basin Plan.

<<end of accredited text for s10.03(1) of the Basin Plan>>

The surface water SDL resource units located across the Victorian Murray water resource plan area and the Northern Victoria water resource plan area are displayed in **Figure 2-1**.

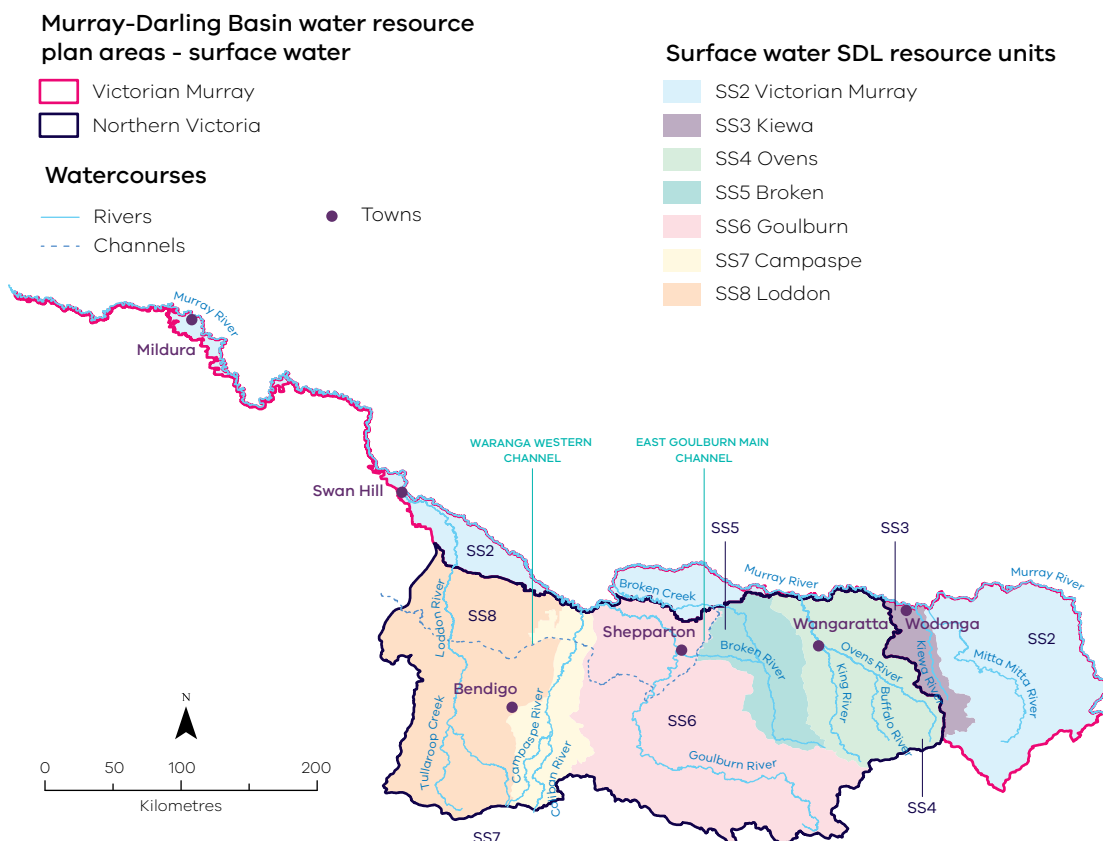


Figure 2-1: The surface water SDL resource units located across the Victorian Murray and Northern Victoria water resource plan areas.

2.2 Surface water boundaries

The surface water component of Victoria’s North and Murray water resource plan area includes seven basins in Division IV, Murray-Darling Basin, of the Australian Water Resources Council Drainage Basins as shown in **Figure 2-2**.

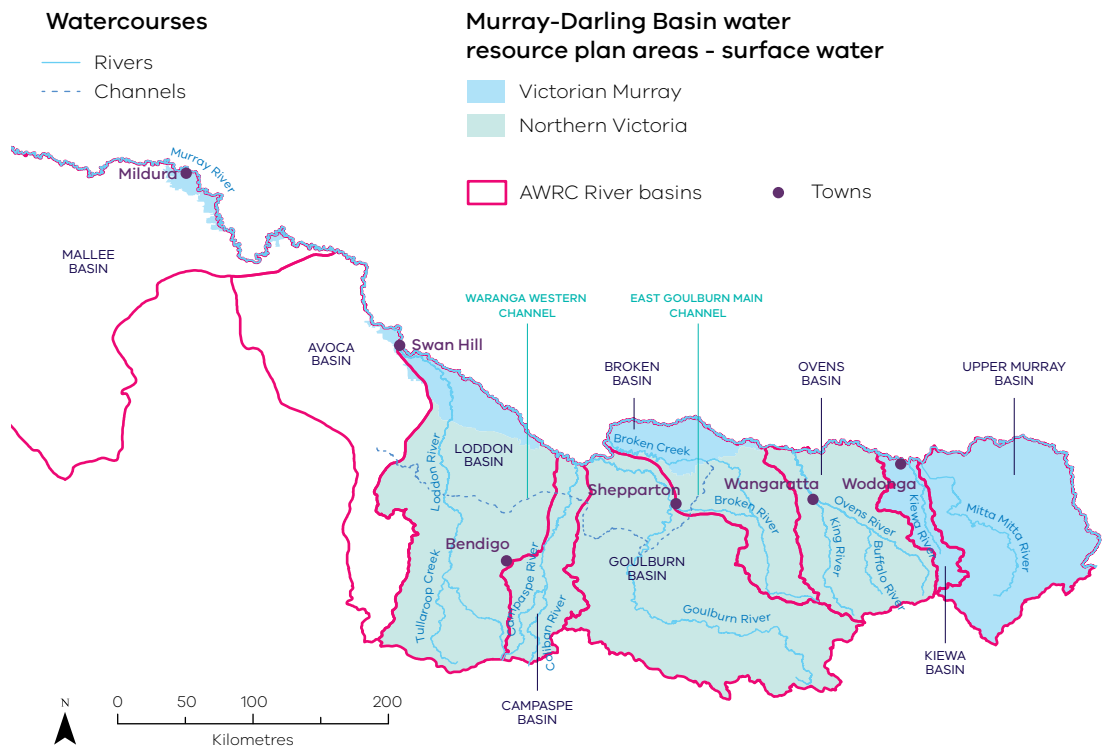


Figure 2-2: Victoria’s North and Murray water resource plan area for surface water and corresponding AWRC drainage divisions and basins

2.2.1 Victorian Murray water resource plan area

The River Murray forms the border with New South Wales and Victoria and both states share the volume of water held in the MDBA storages as specified by the Murray-Darling Basin Agreement. The Victorian Murray water resource plan area includes the Victorian Upper Murray Basin (including the Mitta Mitta and Kiewa basins). The Victorian Murray water resource plan area also includes irrigation areas that source water from the Victorian Murray. These include the Murray Valley and Torrumbarry Irrigation Areas, the Nyah, Tresco, Merbein, Mildura, Red Cliffs and Robinvale Irrigation Districts, and any stock and domestic pipelines and private diverters which take water from the River Murray or Lake Cullulleraine. For more information see **Section 4.2.3**.

Table 2-1: Victorian Murray water resource plan area

Water resource plan area name	SDL resource unit name	SDL resource unit code	Australian Water Resources Council (AWRC) Drainage Basins – Murray Darling Division IV
Victorian Murray water resource plan area (SW2)	Victorian Murray	SS2	1
	Kiewa	SS3	2

2.2.2 Northern Victoria water resource plan area

The surface water component of the Northern Victoria water resource plan area includes five basins in Division IV, Murray-Darling Basin, of the Australian Water Resources Council Drainage Basins as shown in [Figure 2-2](#). The Northern Victoria water resource plan area includes the Ovens, Broken, Goulburn, Campaspe and Loddon rivers and their tributaries. It also includes connecting channels and pipelines which distribute water between basins (interbasin transfers). These are discussed further in [Chapter 4](#).

Table 2-2: Northern Victoria water resource plan area

Water resource plan area name	SDL resource unit name	SDL resource unit code	AWRC Drainage Basins – Murray Darling Division IV
Northern Victoria water resource plan area (SW3)	Ovens	SS4	3
	Broken	SS5	4
	Goulburn	SS6	5
	Campaspe	SS7	6
	Loddon	SS8	7

2.3 Groundwater boundaries

Groundwater is water in pores and crevices of rocks and soil beneath the earth's surface. The layers of soil and rock that contain useable quantities of groundwater are called aquifers and these lie beneath all parts of Victoria. The groundwater within aquifers varies in quality from fresh drinking water to water which is saltier than seawater.

Shallow groundwater resources are connected to surface waters and are affected by drought and climate change. Deep groundwater reserves are more resilient to changes in rainfall, but it can take many years to refill deep aquifers.

2.3.1 Goulburn-Murray water resource plan area

Under the Basin Plan, groundwater resources in the Goulburn-Murray water resource plan area are divided into four SDL resource units. [Table 2-3](#) shows the SDL resource units that make up the Goulburn-Murray water resource plan area.

Table 2-3: Goulburn-Murray water resource plan area

Water resource plan area name	SDL resource unit name	SDL resource unit code	Water resources within each SDL resource unit
Goulburn-Murray water resource plan area (GW3)	Goulburn-Murray: Shepparton Irrigation Region (item 1)	GS8a	All groundwater in the Shepparton Irrigation Region Water supply protection area to a depth of 25 metres below the land surface
	Goulburn-Murray: Highlands (item 2)	GS8b	All groundwater in the outcropping Palaeozoic rocks (or the in situ weathered horizon where it is within 5 metres of the surface) from the land surface to 200 metres below the surface
	Goulburn-Murray: Sedimentary Plain (item 3)	GS8c	All groundwater from the land surface to 200 metres below the surface or 50 metres below the base of the Tertiary sediments, whichever is the deeper, excluding groundwater in item 2
	Goulburn-Murray: deep (item 4)	GS8d	All groundwater, excluding groundwater in items 1, 2 and 3

Groundwater in the Goulburn-Murray water resource plan area is found in shallow and deep aquifers that vary in character and connectivity. Fresh groundwater is extracted for urban and domestic and stock use as well as irrigation. Some shallow and saline aquifers across the floodplains are a threat to productivity and natural assets and are managed with pumping.

The Goulburn-Murray water resource plan area includes the following groundwater catchments (see [Figure 2-3](#)):

- Upper Murray groundwater catchment
- Ovens groundwater catchment
- Goulburn Broken groundwater catchment
- Campaspe groundwater catchment
- Loddon groundwater catchment



Figure 2-3: Victoria's groundwater management basins and groundwater catchments

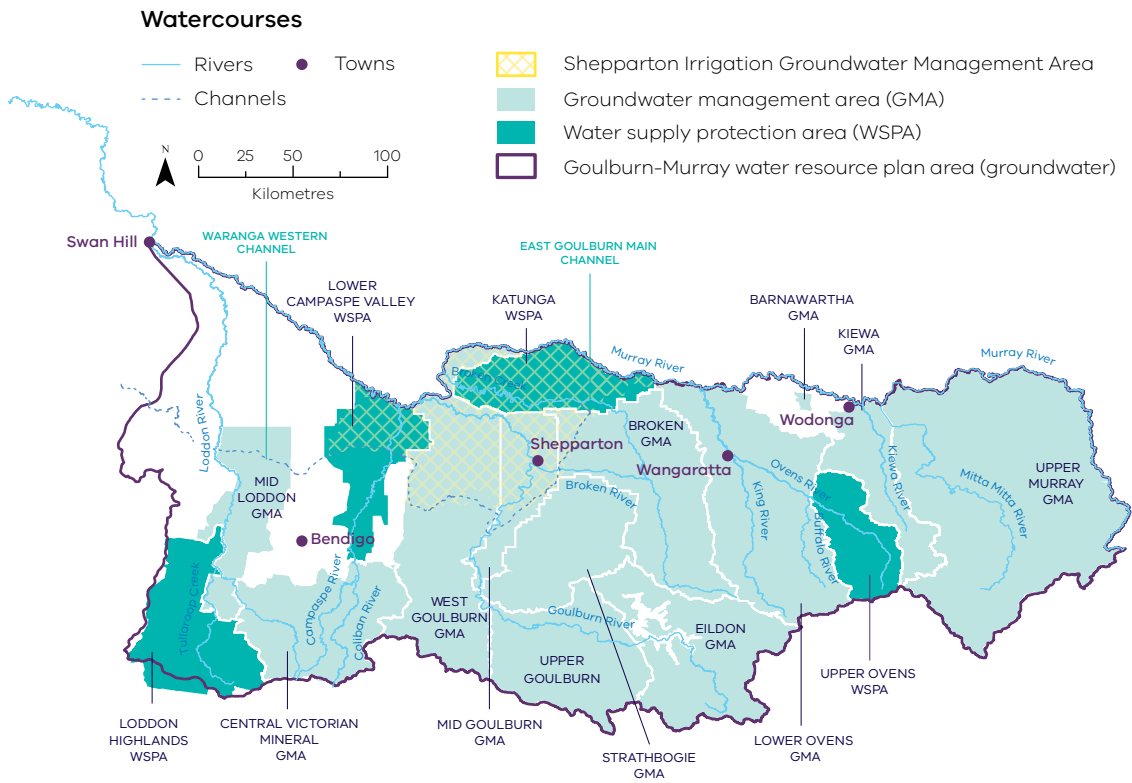
The Victorian Groundwater Management Framework consists of groundwater catchments, groundwater management areas and water supply protection areas. Collectively these are known as groundwater management units. [Figure 2-4](#) shows Victorian groundwater management units and corresponding Goulburn-Murray water resource plan area as at 1 February 2017.

2.3.1.1 Water supply protection areas

A water supply protection area is an area declared under the Victorian Water Act to protect the groundwater or surface water resources through the development of a statutory management plan.

2.3.1.2 Groundwater management areas

A groundwater management area is an area where groundwater has been intensively developed or has the potential to be developed. These areas have defined boundaries to set a permissible consumptive volume (PCV) for ongoing management.



Note: A portion of the Loddon Highlands WSPA is outside of the Goulburn-Murray water resource plan area.

Figure 2-4: Victorian groundwater management units and corresponding Goulburn-Murray water resource plan area as at 1 February 2017.



Chapter 3. Landscape, people and economy





3. Landscape, people and economy

This chapter provides a brief description of the landscape, people and economic drivers in the water resource plan areas.

Working rivers

The rivers of these water resource plan areas provide many environmental, economic, and social benefits for Victorian communities.

Most of northern Victoria's rivers have been modified from their natural state to varying degrees. These modifications have affected hydrologic regimes, physical form, riparian vegetation, water quality and instream ecology.

Under the Basin Plan it is not intended that these rivers and streams be restored to a pre-development state, but that they are managed as 'working rivers' with agreed sustainable levels of modification and use and improved ecological values and functions.

3.1 Features of Victorian Murray water resource plan area

The Victorian Murray water resource plan area covers a broad range of aquatic environments from the highlands streams in the far east, to the floodplains and wetlands of the Murray River in the far west of the state. There are several full river systems in the water resource plan area, including the Kiewa and Mitta Mitta rivers. Other rivers that begin in different water resource plan areas converge with the River Murray in the Victorian Murray water resource plan area. There are a significant number of wetlands in this area, these wetlands are managed by four catchment management authorities (CMAs): North East, Goulburn Broken, North Central and Mallee and their respective land managers.

The Victorian Murray water resource plan area extends from Omeo in the far east of Victoria to the South Australian border in the north west of the state. There are two distinct regions in Victoria's North and the Murray water resource plan area. One is made up of the Victorian tributaries of the River Murray, upstream of Albury-Wodonga, including the Kiewa and Mitta Mitta rivers. The second region is the River Murray and areas that mainly source water directly from the River Murray. An example of one of these areas is the Torrumbarry Irrigation Area, which is mainly supplied from Murray resources even though it physically sits in the Loddon catchment.

3.1.1 Topography

The topography of the region varies between the highly undulating valleys in the north east, down to the River Murray floodplains. The highest point in Victoria's North and the Murray area, and Victoria, is Mt Bogong, at 1986 metres above sea level, and the lowest point is on the floodplains near Mildura at around 50 m. **Figure 3-1** shows the relative topography in the Victorian Murray water resource plan area.

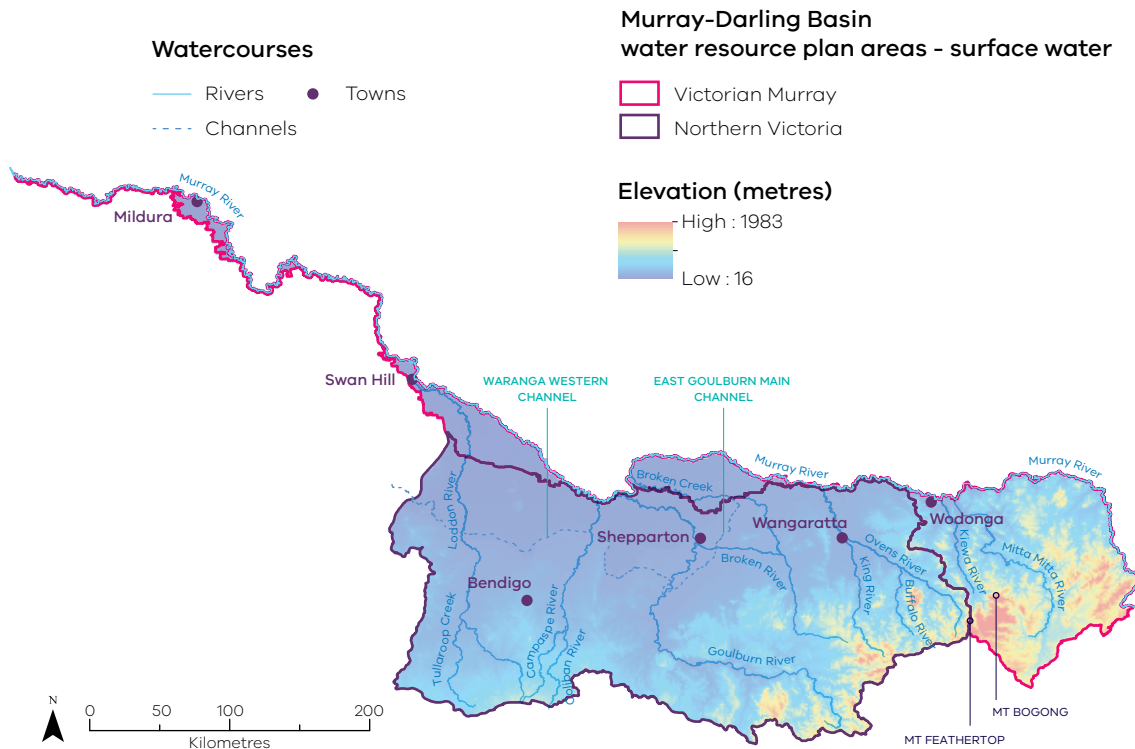


Figure 3-1: Topography in Victoria's North and Murray water resource plan area indicated by relative elevation in metres AHD (Australian Height Datum), rounded to the nearest whole figure.

Red represents areas of high elevation and green represents areas of low elevation.

3.1.2 Rainfall distribution

The climate for the Victorian Murray water resource plan area varies widely as it extends over a large area. In the mountain ranges in the south east, average annual rainfall is up to 2,000 mm in some areas, while in the far north west of the state near Mildura average annual rainfall is less than 300 mm. Rainfall occurs throughout the year, with the highest monthly averages in winter.

3.1.3 Geology, soils and land use

The Victorian Murray water resource plan area is made up of two connected regions: the region including Victoria's part of the upper Murray catchment, the Mitta Mitta catchment and the Kiewa catchment, and the region of the River Murray floodplain from Lake Hume to the South Australian boarder, this includes the irrigation districts and areas which source water from the River Murray.

The upper Murray area is a mixture of sandstone and granite areas such as Adaminaby Group, Omeo metamorphic Complex, Early Devonian Granite and Silurian Granite. The River Murray floodplain area mainly consists of alluvium and incised alluvium geology units.

All major valleys in the upper Murray catchment support significant agriculture, although around 80 percent of the Upper Murray Basin remains forested and a large part of the area is national park and used mainly for recreation and protecting biodiversity. The principal forms of land use are forestry, biodiversity and agriculture, with dairying as the major industry. Land use along the River Murray floodplain supports irrigated agriculture in the Murray Valley and Torrumbarry Irrigation Areas and the Sunraysia region (see GMID).

3.1.4 Economic contribution

The upper Murray region supports significant agricultural industries including dairy, beef, wool, cropping and horticulture, and forestry including managed pine and eucalypt forests. The region employs 29.1-46% of its workforce in agriculture, forestry and fishing sectors (DEDJTR, 2017). Dairying is a major industry in the valley floodplains and the biggest contributor to the local economy, sheep grazing for wool and meat and beef cattle fattening are also important and dominate the foothills other agriculture includes wine grapes and niche crops. The High Plains in the central and south west are used by graziers to run cattle on some public and private land, and the large area of freehold land around Omeo and Benambra is largely used for beef production.

Much of the region is forested and parts are used to support forestry industries including native forestry and pine and eucalypt plantations to produce timber and paper. More than 55 percent of the area is public land which includes over 200 parks and reserves used for biodiversity, ecotourism and recreational fishing activities.

The Murray floodplain area has areas of national parks including Barmah and Gunbower National Parks, along with large areas of irrigated agriculture. The River Murray is a major source of water for some of the largest irrigation schemes in Australia which support dairying, broadacre cropping and horticulture, see case study on GMID for more information.

In the north west, the Sunraysia irrigation region is a major producer of dried fruit, table grapes, wine grapes, almonds, pistachios, citrus and vegetables. The region has significant agricultural manufacturing industries and infrastructure and exports about \$340 million of agricultural products each year.

3.1.5 Traditional Owners

Victoria's part of the upper Murray catchment includes the Mitta Mitta River and Kiewa River catchments. These are areas of interest for the Dhudhuroa, Waywurru and Yaitmathang Nations. The surrounding mountains, hills and valleys have been important for Aboriginal culture for at least 21,000 years. Many Traditional Owner groups would travel from the floodplains to the mountains in spring and summer each year to feast on Bogong moths in the Australian Alps. At these gatherings they performed ceremonies, shared and exchanged knowledge and skills.

The River Murray and its floodplains is an area of interest to many Traditional Owner groups including: Bangerang, Barapa Barapa, Dhudhuroa, Latji Latji, Ngintait, Nyeri Nyeri, Tati Tati, Wadi Wadi, Wamba Wemba, Weki Weki, Waywurru, Yaitmathang. These Traditional Owner groups with areas of interest in the Victorian Murray water resource plan area as well as those with areas of interest in the Northern Victoria water resource plan area, have included comprehensive contributions outlining their views and aspirations for water resources in [Chapter 8](#).

3.1.6 Population and towns

Wodonga is the largest regional centre in the Victorian Murray water resource plan area, with a population of over 40,000 people. Albury in New South Wales forms the other part of the twin city Albury-Wodonga and has a population of just over 50,000 people (ABS, 2018). The twin cities provide health, education and professional services to the region and have diverse industries that grew out of active promotion of decentralisation in the 1970s.

Other major centres include Yarrawonga (~8,000 people), Echuca, (~15,000 people), Swan Hill (~11,000 people), and Mildura (~30,000 people) (ABS, 2018). These centres service residents and agricultural businesses and often have food manufacturing businesses based on local or regional produce. Many of the centres located on the River Murray have a strong tourism sector in their local economies.

3.1.7 Recreation and community values

Most land in the Mitta Mitta catchment is in the Alpine National Park which is used for recreational and nature-based tourism like fishing, camping and four-wheel driving, and conservation. Tourism is a major industry in the upper Murray catchment with the mountain peaks, valleys and extensive forests offering bushwalking, bird watching, skiing, trail riding, fishing and water sports.

Dartmouth reservoir offers water sports and recreation and is a favourite fishing spot, especially for trout and Macquarie perch. Camping with limited facilities is allowed in designated areas around the lake.

Large parts of the Kiewa River catchment are public land, including the Alpine National Park, and have high conservation significance. Tourism and leisure-based industries are important for the economy of the catchment and wider region.

Hume Dam follows an annual cycle of filling and drawdown. It usually receives inflows during winter and fills by the end of spring each year. Releases for water supply generally happen between December and May, with Hume Dam regularly drawn down to less than half of its capacity by the end of autumn each year.

Downstream on the River Murray, recreation and tourism bring in substantial income for the region. The area and its wetlands and national parks attract visitors for water sports, fishing, camping, bushwalking, house boating, historic paddle-steamers, and locally produced wine and food.

Recreation and tourism create substantial income for centres like Echuca and Yarrawonga and economic opportunities for smaller communities. Overall, the Murray region attracts more than five million tourists each year.

In the Mallee region, significant wetlands like the Hattah-Kulkyne National Park and Lindsay, Mulcra and Walpolla islands in the Murray-Sunset National Park provide recreational and community benefits. For more information about recreational and social values of water in Victoria's North and Murray water resource plan areas see [Chapter 13](#).

3.1.8 Environmental assets and features

The Victorian Murray water resource plan area contains many significant riverine, floodplain and wetland systems in the tributaries connected to the River Murray.

Much of the upper Murray catchment is Alpine and sub-alpine, or contiguous forest and has high environmental values associated with its river and wetlands. However major storages like Dartmouth Reservoir on the Mitta Mitta River and the AGL hydro scheme on the Kiewa exert significant pressures on the riverine environment. The rivers downstream of these storages is considered unregulated for water supply purposes, and currently can not receive held environmental water. For more information about how Victoria manages its environmental assets see [Chapter 12](#).

The Murray floodplains contains significant environmental assets including The Living Murray Icon sites and other significant wetlands.

3.1.8.1 River Murray Basin

Living Murray Icon sites

The icon sites are a collection of important locations along the River Murray, selected for their high ecological values and cultural significance. Victoria supports five of the six icon sites which are the Barmah Forest, Gunbower Forest, Hattah Lakes, the Lindsay, Walpolla, Mulcra Islands and the River Murray Channel. All of these except Hattah Lakes sit across state boundaries and require coordination either between Victoria and New South Wales or Victoria, New South Wales

and South Australia to achieve environmental watering objectives. Three of the five icon sites – Barmah Forest, Gunbower Forest and the Hattah Lakes – are also internationally recognised Ramsar wetlands.

The **Barmah Forest**, along with the Millewa Forest across the river in New South Wales, is the largest river red gum forest in Australia and the most intact freshwater floodplain system along the River Murray. The forest is a major feeding and breeding site for waterbirds including egrets, spoonbills, ibis, bitterns and night herons, as well as for significant frog and turtle populations.

A large diversity of significant fish species inhabit the forest wetlands and creeks including Murray-Darling rainbowfish, freshwater catfish, golden perch, flat-headed galaxias, Macquarie perch, Murray cod and silver perch. The forest also supports a broad range of floodplain vegetation including river red gum forest and woodland and the threatened Moira grass plains.

Gunbower Forest contains a range of important environmental values including diverse and rare wetland habitats, vulnerable and endangered plant and animal species and large areas of remnant vegetation, such as river red gum forest. The forest provides diverse habitats for birds and is known to support several internationally-recognised migratory waterbirds.

Gunbower Creek is an integral part of the Gunbower system, providing important habitat for native fish such as Murray cod, trout cod and freshwater catfish. Because of the high diversity of fish in the creek, it is a valuable refuge and source of fish for the re-colonisation of surrounding waterways. The most recent Index of Stream Condition results indicate Gunbower Creek is in moderate environmental condition (DEPI, 2013).

Hattah Lakes is made up of more than 20 perennial and intermittent freshwater lakes. It is recognised for its waterbird breeding habitat and is a high-value drought refuge for wetland-dependent waterbirds, including the spoonbill, egret, night heron, bittern, and for migratory bird species. Five of the nine fish species that have been reported present in the lakes with conservation significance in Victoria, include the golden perch, silver perch, Murray cod, freshwater catfish and unspotted hardyhead species. Flood-dependent vegetation at Hattah Lakes ranges from wetland communities that require frequent flooding to those that require only periodic inundation such as lignum and black box.

The **Lindsay, Wallpolla, Mulcra Islands** system includes semi-permanent and ephemeral waterways and wetlands which support a range of vegetation types, including river red gum and black box woodlands and lignum shrublands. The floodplain supports diverse habitat for native fish, frogs, turtles and waterbirds. The surrounding creeks and streams are important in maintaining flowing water habitat for fish species such as Murray cod, freshwater catfish, silver perch, Murray-Darling rainbowfish and unspotted hardyhead. When they are flooded, the waterways and wetlands in this system provide important habitat for wetland-dependent species and many waterbirds, including the great egret and red-necked stint.

Other important wetlands

The Victorian Murray supports a large number of other significant wetlands as well as the icon sites. These wetlands mainly get their water through infrastructure like channels, pumps and pipes that deliver held environmental water.

Central Murray wetlands

The Central Murray wetlands are located in the vicinity of Barmah and Gunbower Forests. There are several internationally-recognised Ramsar-listed wetlands within the system including Lake Cullen, Hird Swamp and Johnson Swamp, while many of the others are of regional significance. These are part of the Kerang wetlands Ramsar site.

The wetlands are considered highly significant, supporting several vulnerable or endangered

species including the Murray hardyhead, the Australian painted snipe and the growling grass frog. The wetlands provide habitat for many threatened bird species listed under legislation and international agreements, including the great egret and white-bellied sea eagle.

Lower Murray wetlands

The lower Murray wetlands are located in the linear floodplain along the River Murray and extend from the Murrumbidgee River junction to the South Australian border. There is a wide variety of wetland types and depending on their location in the landscape, their interaction with groundwater and their management history, wetlands can be permanent, temporary, fresh or saline.

These differences in water regime and water quality offer diverse habitats for different plants and animals. The dominant tree species found at most wetland sites are river red gum and black box. These trees form significant forests on the floodplain providing habitat, particularly for birds, reptiles and mammals. Considines, Cokum Bushland Reserve and Poyner are assets that form part of the broader Wimmera-Mallee wetland complex but receive their watering from the River Murray (supply system #5). The other wetlands in the complex receive their water from the Glenelg system (supply system #4).

3.1.9 Urban water distribution systems

A reliable water supply supports the region's economy, people and many social activities. Towns supplied with water from within the Victorian Murray water resource plan area are listed in [Table 3-1](#) to [Table 3-5](#).

Table 3-1: Grampians Wimmera Mallee Water combined rural and urban distribution systems

Area	System/towns supplied	Source of supply
Northern Mallee Pipeline	Supplies rural customers around Ouyen and urban customers in Chillingollah, Chinkapook, Ouyen, Manangatang, Nandaly, Nullawil, Patchewollock, Speed, Tempy, Underbool, Waitchie and Walpeup	River Murray at Wemen, Piangil, Nyah and Swan Hill

Table 3-2: Lower Murray Water urban distribution systems

System/towns supplied	Source of supply
Kerang	River Murray
Koondrook	River Murray
Mildura system—Mildura (including Cardross, Koorlong and Nicholls Point), Merbein and Irymple	River Murray
Millewa system—Werrimull, Meringur and Cullulleraine	Millewa waterworks district
Murrabit	River Murray
Mystic Park	Victorian Mid-Murray Storage (Lake Kangaroo)
Piangil	River Murray
Red Cliffs	River Murray
Robinvale	River Murray
Swan Hill system—Swan Hill, Lake Boga, Nyah, Nyah West, Woorinen South and Wakool Shire (New South Wales)	River Murray

Table 3-3: North East Water urban distribution systems

Area	System/towns supplied	Source of supply
Mitta Mitta River	Dartmouth	Mt Tabor Creek
	Eskdale	Regulated Mitta Mitta River
River Murray	Bellbridge	Lake Hume
	Tallangatta	Lake Hume
	Wahgunyah system—Wahgunyah and Rutherglen	Regulated River Murray
	Wodonga system—Wodonga, Baranduda, Kiewa, Springhurst, Tangambalanga, Bonegilla, Ebdon, Barnawartha and Chiltern	Regulated River Murray
	Yarrawonga system—Yarrawonga, Tungamah, St James, Devenish and Goorombat	Regulated River Murray
Subalpine	Beechworth	Nine Mile Creek Frenchmans Creek Lake Kerferd catchment
	Yackandandah	Nine Mile Creek
Upper Murray	Corryong system—Corryong and Cudgewa	Nariel Creek
	Walwa	Unregulated River Murray

Table 3-4: Goulburn Valley Water urban distribution systems

Area	System/towns supplied	Source of supply
Murray channels	Katamatite and Picola	Murray Valley Irrigation Area
River Murray	Barmah	River Murray
	Cobram system—Cobram, Strathmerton and Yarraweyah	River Murray

Table 3-5: Coliban Water urban distribution systems

Area	System/towns supplied	Source of supply
Murray	Cohuna rural system—Cohuna, Mead and Gunbower	River Murray—Gunbower Creek
Coliban Northern	Echuca	River Murray
	Gunbower	River Murray—Taylors Creek
	Leitchville	River Murray—Gunbower Creek and Cohuna irrigation channel

3.2 Features of the Northern Victoria water resource plan area

The Northern Victoria water resource plan area extends from the Victorian Alps in the east, around Daylesford in the south west, and to the western boundary of the Loddon River catchment. The area comprises the major tributaries of the River Murray downstream of the junction with the Kiewa River.

The area is dominated by northerly flowing river systems including the Ovens, Broken, Goulburn, Campaspe, and Loddon rivers, with mountains in the south, and broad alluvial valleys dominated by irrigated agriculture in the north.

The Lower Broken Creek and Lower Loddon River regions are associated with the River Murray because they source their water from the Victorian Murray, and consequently are described in the Victorian Murray water resource plan area. The water resource plan area contains sections of the Victorian catchment management authority regions of North Central, North East and Goulburn Broken.

Most of the major rivers in the region are highly regulated, except the Ovens River which is often described as semi-regulated. The region's major water storages include Lake Buffalo and Lake William Hovell on the Ovens River system, Lake Nillahcootie on the Broken River, Lake Eildon and Goulburn Weir on the Goulburn River, Lake Eppalock on the Campaspe River, the Upper Coliban storages on the Coliban River and Cairn Curran, Tullaroop and Laanecoorie Reservoirs on the Loddon River.

3.2.1 Topography

The highest point in the water resource plan area is Mount Feathertop near the headwaters of the Ovens River and 1,922 metres above sea level. The lowest point is Kerang at 77 metres above sea level. The eastern and southern extents of the water resource plan area are steep and of relatively high relief at over 500 metres AHD, but most of the area is dominated by lowland rivers that are generally under 200 metres. **Figure 3-1** shows the (relative) topography.

3.2.2 Rainfall distribution

The climate is highly variable across the whole region. The average annual rainfall ranges from up to 2,000 mm in the Victorian Alps in the east to less than 400 mm near Kerang. Rainfall occurs throughout the year with highest monthly averages in winter.

3.2.3 Geology, soils and land use

The geology of the plains in northern Victoria is complex and made up of unnamed alluvium along the northern reaches of the Broken, Goulburn, Loddon and Campaspe rivers and associated floodplains. Along the Great Dividing Range the geology is mainly a combination of sandstones and siltstones such as Castlemaine Group, Adaminaby Group, Norton Gully Sandstone and Humevale Siltstone and Late Devonian granitic rocks.

Land use is a combination of irrigation and dryland farming through lowland floodplains, grazing and cropping in the mid to upper catchments in the south, forestry operations in the foothill, and conservation areas around the mountains (North Central Catchment Management Authority, 2013).

3.2.4 Economic contribution

The Northern Victoria water resource plan area sustains agriculture, food processing, manufacturing, forestry and support services including health, education, tourism and retail. People and economic activity are spread throughout the region in towns and rural settings. Agriculture, forestry and fishing are major employers and the region makes a major contribution to Victoria's economy.



The mountains in the south east of the water resource plan area support conservation and tourism with large areas of national parks, seasonal ski activities and some forestry. Grazing, cropping and viticulture are supported within these valleys, which includes the King Valley region.

"production in agriculture builds the jobs in rural communities - this is at threat. \$8bn of GDP comes out of the GMID and that is being put in jeopardy. We seem to be throwing our water security away which is causing such angst."

Public meeting, Yea

3.2.4.1 Ovens Basin

Beef and sheep grazing is the major agricultural use of private land in the Ovens Basin, followed by wine-growing. Parts of the King Valley and Myrtleford district have successfully converted from traditional tobacco-growing to grape-growing and wine production and other horticultural crops include hops, hazelnuts, walnuts, chestnuts, herbs, berries and apples.

Beyond the extensive areas of the Ovens Basin set aside in national parks, public land is used to produce hardwood and softwood.

Tourism is well established, with alpine ski fields and resorts nearby, and excellent rivers and streams for fishing. The region also specialised in wine and food tourism.

3.2.4.2 Broken Basin

Most of the Broken Basin has been cleared for agriculture that supports grazing in the south and mixed cereal and livestock in the central region. Parts of the forested upper region are used for softwood and hardwood production.

Benalla is the main town in the Broken Basin that services the region, with agricultural support services, education and health services, a fibreboard factory and Thales Australian ammunition factory as the main employers.

Water resource management in the Broken Basin went through a major reconfiguration when Lake Mokoan was decommissioned in 2009. Environmental works are continuing to rehabilitate the site and return it to its natural state as an ephemeral wetland.

3.2.4.3 Goulburn Basin

Diverse agriculture in the Goulburn Basin ranges from hardwood timber production in the south-east to dairying and fruit production in the north. Tongala, Tatura and Shepparton are prominent dairying centres and the Shepparton area is well-known for its pome and stone fruit production.

Lake Eildon supports a growing tourism industry. Areas around Lake Eildon produce sheep for wool and cattle for beef and dairy production. Sheep and cropping are important in dryland and irrigated areas further along the Goulburn Valley.

A large part of the northern section of the Goulburn Basin is in the Goulburn-Murray Irrigation District where there is irrigation for fruit-growing, dairying and livestock production.

3.2.4.4 Campaspe Basin

Agriculture dominates land use in the Campaspe Basin. Most of the land has been cleared for farming but there are still significant forested areas in the Axe Creek catchment and on the southern hills.

The Gold Rush of the 1850s significantly changed the landscape and resulted in town far away from major rivers. The southern area of the Campaspe Basin now produces livestock, crops and horticulture including grape-growing around Heathcote, and much of the northern part of the Campaspe Basin is in the Goulburn-Murray Irrigation District and produces cropping and dairy. Irrigators source water from the Campaspe River and the Goulburn-Murray Irrigation District which primarily sources water from the Goulburn Basin. Some of the northern basin areas support dryland farming to produce cereal crops, beef cattle, lambs and wool.

Echuca near the junction of the River Murray and Campaspe is the largest urban centre in the Campaspe Basin.

3.2.4.5 Loddon Basin

In the Loddon Basin there is mixed grazing of sheep and cattle on steep to undulating land in the south, and some crop production. Fruit, vegetable and forest industries are important and the main fruit-growing district is at Harcourt near Castlemaine. In the north of the region land is used for crops where wheat, barley, oats and hay are grown under irrigation. There is also pig and poultry farming throughout the region.

Goulburn-Murray Irrigation District

Irrigation in the Goulburn-Murray Irrigation District (GMID) was first developed in the late 1800s early 1900s with the completion of the Goulburn Weir in 1891. The Goulburn Weir was the first major diversion structure built for irrigation in Australia and was considered very advanced for the time. A network of channels was built over the period of 1900-1950 to deliver water to farm gates, it comprised 6,300 km of channels and 800 km of natural waterways. The biggest change to the system came in the 1950s and 1960s following completion of Eildon Dam and the expansion of Hume Dam. This supported more water entitlements for farms, the volume of entitlement farms received depended on their size, soil type and proximity to the channel system. Until the late 1960s and early 1970s water resources for farming were considered unlimited, however dry conditions showed that the resources were limited. As a result, Dartmouth Dam was built largely as a drought reserve for the system. This enabled Victoria to continue to support entitlements with a high degree of certainty. This was important because up until the late 1980s the only way for a farmer to increase their water entitlement was to purchase more land with existing entitlement. The creation of the water market in the early 1990s gave irrigators the ability to diversify or change their farming practices and to manage risks of low allocation years. The market is now widely used by irrigators and factored into farm planning and risk management.

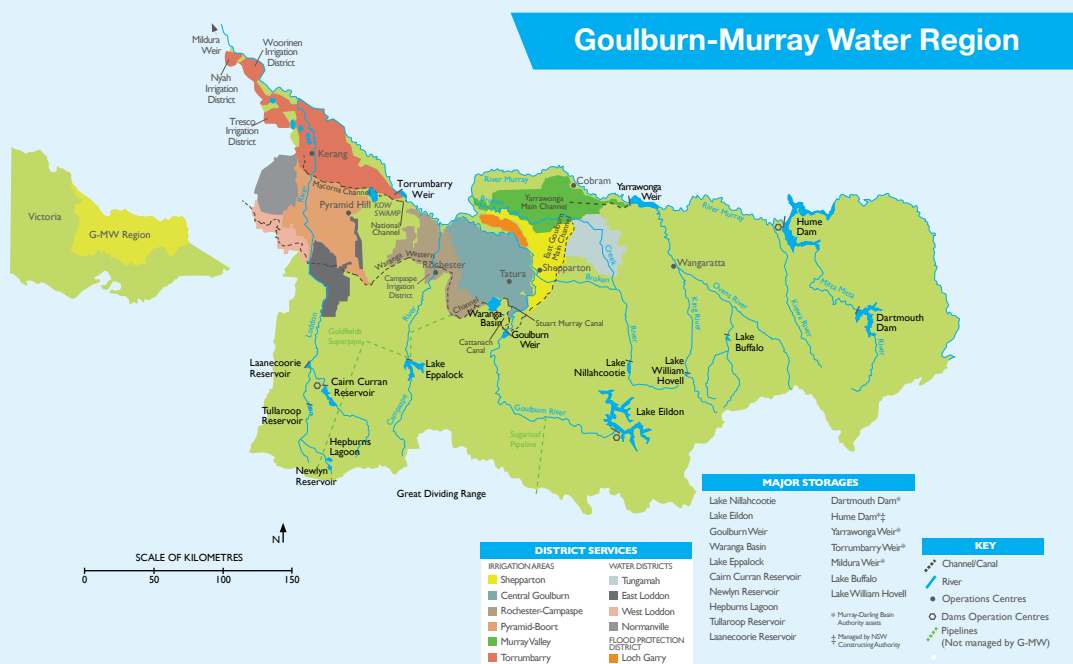
The GMID is located in northern Victoria and receives average rainfall of 400 mm- 500 mm per annum. This volume is insufficient to support many farming enterprises hence the reliance on irrigation water. The high value agriculture that has developed in the region is a result of the reliability of water supply.

The GMID is the largest irrigation system in Victoria. It is supplied with water from Dartmouth Dam, Hume Reservoir, Eildon Dam, Waranga Basin and to a lesser extent resources from the Campaspe and Loddon systems (via supplements). Goulburn-Murray Water operate the GMID and is Victoria's largest rural water provider. GMW supplies a range of customers in the GMID including gravity irrigators, irrigators on pump systems and domestic and stock customers.

The region contains an extensive network of canals and channels transporting water from the storages or rivers to the farm gate. Victorian and Commonwealth governments have invested \$2 billion in the Connections Project which is modernising the irrigation infrastructure across the GMID. The Connections Project is modernising regulators, channels, pipelines and meters and decommissioning some channels to increasing the efficiency of the system. The water savings from this project are being shared by investors with the majority of them being provided to the environment.

The GMID is often referred to as Victoria's foodbowl and generates \$5.9 billion worth of production a year (GMW, 2016). The region supports around 1,200 dairy farms, which created 6,600 jobs for Victoria and provides 21 percent of Australia's milk. It also supports 400,000 hectares of irrigated broadacre crops including wheat, barley, triticale, corn and oilseeds and 28,151 hectares of horticulture including almost three quarters of Australia's pear crop. The GMID includes six distinct regions, including the Murray Valley, Shepparton, Central Goulburn, Rochester, Loddon Valley and Torrumbarry irrigation areas. The Murray Valley and Torrumbarry districts are mainly supplied by Murray resources and the Shepparton, Central Goulburn, Rochester and Loddon Valley are mainly supplied by Goulburn resources.

Within the GMID towns have an important role to support the irrigation and farming sectors and have substantial food processing industries. The larger towns have diversified industries and while the agriculture and related including education, health and retail while the smaller towns are more dependent on agriculture and food manufacturing and are vulnerable to reductions in water availability.



3.2.5 Traditional Owners

Water holds a significant place in Aboriginal culture and identity and is intimately linked to the health of Country and life. Many Aboriginal cultural sites in the water resource plan area are on or near waterways, and rivers, streams and waterbodies are still important sources of food and medicine.

Aboriginal communities hold knowledge of the region's water resources, which is vital for many cultural practices and values (see [Chapter 8](#)).

The Northern Victoria water resource plan area includes the Ovens, Broken, Goulburn, Campaspe and Loddon river catchments. Traditional Owner groups with interest in these areas include: Bangerang, Barapa Barapa, Dhudhuroa, Dja Dja Wurrung, Taungurung, Wamba Wemba, Yaitmathang and Yorta Yorta.

3.2.6 Population and towns

The Ovens region has about two percent of the Murray-Darling Basin's population, much of the population is concentrated in the major centres of Wangaratta, Myrtleford, Beechworth and Bright.

The Goulburn and Broken catchments are home to about seven percent of the population of the Murray-Darling Basin with an estimated population of 215,000. This includes as many as 6,000 Victorians who identify as Traditional Owners. Over 90 percent of people live in the regional towns and centres Shepparton/Mooroopna has the largest population followed by Benalla, Kyabram, Seymour and Mansfield.

About two percent of the Murray-Darling Basin's population live in the Campaspe catchment in the major towns of Kyneton, Rochester and Echuca.

The Loddon catchment is home to about seven percent of the Murray-Darling Basin's population. Bendigo is Victoria's fourth largest city and the largest city in Victoria's North and Murray water resource plan area. Other towns in the Loddon catchment are smaller including Maryborough, Castlemaine, Kerang, Avoca, St Arnaud, Charlton and Sea Lake.

3.2.7 Recreation and community values

Tourism and recreation are well-established across the region with alpine ski fields and resorts, rivers and streams offering excellent fly-fishing, water sports, kayaking, swimming and water skiing and wine and food tourism. ([Figure 3-2](#))

Nature-based and cultural heritage tourism, and recreation support many jobs in the Goulburn region. For example Lake Eildon's 515 km of shoreline, long reaches and deep waters attract trout anglers, water skiers and houseboaters.

In the Campaspe and Loddon basins, national parks and historic gold-mining towns draw visitors to the southern catchment, while the River Murray attract anglers. Water storages are important valued sites for recreation in the region. People visit the central and northern catchment for water sports, especially Lake Eppalock and Echuca, with its rich history as a major inland port during the paddle steamer era. For more information about recreational and social values of water in Victoria's North and Murray water resource plan areas see [Chapter 13](#).

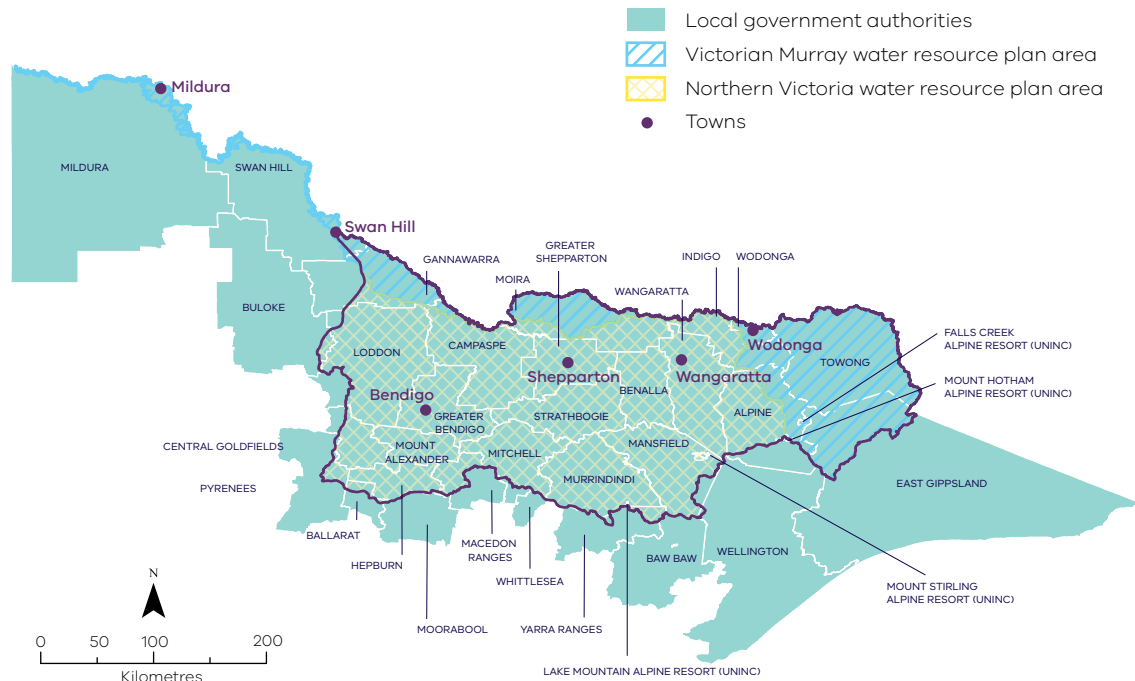


Figure 3-2: Local government boundaries and Victorian Murray and Northern Victoria water resource plan areas

3.2.8 Environmental assets and features

The Northern Victoria water resource plan area contains many significant riverine, floodplain and wetland systems. For more information about how Victoria manages its environmental assets see [Chapter 12](#).

3.2.8.1 Ovens River Basin

The Ovens River priority environmental assets include the regulated reaches of the Buffalo River below Lake Buffalo, the King River below Lake William Hovell and the Ovens River from its confluence with the Buffalo River to Lake Mulwala. The catchment upstream supports a wide range of self-sustaining populations of significant native fish including Murray cod, trout cod, golden perch and many smaller-bodied fish such as the fliespecked hardyhead.

Frogs including the growling grass frog are present in the lower Ovens River and associated wetlands and in the King River upstream of Cheshunt.

The Lower Ovens River from Killawara to Lake Mulwala was declared a heritage river because of the quality of the river red gum forests which surround much of the lower section and considered one of the healthiest in the Murray–Darling Basin, the scenery, significant fauna, and the high diversity of the native fish and birds like egrets, herons, cormorants and bitterns.

The river is one of the largest semi-unregulated waterways in Victoria, with natural flows inundating over 1,800 wetlands, and 96 percent of the Lower Ovens floodplain on average every three years (Water Technology, 2018). The most recent Index of Stream Condition results indicate the majority of the Ovens system is in moderate environmental condition (DEPI, 2013).

3.2.8.2 Broken Basin

The Broken River supports native fish including golden perch, silver perch, Murray cod, trout cod, Macquarie perch and freshwater catfish. The Broken Creek diverges from the Broken River



downstream of Benalla at Caseys Weir and flows into the River Murray at the downstream end of the Barmah Forest.

The Broken Creek system is largely characterised by box-dominated riparian vegetation and plains grassy woodlands, which support many threatened species of state and national conservation significance, including brolga. Sections of the Broken Creek are in poor condition, and sections of the Broken River are in very poor condition (DEPI, 2013).

The Broken catchment also supports the Winton wetlands. Since the decommissioning of Lake Mokoan, the rehabilitation of the Winton wetlands is now one of the largest wetland rehabilitation projects in the southern hemisphere.

The catchment also supports Moodies Swamp, which contains several state and nationally-threatened species and plants, including rigid water milfoil, slender water milfoil and river swamp wallaby-grass. The wetlands provide breeding habitat for several bird species listed in international agreements and conventions, such as the brolga and royal spoonbill.

3.2.8.3 Goulburn Basin

The Goulburn River supports native fish, including golden perch, silver perch, Murray cod, trout cod, Macquarie perch and freshwater catfish. Its aquatic vegetation and submerged logs provide a great diversity of habitat to support adult and juvenile fish.

The bank vegetation is dominated by river red gum open forest/woodland, and yellow box and grey box woodland/open forests providing important habitat for vulnerable or threatened wildlife. Birds such as egrets, herons and cormorants regularly use the rivers to feed. The majority of the river length in the Goulburn catchment is in moderate environmental condition, and 20 percent is in good and excellent environmental condition (DEPI, 2013).

Significant wetlands in the catchment include Reedy Swamp and Doctors Swamp. These wetlands contain a wide variety of vegetation, including ecological vegetation dominated by river red gums, such as tall marsh, floodway pond, herbland, rushy riverine swamp and cane grass wetlands.

3.2.8.4 Campaspe Basin

The Campaspe River downstream of Lake Eppalock is a habitat for several significant fish species such as Murray cod, silver perch, golden perch and Murray-Darling rainbowfish. Platypus, turtles and frogs also inhabit the river. Along the river, there is a highly-connected, intact river red gum canopy. The most recent Index of Stream Condition results indicate the Campaspe River below Lake Eppalock is in good to moderate environmental condition (DEPI, 2013).

Despite being disconnected from the rest of the catchment by Lake Eppalock, the Coliban River retains populations of Murray cod, trout cod, golden perch and Macquarie perch, possibly due to stocking. River blackfish, once common, have not been sighted since 1981 (NCCMA, 2006). Platypus, rakali and common long-necked tortoises have also been recorded.

The river supports stands of emergent and submerged aquatic vegetation, while the riparian environment is dominated by remnant patches of stream bank. Similar to the Campaspe, the most recent Index of Stream Condition results indicate the Coliban River to be in moderate environmental condition (DEPI, 2013).

3.2.8.5 Loddon Basin

The Loddon River and its tributaries downstream of the Bullarook, Laanecoorie, Tullaroop and Cairn Curran reservoirs contain populations of Murray cod, golden perch and river blackfish. Riparian vegetation is typically narrow river red gum woodland in the upper section (LREFSP, 2002), with some shrubby understorey of lignum further downstream. The most recent Index of

Stream Condition results indicate the Loddon River is in moderate environmental condition, Tullaroop and Birch's Creeks in poor condition and Pyramid, Serpentine and Bullock Creeks in very poor condition (DEPI, 2013).

The Boort wetlands (Boort, Yando, Leaghur, Lake Meran and Little Lake Meran) contain important habitat for a range of bird, reptile and amphibian species. The wetlands are extremely important waterbird habitat and breeding sites including for yellow-billed spoonbill, banded stilt, Australian white ibis and a number of duck species. Significant fish species recorded include Murray hardyhead and freshwater catfish.

Native vegetation values in the wetlands include several threatened ecological vegetation types such as red gum swamp and riverine chenopod woodland, and important plant species such as cane grass.

3.2.9 Urban water distribution systems

A reliable water supply supports the region's economy, people and many social activities. Towns supplied with water from within the Northern Victoria water resource plan area are listed in the tables below.

Table 3-6: North East Water urban distribution systems

Area	System/towns supplied	Source of supply
Alpine	Bright system—Bright, Wandiligong and Porepunkah	Unregulated Ovens River
	Harrietville	Ovens River
	Mount Beauty system—Tawonga, Tawonga South and Mount Beauty	West Kiewa River
	Myrtleford	Buffalo Creek
Broken River	Benalla	Ryan and Whiskey creeks
King and Ovens rivers	Moyhu, Oxley and Whitfield	Regulated King River
	Wangaratta and Glenrowan	Regulated Ovens River, groundwater

Table 3-7: Goulburn Valley Water urban distribution systems

Area	System/towns supplied	Source of supply
Broken Creek	Nathalia	Broken Creek
	Numurkah system—Numurkah and Wunghnu	Broken Creek and the Murray Valley 6/6 Channel
Goulburn channels	Towns supplied from Shepparton Irrigation Area—Dookie and Katandra West	Shepparton Irrigation Area
	Towns supplied from Central Goulburn Irrigation Area—Tatura, Kyabram, Tongala, Girgarre, Stanhope, Merrigum and Rushworth	Central Goulburn Irrigation Area
	Colbinabbin	Rochester Irrigation Area
	Corop	Rochester Irrigation Area

Area	System/towns supplied	Source of supply
Goulburn River	Alexandra	Regulated Goulburn River
	Murchison	Regulated Goulburn River
	Nagambie	Regulated Goulburn River
	Seymour system—Seymour, Avenel, Mangalore and Tallarook	Regulated Goulburn River
	Shepparton system—Shepparton, Mooroopna, Congupna, Toolamba and Tallygaroopna	Regulated Goulburn River
	Kirwans Bridge	Regulated Goulburn River
	Molesworth	Regulated Goulburn River
	Baxters Road	Regulated Goulburn River
	Woods Point	Unregulated Goulburn River
Goulburn River tributaries	Broadford system—Broadford and Waterford Park (Clonbinane)	Sunday Creek Reservoir and regulated Goulburn River at Tallarook
	Euroa system—Euroa and Violet Town	Mountain Hut Creek and Seven Creeks
	Kilmore system—Kilmore, Wandong and Heathcote Junction	Sunday Creek Reservoir, Hazels Creek
	Longwood	Nine Mile Creek
	Mansfield	Delatite River
	Marysville and Buxton	Steavenson River
	Pyalong	Mollisons Creek
	Strathbogie	Seven Creeks
	Upper Delatite system—Sawmill Settlement and Merrijig	Delatite River
	Yea	Yea River
Lake Eildon	Bonnie Doon and Eildon	Brankeet Creek / Lake Eildon
Katunga groundwater management area	Katunga	Groundwater

Table 3-8: Coliban Water urban distribution systems

Area	System/towns supplied	Source of supply
Campaspe	Goornong	Campaspe River
Coliban Northern	Bendigo system—Bendigo, Axedale, Raywood and Sebastian	Coliban storages (via Main Channel), Lake Eppalock and the Goulburn system (Lake Eildon and Waranga Basin via Goldfields Superpipe)
	Heathcote and Tooborac	Lake Eppalock and the Goulburn system (via Goldfields Superpipe)
Coliban Southern	Castlemaine system—Castlemaine, Maldon, Campbells Creek, Chewton, Newstead, Elphinstone, Taradale and Harcourt	Coliban storages (via Coliban Main Channel)
	Kyneton system—Kyneton, Malmsbury and Tylden	Lauriston Reservoir
Elmore groundwater	Elmore	Lower Campaspe Valley water supply protection area
Goulburn	Towns supplied from Loddon Valley Irrigation Area—Boort, Dingee, Macorna, Mitiamo, Mysia and Pyramid Hill	Goulburn system (Lake Eildon and Waranga Basin)
	Towns supplied from Rochester Irrigation Area—Lockington and part of Rochester	Goulburn system (Lake Eildon and Waranga Basin)
Loddon	Bridgewater system—Bridgewater and Inglewood	Loddon River
	Jarklin	Loddon River—Serpentine Creek and tankered
	Laanecoorie system—Laanecoorie, Tarnagulla, Bealiba and Dunolly	Loddon River
	Serpentine	Loddon River—Serpentine Creek and tankered
Trentham Groundwater	Trentham	Spring water and groundwater from Campaspe Basin

Table 3-9: Central Highlands Water urban distribution systems

Area	System/towns supplied	Source of supply
Maryborough and district (Loddon Basin)	Maryborough system—Adelaide Lead, Alma/Moonlight, Betley, Carisbrook, Craigie, Daisy Hill, Havelock, Majorca, Maryborough, Rodborough, Simson/Bet Bet, Talbot and Timor/Bowenvale	Evansford and Talbot reservoirs (which source water from McCallums Creek) and Tullaroop Reservoir on the Loddon River
Individual or small groups of towns	Clunes (Loddon Basin)	Groundwater bore
	Daylesford system –Daylesford, Hepburn and Hepburn Springs (Loddon Basin)	Three small storages supplied from various streams
	Dean (Loddon Basin)	Groundwater bore
	Forest Hill system (Loddon Basin) –Allendale, Newlyn, Smeaton, Kingston, Springmount, Broomfield and homes in rural areas	Three groundwater bores at Forest Hill
	Learmonth (Loddon Basin)	Groundwater bore
	Lexton (Loddon Basin)	Lexton Reservoir, which captures water from springs in its catchment
	Waubra (Loddon Basin)	Two groundwater bores

3.3 Groundwater

The Goulburn–Murray groundwater basin in northern Victoria borders the Gippsland groundwater basin to the south east, the Central and Otway–Torquay groundwater basins to the south and the Wimmera–Mallee groundwater basin to the west.

The hydrogeology of the region is broadly subdivided into two distinct geological regions: southern highlands of bedrock with sedimentary valleys and the northern plains with layers of sedimentary aquifers.

In the south, the highlands feature exposed bedrock and valleys of eroded material that form the Quaternary Aquifer. This thin, shallow aquifer made up of sand, colluvium, fluvial sands, gravels, clay and silts is found in upland valleys such as Alexandra, Yea and Flowerdale. Water is also held in the Mesozoic and Palaeozoic basement rock, which is comprised of sedimentary fractured rock. Basement rock is close to the surface near Jamieson, Mansfield, Marysville, Kilmore and Seymour and to the east is increasingly buried deeper. These are generally low-yielding groundwater resources.

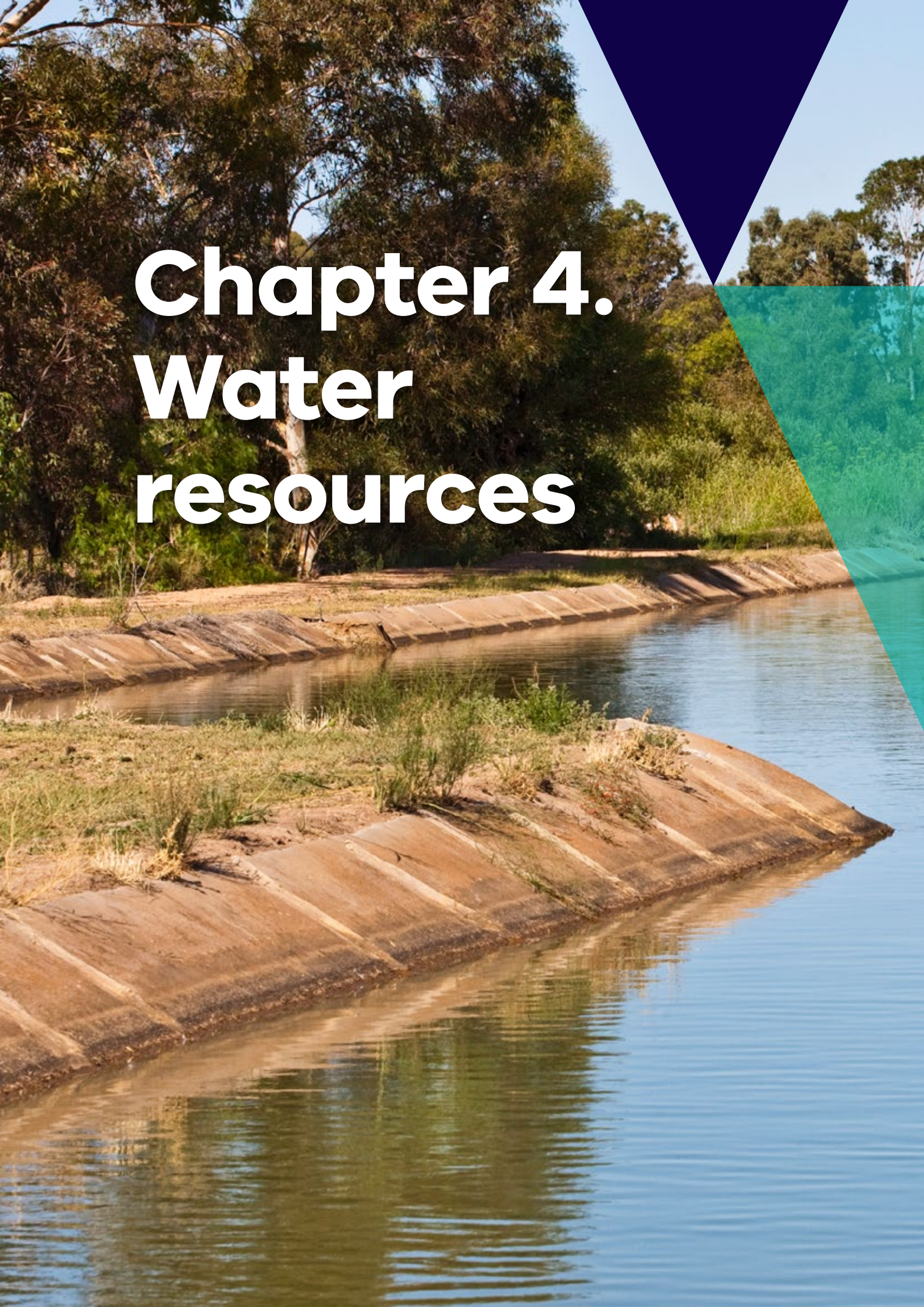
In the north, the floodplain of the Ovens, Broken, Goulburn, Campaspe, Loddon and Murray rivers gradually thickens into several geological layers.

- Upper Tertiary Quaternary Aquifer (UTQA) of the Shepparton formation is made of layered clay, sands and silt. It appears north of Seymour and runs to Nathalia, Barmah and Numurkah. Along the River Murray, the UTQA overlies the Calivil Formation Upper Tertiary Aquifer fluvial, containing fluvial sand, gravel and clay. These are major groundwater resources in the region
- Lower Tertiary Aquifers of the Renmark formation appear in pockets to the north, near Nathalia and Barmah. They comprise sand, gravel, clay, silt and minor coal and are major groundwater resources in the region
- Cretaceous Permian sediments made of fractured rock, sand and minor coal. They appear from Shepparton to parts of the north near Nathalia and Numurkah
- Mesozoic and Palaeozoic basement rock, which comprises sedimentary fractured rock

Groundwater supports a significant amount of agricultural activity and commercial operations. It provides urban supplies and is an essential source for domestic and stock water supply. It is also an important environmental asset that provides base flow to streams and supports wetlands and other ecosystems that depend on groundwater.

The Minister for Water is responsible for the management of groundwater across Victoria. Goulburn–Murray Water plays an essential role in managing groundwater sustainably for local communities and the environment in northern Victoria (see [Chapter 4](#)).



A photograph of a river with concrete retaining walls on both sides. The water is calm and reflects the surrounding greenery. In the background, there are dense trees and a clear blue sky. The image is overlaid with a dark blue triangle in the top right corner and a teal triangle in the middle right.

Chapter 4. Water resources



4. Water resources

This chapter outlines how water resources are managed in the Victoria's North and Murray water resource plan area. It includes the key water resources and features in the Northern Victoria and Victorian Murray water resource plan areas (surface water) and the Goulburn-Murray water resource plan area (groundwater).

4.1 Managing water resources: types of water resource supply systems

Rivers in Victoria's North and Murray water resource plan area vary from unregulated, like the Yea River, a tributary of the Goulburn, to semi-regulated like the Ovens River to the highly regulated Goulburn River.

4.1.1 Unregulated surface water systems

An unregulated catchment is one that does not contain a storage such as a dam or weir, which significantly alters and regulates the flow of the river downstream. An unregulated catchment may contain rivers, creeks and many small waterways, and in the case of several unregulated catchments in Victoria, can extend well over 1,000 km² in area.

Unregulated catchments are all undeclared which means that entitlements are bundled. Bundled entitlements provides for both the take and use of water. In unregulated catchments, entitlements to water include take and use licences and bulk entitlements (see [Chapter 7](#)).

All water taken for commercial or irrigation purposes in unregulated catchments must be licensed, including water taken from harvesting dams. Water taken by urban water corporations is authorised under a bulk entitlement or a take and use licence. The licences are called take and use licences or section 51 licences after the relevant section of the Victorian Water Act. The use of water, and trade of licences between users, is managed by Goulburn-Murray Water (GMW) in accordance with Ministerial trading rules (Minister for Water, 2014). (See [Chapter 7](#)).

In unregulated surface water systems, the volume of water taken and the impact on the environment is managed by specifying limits on the timing and the rate of take in bulk entitlements and take and use licences. The volume of water which can be extracted by consumptive users is further limited by restricting or banning take by take and use licence holders during times of low flow. While above cap water remains in the unregulated system, it provides for environmental and other shared benefits (see [Section 12.4.3](#)).

Any water not allocated through entitlements is above cap water. For more information on above cap water see [Section 7.2.2.4](#) and [Section 12.4.3.1](#). When above cap water in an unregulated system flows into a storage it will become regulated and support the needs of the regulated system. Depending on the rules in the bulk entitlement for the regulated system, this water may be stored or released as a passing flow.



A range of water management arrangements have been developed for unregulated streams in Victoria's North and Murray water resource plan area, examples include:

- a water supply protection area has been declared for the Upper Ovens River. A management plan was developed by a consultative committee and approved by the Minister for Water (GMW, 2012). This plan is an integrated water management plan which manages surface water and groundwater
- local management plans have been developed and published (<http://www.g-mwater.com.au/water-resources/surface-water/unregulated-local-management-rules>) for all other significant unregulated streams in the Northern Victoria water resource plan area. These communicate how the water corporation intends to manage the resource in an identified area or for a specified resource. Typically, these identify trigger levels for water users to stop pumping to support the protection of baseflows.

4.1.2 Regulated surface water systems

A regulated system is controlled or regulated by infrastructure such as water storages or weirs which impede the flow of water and allow the water to be released when it is required. The stored water can be controlled and released to supply urban, industrial, agricultural and environmental needs.

Regulated systems can either be declared (under section 6A of the Victorian Water Act) or undeclared. In declared systems, water entitlements have been unbundled from land and split into a water share (an entitlement to a share of the resource) and a water-use licence or water-use registration (authorising the use of water on land or for specified uses) (for more information see [Section 7.2.2](#)). Unbundled entitlements provide flexibility for water users to manage their water use and their risks through easier water trades. The Ovens, Broken, Goulburn, Campaspe, Loddon and Murray systems were declared in 2007.

In undeclared systems, water entitlements remain bundled as take and use licences. Bulk entitlements exist in both declared and undeclared systems. A list of rivers and creeks in northern Victoria and whether they are declared or undeclared, regulated or unregulated can be found in [Table 4-1](#).

Storages can be either in-stream or off-stream. In-stream storages are fed by a water catchment with a dam built across a river. If the storage is built away from a river then the storage is called off-stream. Off-stream storages receive water transferred from in-stream storages or other sources.

In Victoria off-stream storages fall into two categories. They are either in the unregulated regions or are part of a large regulated system. Off-stream storages in unregulated parts of the basin are used to store urban town supply by the local urban water corporation and tend to be small. An example is the 540 ML Freeburgh Storage off the Ovens River, which is managed by North East Water to supply Bright and Porepunkah.

Large off-stream regulated storages are used to capture water diverted into the storage using weirs and channels. Released water returns to the river using other canals. These storages are used as mid-catchment harvesting storages to capture unregulated flows that enter the river from tributaries downstream of the headworks storages, or when the headworks storage spills. An example of an off-stream storage is Waranga Basin.

Water is released from storages in different ways. The most common way is via an outlet valve, which can be controlled to release the right volume of water. Most storages have an outlet tower built immediately upstream of the dam wall. There may be various inlets at the side of the tower leading into the outlet pipe. These allow water from different levels of the reservoir, not just the bottom, to pass into the outlet pipe. This allows some control over the quality of water released.

Water leaving the outlet usually splashes over rocks or a special concrete buffer which reduces the tremendous force of the fast-flowing water and allows it to pass into the river without severely eroding the banks.

At some reservoirs water can be released by a turbine which turns a generator to produce electricity, for example, at Dartmouth Reservoir and Lake Eildon. All storages have spillways which allow water to flow downstream safely when they fill to capacity.

At diversion weirs such as Goulburn Weir, the purpose of the structure is to create a weir pool and raise the water level so that water supplies can be diverted and allowed to flow under gravity along a network of channels. In the case of the River Murray, weirs also improve navigability of the river.

Goulburn Weir allows diversion of water into three major channels - the Stuart Murray Canal alongside the weir and the Cattinach Canal which transfer water to Waranga Basin and the western part of the Goulburn-Murray Irrigation District, and the East Goulburn Main Channel which supplies the eastern part of the Goulburn-Murray Irrigation District and the Shepparton Irrigation Area, also it can supply the Lower Broken Creek.

Table 4-1: Status of rivers and creeks in Victoria's North and Murray water resources plan area

River	Unregulated	Regulated	Undeclared	Declared
Acheron River	X		X	
Axe Creek	X		X	
Barr Creek	X		X	
Bendigo Creek	X		X	
Bet Bet Creek	X		X	
Big River	X		X	
Birch Creek (above storages)	X		X	
Birch Creek (below storages)		X		X
Blind Creek	X		X	
Broken River (above Lake Nillahcootie)	X		X	
Broken River (below Lake Nillahcootie)		X		X
Buckland River	X		X	
Broken Creek (downstream of Caseys Weir to East Goulburn Main Channel)		X	X	
Broken Creek (downstream of East Goulburn Main Channel)		X		X
Buffalo River (above Lake Buffalo)	X		X	
Buffalo River (below Lake Buffalo)		X		X
Bullock Creek	X		X	
Bundara River	X		X	

River	Unregulated	Regulated	Undeclared	Declared
Campaspe River (above Lake Eppalock)	X		X	
Campaspe River (below Lake Eppalock)		X		X
Cobungra River	X		X	
Coliban River (above upper Coliban storages)	X		X	
Coliban River (below upper Coliban storages)		X	X	
Cudgewa Creek	X		X	
Corryong Creek	X		X	
Goulburn River (above Lake Eildon)	X		X	
Goulburn River (below Lake Eildon)		X		X
Gunbower Creek		X		X
Holland Creek	X		X	
Kiewa River	X		X	
King River (above Lake William Hovell)	X		X	
King River (below Lake William Hovell)		X		X
Koetong Creek	X		X	
Little Snowy Creek	X		X	
Lima East Creek	X		X	
Livingston Creek	X		X	
Loddon River (above storage)	X		X	
Loddon River (below storage to Loddon Weir)		X		X
Loddon River (below Loddon Weir)	X		X	
McIvor Creek	X		X	
Middle Creek	X		X	
Mitta Mitta River (above Dartmouth Reservoir)	X		X	
Mitta Mitta River (below Dartmouth Reservoir)		X		X
Morses Creek	X		X	
Mt Pleasant Creek	X		X	

River	Unregulated	Regulated	Undeclared	Declared
Murray River (above Lake Hume)	X		X	
Murray River (below Lake Hume)		X		X
Ovens River (above confluence with Buffalo River)	X		X	
Ovens River (below confluence with Buffalo River)	X	X		X
Pyramid Creek		X		X
Reedy Creek	X		X	
Rubicon River	X		X	
Running Creek	X		X	
Ryans Creek		X	X	
Serpentine Creek (upstream of the channel linking to Bears Lagoon)		X		X
Serpentine Creek (downstream of the channel linking to Bears Lagoon)	X		X	
Seven Creeks		X	X	
Sheepwash Creek	X		X	
Simmonds Creek	X		X	
Snowy Creek	X		X	
Thowgla Creek	X		X	
Tullaroop Creek (above storage)	X		X	
Tullaroop Creek (below storage)		X		X
Yea River	X		X	
Yackandandah Creek	X		X	



4.1.3 Groundwater systems

Groundwater systems are described at many levels, and because groundwater moves both longitudinally and laterally systems will depend on the scale at which you are considering the groundwater. For example, groundwater systems as defined by the Basin Plan cover most of northern Victoria and are laterally bound by depth and rock type. Each groundwater SDL resource unit defined in the Basin Plan encompasses a number of Victoria groundwater management units which are the scale which Victoria manages groundwater. Areas of intensive groundwater use are incorporated into management plans, these include groundwater management areas for which the Victorian Water Act provides the legislative arrangements for the delegated authority to manage take in these systems, and or water supply protection areas for which a statutory water management plan are prepared to manage take across the system. For groundwater management areas water corporations prepare local management rules which describe how the authority manages the resources including triggers and rosters and restrictions to manage during dry conditions. Licensed take from an aquifer in Victoria is managed under caps which are called permissible consumptive volumes. Permissible consumptive volumes, limit the volume of water that may be taken for consumptive use, have been set for all groundwater management areas and water supply protection areas, except the Upper Ovens River water supply protection area where the statutory management plan prevents additional licensed volume being issued.

Groundwater is important to the environment and supports ecosystems that rely on groundwater for all or part of their water needs, such as river reaches that gain or lose groundwater, wetlands that rely on shallow aquifers or terrestrial vegetation that relies on shallow or deeper aquifers.

For more information on groundwater dependent environmental assets see [Section 12.5.5](#).

4.1.4 Having regard to connectivity

Basin Plan requires Victoria's North and Murray Water Resource Plan to identify and have regard to any water resources that have a significant hydrological connections to the water resource of the water resource plan area.

Victoria's North and Murray water resource plan area is included in the Southern Connected Basin. The Southern Connected Basin is a combination of the River Murray system and the major interconnecting rivers of the River Murray. Those interconnecting rivers are the Ovens, Goulburn (and tributary Broken), Campaspe, Loddon and Avoca rivers and Broken Creek in Victoria, and the Murrumbidgee River, Billabong Creek and the Great Darling Anabranch in New South Wales. In South Australia the Southern Connected Basin covers the length of the River Murray including Lakes Alexandrina and Albert and the Murray Mouth area as well as the Coorong.

The Southern Connected Basin includes the infrastructure on the interconnecting tributaries such as in Victoria Eildon Dam and Goulburn Weir on the Goulburn River and Lake Eppalock on the Campaspe River, and in New South Wales it includes Burrinjuck Dam, Blowering Dam and the various weirs along the Murrumbidgee River system. It also includes river flow interactions with the Snowy Mountains Scheme through its releases to the Murray and Murrumbidgee rivers.

The Southern Connected Basin does not include disconnected rivers such as the Lachlan River and the Wimmera River.

Regard was had to significant hydrological connections which are displayed in [Figure 4-1](#). These connections are discussed in detail in [Section 4.2.4](#), [Section 4.3.6](#) and [Section 4.4.6](#).

**Basin Plan
s10.05(b)**

1. Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. The following significant connections have been identified between the Victorian Murray water resource plan area and the Northern Victoria water resource plan area:
 - a. the Ovens River, Broken River (via Broken Creek), Goulburn River, Campaspe River and Loddon River have a significant hydrological connection with the River Murray. These rivers are in the Northern Victoria water resource plan area, however connect through to the River Murray via the Victorian Murray water resource plan area. The connections in the River Murray relate to the NSW Murray and Lower Darling water resource plan area, and the South Australian River Murray water resource plan area;
 - b. the Goulburn River has a significant connection to the River Murray via the East Goulburn Main Channel which comes off the Goulburn River and diverts water into the Lower Broken Creek and the Murray Irrigation Area connecting the Northern Victorian water resource plan area to the Victorian Murray water resource plan area.
2. Where surface water is significantly hydrologically connected from the Northern Victoria water resource plan area and the Victorian Murray water resource plan area into the River Murray the connected resources are primarily managed through the Murray-Darling Basin Agreement.
3. Where surface water is significantly hydrologically connected within Victoria, bulk entitlements issued under the *Water Act 1989* (Vic) contain arrangements for the management of those resources. Rules relating to system management and in setting those rules consideration is given as to how water is taken by individual users from the system.

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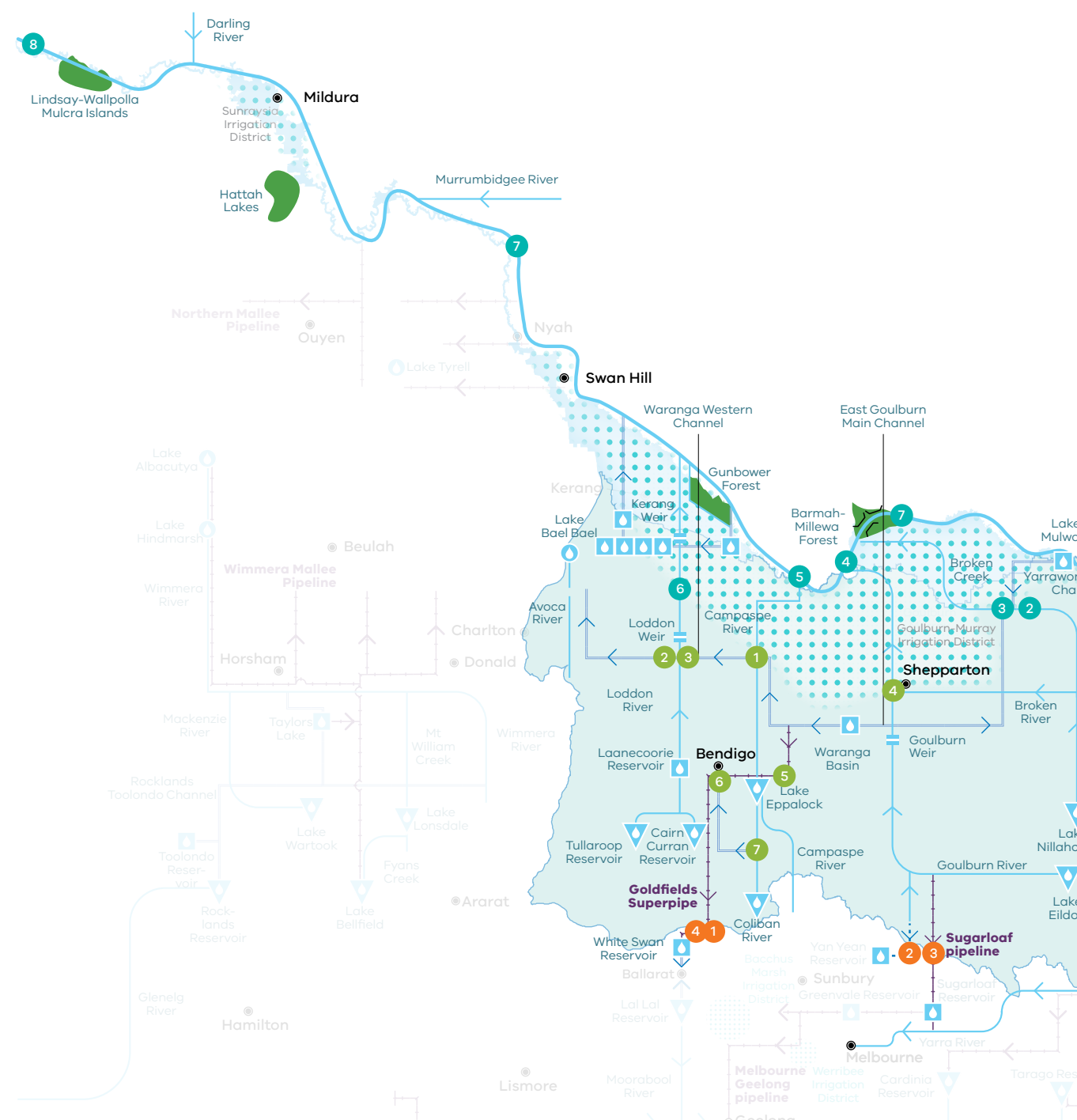
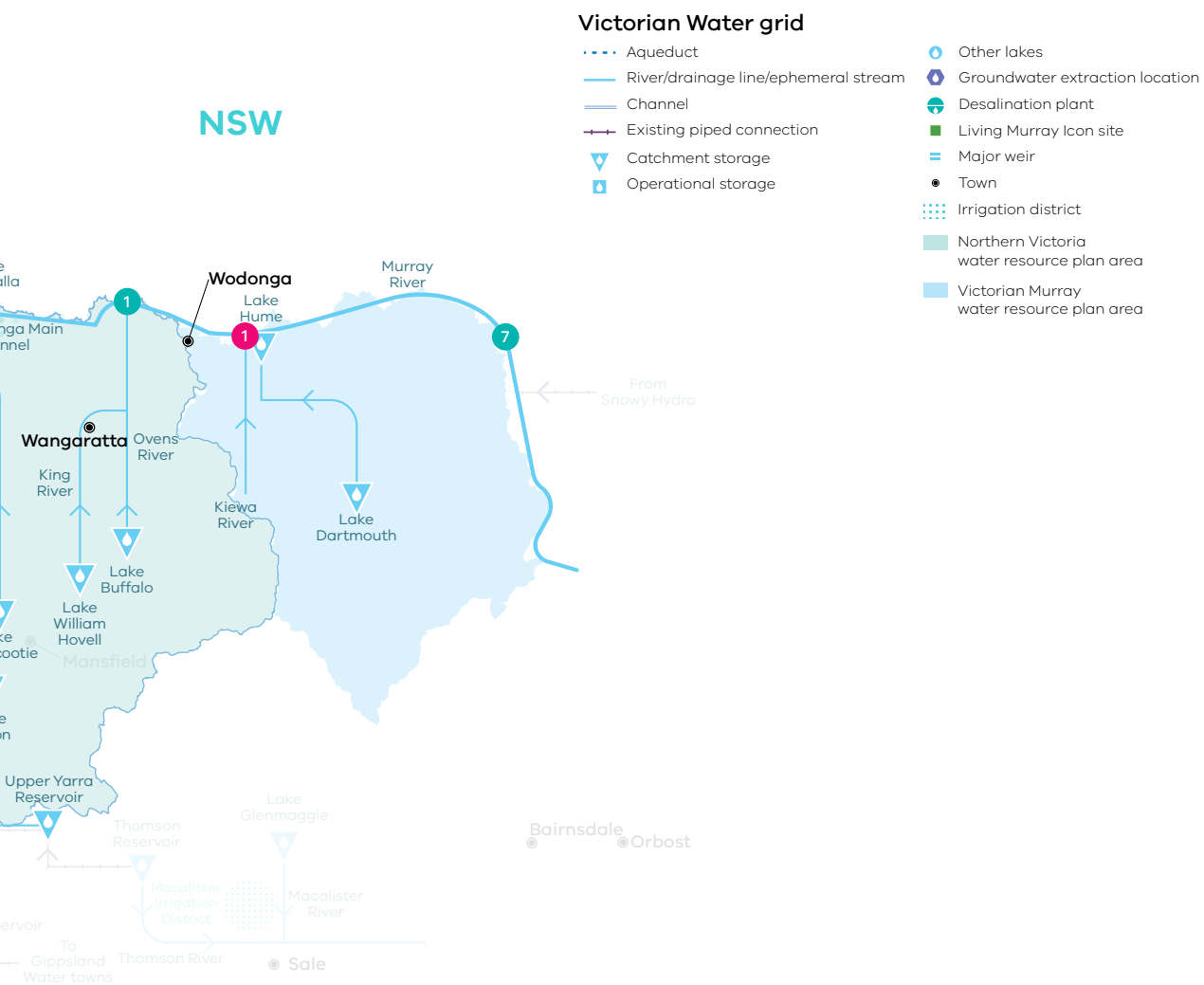


Figure 4-1: Map of significant connections between water resource plan areas, and within water resource plan areas



	Connections between water resource plan areas		Connections within the Northern Victoria water resource plan area		Connections within the Victorian Murray water resource plan area		Connections beyond the Victoria's North and Murray water resource plan area	
1	SS4 to SS2	Ovens River to Murray via Ovens River	SS6 to/ from SS7	Goulburn River and Campaspe River through Waranga Western Channel	SS3 to SS2	Kiewa River to Murray River	SS6 to Southern Victoria	Goulburn River to White Swan Reservoir (Ballarat) through the Goldfields Superpipe
2	SS5 to SS2	Upper Broken Creek to Lower Broken Creek	SS6 to/ from SS8	Goulburn River and Loddon River through Waranga Western Channel			SS6 to Southern Victoria	Goulburn River to Yan Yean Reservoir (Melbourne)
3	SS6 to SS2	Goulburn River via East Goulburn Main Channel to Lower Broken Creek	SS7 to SS8	Campaspe River and Loddon River through Waranga Western Channel			SS6 to Southern Victoria	Goulburn River to Sugarloaf Reservoir (Melbourne)
4	SS6 to SS2	Goulburn River to River Murray	SS5 to SS6	Broken River to Goulburn River			SS7 to Southern Victoria	Lake Eppalock to White Swan Reservoir (Ballarat) through the Goldfields Superpipe
5	SS7 to SS2	Campaspe River to Murray River	SS6 to SS7	Goulburn River to Lake Eppalock through the Goldfields Superpipe				
6	SS8 to SS2	Loddon River to Lower Loddon	SS7 to SS8	Lake Eppalock to Bendigo (Loddon) through the Eppalock-Bendigo pipeline				
7	SW2 to SW8	Victoria Murray to New South Wales	SS7 to SS8	Upper Coliban Storages (Campaspe) to Bendigo (Loddon)				
8	SW2 to SW6	Victoria Murray to South Australia						

Note: The Figure and corresponding table and [Section 4.2.4](#), [Section 4.3.6](#) and [Section 4.4.6](#) refer to the SDL resource unit label to align Victorian surface water basins with the SDL resource units described in the Basin Plan.

4.2 Victorian Murray water resource plan area

4.2.1 Victorian Murray Basin (SS2)

The upper River Murray Basin forms the catchment for Hume Reservoir and covers an area of 1,528,000 hectares across Victoria and New South Wales. The catchment extends across the Great Dividing Range from Forest Hill to Mt Hotham, to the River Murray which forms the north and east sides of the Victorian part of the upper River Murray Basin.

Flows are regulated by Lake Hume, which is owned by WaterNSW, and Dartmouth Reservoir, which is owned by Goulburn-Murray Water (GMW). Both these dams are operated by the Murray-Darling Basin Authority under the Murray-Darling Basin Agreement. Under the agreement the regulated flow in the River Murray at Albury, which includes inflows from the Kiewa River, is shared equally by New South Wales and Victoria, subject to those states contributing equally to the annual flows guaranteed to South Australia of 1,850,000 ML in a normal year.

The upper River Murray Basin gains approximately 600,000 ML per year from inter-basin transfers through the Snowy Mountains Hydro-electric Scheme which is shared in the same way as natural flows.

The Victorian Murray regulated system supplies water to a number of irrigation areas and private diverters. These include the Murray Valley and Torrumbarry Irrigation Areas, Tresco and Nyah irrigation districts managed by GMW and Robinvale, Red Cliffs, Mildura and Merbein Irrigation Districts managed by Lower Murray Water.

These are described in the Murray irrigation areas section (see [Section 4.2.3](#)).

Table 4-2: Upper Murray Basin key statistics

Catchment area	Upper Murray: 2% of the Murray–Darling Basin (combined with New South Wales) Mitta Mitta: 0.9% of the Murray–Darling Basin
Annual streamflow	2,550 GL per year (Hume Dam unregulated inflow)
River length	Upper Murray: 300 km source to Hume Dam Mitta Mitta: 204 km
Major tributaries	Upper Murray: Koetong, Cudgewa, Corryong and Thowgla Creeks and Mitta Mitta River Mitta Mitta: Big, Bundara and Cobungra Rivers, Snowy, Little Snowy and Livingstone Creeks
Major towns/cities	Wodonga, Tallangatta, Dartmouth, Eskdale and Mitta Mitta
Major water storages	Dartmouth (3,856 GL) Lake Hume (3,005 GL)
Key water users	Hydro-electricity, urban water supply and domestic and stock

4.2.1.1 Land and stream network

The Victorian part of the upper Murray Basin covers 1,015,00 ha and is split into two sections, the Mitta Mitta Basin and the northern section of the basin which drains into the Victorian bank of the River Murray.

The Mitta Mitta River catchment covers an area of 1,006,200 ha and comprises the upper tributaries of the Mitta Mitta River including the Big, Bundara, and Cobungra Rivers and the Hollands and Livingstone Creeks, draining water from the High Plains through a dissected landscape. The Victorian Upper Murray catchment covers 8,800 ha and includes Corryong, Cudgewa and Thowgla creeks.

Rising on the high plains beneath Mt Bogong, the upper reaches and tributaries of the Mitta Mitta River drain through deeply dissected forests. The main channel of the Mitta Mitta River forms at the confluence of Cobungra River and the Big River, and then flows northwards through near-pristine forest to Dartmouth Dam.

The River Murray is Australia's longest river and it has its headwaters in the Australian Alps and drains out to sea in South Australia at Lake Alexandrina. As discussed in [Section 4.1.4](#) the River Murray is the main river in the Southern Connected Basin. The river itself forms the boarder between New South Wales and Victoria with the river itself lying in New South Wales. Irrigation development along the River Murray began in the 1890s. Weirs and dams were constructed along the river throughout the 1900s to regulate water flow and service irrigation areas. The main weirs included Torrumbarry Weir, Yarrawonga Weir and Mildura Weir. Hume Dam was constructed in 1928 and then expanded in 1961, and Dartmouth Reservoir was built in 1979.

Lake Victoria in the lower Murray area in New South Wales is operated to capture unregulated flows from the central Murray reach and to regulate the supply water to South Australia. The Mid-Murray storages are also important mid-catchment storages which are operated to capture the increased unregulated flows that were a result of the decommissioning of Lake Mokoan in the Broken Basin (see [Section 4.3.2](#)). They are also operated to supply water to the Torrumbarry Irrigation Area.

4.2.1.2 Rainfall and surface hydrology

Climate varies widely over the area and topography is the single most important factor affecting this. Generally rainfall increases according to elevation, with the highest annual average rainfall in the catchment of the River Murray and Mitta Mitta River in the south west, and decreases as the River Murray flows west and north.

Along the Mitta Mitta River, mean annual flow can triple from Hinnomunjie in the south to Tallangatta in the north. Highest flows are in October and are attributed to the spring snow melt.

Dartmouth is the largest storage on the Murray-Darling Basin and has capacity to hold up to 40 percent of the water in the Murray-Darling Basin. It is operated as a drought reserve for Murray resources. Lake Hume operates as a 'fill and spill' storage which is drawn down over summer and filled over winter/spring.

Water recovery

In the Basin Plan, the Mitta Mitta catchment is included in the Victorian Murray surface water SDL resource unit. This SDL resource unit applies to the upper and central catchment area on the Victorian side of the River Murray, from the headwaters of the Murray to its confluence of the Edward River near Swan Hill, as well as small areas along the Victorian side of the Murray near Robinvale and Mildura.

The baseline diversion limit of surface water determined by the Basin Plan for this SDL resource unit is 1,707 GL per year. The required local reduction in take to achieve an environmentally sustainable level of diversion is 253 GL per year.

Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Victorian Murray SDL resource unit is 210.8 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

The Basin Plan allows for adjustments to SDLs if:

- new works or changes in river operation and management rules increase the quantity of water available to be extracted, or
- efficiency measures through infrastructure works and upgrades reduce the quantity of water required in a delivery system

4.2.1.3 Entitlements and diversions

The regulated River Murray bulk entitlements are held by Goulburn-Murray Water, Coliban Water, Goulburn Valley Water, North East Water, Grampians Wimmera Mallee Water, Lower Murray Water, City West Water, South East Water, Yarra Valley Water, and the Victorian Entitlement Water Holder. These entitlement holders supply towns, irrigation districts and the environment throughout the system. Most of the water in the Murray Basin to which Victoria is entitled is regulated in the upper catchment but used in the middle and lower parts of the catchment. These entitlements are described further in the next section.

The towns Corryong and Cudgewa are in the unregulated sections of the catchment are supplied by North East Water and Omeo is supplied by East Gippsland Water.

The three Melbourne retailers City West Water, South East Water and Yarra Valley Water all invested in part of the Goulburn-Murray Water Connections Project Stage 1. In return for their investment they have been issued with River Murray and Goulburn River bulk entitlements which gives them a share of the water savings from the irrigation modernisation project.

Entitlements to water in the Murray Basin are outlined in [Table 4-3](#).

Table 4-3: Entitlements in the Murray Basin (Victoria)

Water entitlements
Bulk Entitlement (River Murray - Goulburn-Murray Water) Conversion Order 1999
• High-reliability water shares
• Low-reliability water shares
• High-reliability supply by agreements

Water entitlements
Low-reliability supply by agreements
Loss provisions – irrigation district
Mid-Murray Storages – Loss provision
Bulk Entitlement (River Murray – Lower Murray Urban and Rural Water – Irrigation) Conversion Order 1999
High-reliability water shares
Low-reliability water shares
High-reliability supply by agreements
Waterworks districts
Provision for unlicensed domestic and stock use
Loss provisions – irrigation district
Bulk Entitlement (River Murray – Lower Murray Urban and Rural Water – Urban) Conversion Order 1999
Bulk Entitlement (River Murray – Grampians Wimmera Mallee Water) Conversion Order 1999
Bulk Entitlement (River Murray – North East Water) Conversion Order 1999
Bulk Entitlement (River Murray – Goulburn Valley Water) Conversion Order 1999
Bulk Entitlement (River Murray – Coliban Water) Conversion Order 1999
Bulk Entitlement (River Murray – South East Water) Order 2012
Bulk Entitlement (River Murray – City West Water) Order 2012
Bulk Entitlement (River Murray – Yarra Valley Water) Order 2012
Bulk Entitlement (Corryong) Conversion Order 2000
Bulk Entitlement (Cudgewa) Conversion Order 2000
Bulk Entitlement (Dartmouth) Conversion Order 2000
Bulk Entitlement (Omeo) Conversion Order 2008
Bulk Entitlement (Walwa) Conversion Order 2000
Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999
High-reliability entitlement
Low-reliability entitlement
Unregulated entitlement
Environmental Entitlement (River Murray – NVIRP Stage 1) 2012
Bulk Entitlement (River Murray – Snowy Environmental Reserve) Conversion Order 2004
Take and use licences – unregulated surface water



In addition to the entitlements listed above the estimated total capacity of farm dams (or runoff dams) in the River Murray Basin and the total water harvested from those dams is small compared with other basins. The capacity of farm dams for the River Murray Basin is estimated using GIS mapping. (See [Chapter 11](#)).

4.2.1.4 Environmental assets and water for the environment

The Upper River Murray, the Mitta Mitta River and their tributaries support intact riparian vegetation and a number of alpine species such as the alpine spiny crayfish. The lower reaches of the Mitta Mitta River support a diverse native fish population which includes Macquarie perch, Murray cod, golden perch and flat-headed galaxias. This is largely in the unregulated reaches of the river and cannot receive any held environmental water or planned environmental water.

The regulated stem of the River Murray also supports significant environmental assets. Held environmental water held by the Victorian Environmental Water Holder, the Murray-Darling Basin Authority and the Commonwealth Environmental Water Holder can be delivered to these assets. Due to the connected nature of the rivers in northern Victoria, and the ability to use return flows (see [Section 12.7](#)), water from most entitlements held by these agencies can be used to support environmental assets in the Victorian Murray.

Significant assets that receive held environmental water Victorian Murray resources include the Barmah–Millewa Forest, Gunbower Forest, Hattah Lakes and Kerang Wetlands. These are located along the River Murray and are all internationally significant wetlands listed under the Ramsar Convention and are Living Murray Icon sites. The Lindsay, Wallpolla and Mulcra Islands are also Living Murray Icon sites and depend on water for the environment in the River Murray Basin.

In the Murray Basin (Victoria) held environmental water is made up of these components:

- Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999
- Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999 – Living Murray
- Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999 – Barmah–Millewa Environmental Water Allocation
- Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999 – River Murray Increased Flows
- Environmental Entitlement (River Murray – NVIRP Stage 1) 2012
- Bulk Entitlement (River Murray – Snowy Environmental Reserve) Conversion Order 2004
- High-reliability water shares and low-reliability water shares held by the Commonwealth Environmental Water Holder for the environment
- High-reliability water shares and low-reliability water shares held by the Murray-Darling Basin Authority for the environment

For Victoria there is no planned environmental water in the River Murray for more information about environmental water management see [Chapter 12](#). For more information on how much water is held in each of these listed entitlements see [Appendix E](#) or the entitlements on the Victorian Water Register.

4.2.2 Kiewa Basin (SS3)

The Kiewa basin is the third smallest of Victoria's basins and occupies a narrow strip in the north-east of the state. It is approximately 100 km long and typically only 20 km wide, extending from the Bogong High Plains northward to the River Murray.

The Kiewa basin is less than 0.2 percent of the area of the Murray–Darling Basin. Although it is the smallest catchment in the Basin, the upstream branches of the Kiewa River supply water to Victoria's largest hydro-electric scheme and make a significant contribution to flows in the River Murray.

Nearly all of the water used in the Kiewa basin is supplied from surface water resources, except for a very small portion extracted from groundwater resource for commercial use.

Table 4-4: Kiewa basin key statistics

Catchment area	< 0.2% of the Murray–Darling Basin
Annual streamflow	689 GL
River length	109 km
Major tributaries	Mountain, Running, Yackandandah, Simmonds and Middle Creeks, Kiewa River east branch and Kiewa River west branch
Major towns/cities	Wodonga, Tangambalanga, Kiewa, Yackandandah, Mount Beauty and Falls Creek
Major water storages	Rocky Valley Dam (28 GL)
Key water users	Urban water supply, stock and domestic, hydro-electricity and irrigation

4.2.2.1 Land and stream network

The landscape consists of alpine peaks and plateaus and highly dissected valleys. Victoria's highest peak, Mt Bogong, and the nearby Bogong High Plains are located in the southern headwaters of the Kiewa basin. From their headwaters, the east and west branches of the Kiewa Rivers flow through alpine terrain and gorge-like valleys to meet in the vicinity of Mt Beauty.

4.2.2.2 Rainfall and surface hydrology

Most of the precipitation in the Kiewa basin occurs as rain, while snow falls above 1,400 m in winter. Average annual rainfall gradually increases from the north of the catchment to the south with rising elevation.

The flow regime of the Kiewa River displays a marked seasonal variation, with the three months from August to October accounting for about 50 percent of annual streamflow, and the three months from January to March for only about 7 percent. Work began on the Kiewa hydro-electricity scheme in 1937 but was not completed until 1960 because of setbacks including World War II, a recession and funding cuts. The finished project was a scaled-down version of the original proposal, and the fourth power station was completed in 2009.

The finished scheme features five aqueducts and five dams and pondages, including Clover Dam, Lake Guy, Pretty Valley, Mt Beauty and Rocky Valley storages. Rocky Valley is the largest with a capacity of 28 GL. The storages operated for hydro-electric power generation in the high country like the Rocky Valley Storage and the Mt Beauty Pondage, modify the natural flow regime of the Kiewa system to a small extent.

Water recovery

The baseline diversion limit of surface water determined by the Basin Plan for the Kiewa catchment is 25 GL per year. This level of diversion was considered sustainable and no local reduction in take was required. Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Kiewa SDL resource unit is 1.1 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

4.2.2.3 Entitlements and diversions

In the Kiewa basin AGL Hydro holds an entitlement to harvest, store and release water for power generation.

The main consumptive user in the Kiewa basin is take and use licences and North East Water, which supplies water to the townships of Mount Beauty, Yackandandah and Beechworth, which is harvested from the Kiewa and diverted to the Ovens Basin for use. Entitlements to water in the Kiewa basin are listed in [Table 4-5](#).

Table 4-5: Entitlements in the Kiewa basin

Water entitlements
Bulk Entitlement (Kiewa – Hydro) Conversion Order 1997
Bulk Entitlement (Kiewa – Tangambalanga) Conversion Order 2000
Bulk Entitlement (Mount Beauty – Tawonga) Conversion Order 1997
Bulk Entitlement (Yackandandah) Conversion Order 2001
Bulk Entitlement (Beechworth) Conversion Order 2001
Take and use licences – unregulated surface water

In addition to entitlements above the calculated volume of water harvested from farm dams (or runoff dams) in the Kiewa Basin is estimated using GIS mapping. See [Chapter 11](#).

4.2.2.4 Environmental assets and water for the environment

The upper and lower Kiewa River and its tributaries are listed as a high-value environmental asset. Golden perch and Murray cod are high priority threatened migratory fish that move between the River Murray into the lower-mid sections of the Kiewa River as part of their life cycle. Fish diversity is restricted in the upper reaches by the hydro-electricity scheme. There are few wetlands on the Kiewa River, as the valley floor is highly developed for agriculture. However, there are important habitat sites in the Kiewa River corridor.

Water from the Kiewa Basin flows into the River Murray, helping to protect environmental assets in the Murray Basin.

There is no held environmental water or planned environmental water in the Kiewa River. For more information about environmental water management see [Chapter 12](#).

4.2.3 Murray irrigation areas

There are two rural water corporations that manage the distribution and the use of Murray resources, Goulburn-Murray Water (GMW) and Lower Murray Water (LMW).

The Victorian Murray SDL resource unit supplies water to a number of irrigation systems. These include the Murray Valley and Torrumbarry Irrigation Areas, the Tresco and Nyah irrigation districts managed by GMW and Robinvale, Red Cliffs, Mildura and Merbein Irrigation Districts managed by LMW. The system also supplies water to towns and irrigators which pump directly from the river.

Table 4-6: Murray Irrigation Areas key statistics (Murray River downstream of Lake Hume)

Catchment area	0.9% of the Murray–Darling Basin
Annual stream flow	NA
River length	NA
Major tributaries	Ovens River, Lower Broken Creek, Goulburn River, Campaspe River and Loddon River
Major towns/cities	Wodonga, Echuca, Swan Hill and Mildura
Major water storages	Mid-Murray Storages
Key water users	Urban water supply, stock and domestic environment and irrigation

4.2.3.1 Land and stream network

The River Murray takes in water from the Kiewa, Ovens, Goulburn, Campaspe Rivers in Victoria and Wakool and Murrumbidgee Rivers in New South Wales. When there are significant catchment inflows it takes in water from the Loddon River and the Lower Broken Creek in Victoria.

The largest population centres along the river that use Murray resources are Wodonga, Echuca, Swan Hill and Mildura. These are supplied by North East Water, Coliban Water and Lower Murray Water respectively.

The Barmah Choke is a significant feature on the River Murray. The Barmah Choke is a naturally narrow section of the River Murray through the Barmah-Millewa Forest. The capacity of the channel varies through this section, although it is typically measured at Yarrawonga where flows of about 9,500 ML per day can be contained within channel. Flows exceeding 9,500 ML per day at Yarrawonga result in water leaving the main channel and entering the forest floodplain. This is often desirable during winter and spring when flooding occurs naturally, but when the floodplain is dry in summer and autumn, this results in large volumes of water being lost from the supply system and damages the forest ecosystems.

The Barmah Choke divides Murray resources into two trading zones. Upstream of the Barmah Choke the use of Victorian Murray resource is in zone 6, while downstream of the Barmah Choke Victorian Murray resources are in zone 7 (see [Chapter 7](#) for more information).

4.2.3.2 Rainfall and surface hydrology

Average annual rainfall is about 700 mm at the eastern end of the central catchment, but it mostly ranges from 500 mm down to 300 mm from east to west. Summers are hot and dry in this part of the Murray catchment and rainfall is received mainly in winter and spring.

The two major Goulburn-Murray Water irrigation areas supplied primarily from Murray resources are the Murray Valley Irrigation Areas in zone 6 and Torrumbarry Irrigation Area in zone 7. GMW also operates the three piped irrigation districts of Tresco, Nyah and Woorinen in zone 7.

The Murray Valley Irrigation Area physically sits in the north of the Broken Creek in the Broken River catchment. However because it mainly sources water from the River Murray, it is treated as part of the Victorian Murray water resource plan area. It can also physically receive water from the Goulburn Basin through the East Goulburn channel and can receive an entitlement for up to 40 GL of Goulburn resources under certain circumstances.

The Torrumbarry Irrigation Area physically sits in the unregulated northern part of the Loddon River catchment but receives water from the River Murray and the Mid-Murray storages. It can also receive water from the Loddon system and rules around when and how this occurs are contained in Goulburn-Murray Water's Loddon bulk entitlement.

Lower Murray Water (LMW) manages the distribution and use of water for irrigators from Miralie-Cocamba road at Wood Wood and supplies all towns urban needs from Koondrook to the South Australian border. The four irrigation areas managed by LMW are Mildura, Red Cliffs, Robinvale and Merbein. There is also a large number of private diverters who take water from the River Murray, with take authorised by Lower Murray Water. LMW also supplies water to domestic and stock customers in the Millewa Rural District.

Grampians Wimmera Mallee Water also has off-takes from the River Murray to supply customers on the Northern Mallee Pipeline. This is a 3,650 km pipeline covering an area of 890,000 ha. It was completed in 2004 to replace the old, inefficient open channel system in the area to provide a more secure and healthier water supply. Water for the Northern Mallee Pipeline is sourced directly from the River Murray from four pumping stations at Swan Hill, Piangil, Nyah and Liparoo.

4.2.3.3 Entitlements and diversions

The regulated River Murray bulk entitlements are held by Goulburn-Murray Water, Coliban Water, Goulburn Valley Water, North East Water, Grampians Wimmera Mallee Water, Lower Murray Water, the three Melbourne retailers City West Water, South East Water and Yarra Valley Water, and the Victorian Environmental Water Holder. These supply towns, irrigation districts and the environment throughout the system.

Entitlements to water in the Murray Basin are outlined in [Table 4-3](#).

4.2.3.4 Environmental assets and water for the environment

As outlined in [Section 4.2.1.4](#)

4.2.4 Significant surface water connections in the Victorian Murray water resource plan area

Figure 4-1 maps the significant hydrological connections between water resource plan areas, and within water resource plan areas. The Basin Plan describes the SDL resource units and labels which apply here. Significant hydrological connectivity means there is a clear connection between different resources and a high likelihood of impacts from the use of one resource on the other.

4.2.4.1 Significant connections between water resource plans

The Basin Plan requires Victoria's North and Murray Water Resource Plan to identify and have regard to the water resources that have a significant hydrological connection with other water resources. Significant connections are outlined below. The Victorian Murray water resource plan area (SW2) is connected significantly to the Northern Victoria water resource plan area (SW3) because all the major rivers in the Northern Victoria water resource plan area run into the River Murray and contribute resources to the Murray River in accordance with the sharing arrangements defined in the Murray-Darling Basin Agreement.

The Victorian Murray water resource plan area (SW2) is connected to the New South Wales Murray and Lower Darling water resource plan area (SW8) and the South Australian River Murray water resource plan area (SW6). How these resources are shared is outlined in [Section 4.2.1](#).

4.2.4.2 Significant connections between SDL resource units

The Kiewa River (SS3) flows into the River Murray (SS2) and water entering the River Murray is managed in accordance with the Murray-Darling Basin Agreement (see [Figure 4-1](#)).

4.2.4.3 Significant connections between surface water and groundwater

The River Murray (SS2) and Kiewa River (SS3) are significantly connected to both Goulburn-Murray: Highlands (GS8b) and Goulburn-Murray: Sedimentary Plain (GC8c) SDL resource units.

4.2.4.4 Other non-significant connections

Other locally significant connections exist between Nine Mile Creek and Frenchmans Creek, tributaries of the Kiewa River that are diverted out of the Kiewa Basin and into the Ovens Basin to supply the town of Beechworth. The rules relating to the volume of water which can be transferred and the conditions under which it can be transferred are outlined in the Bulk Entitlement (Beechworth) Conversion Order 2001.

Basin Plan s10.05(b)

1. In the Victorian Murray water resource plan area, the Kiewa River flows into the River Murray and this is considered a significant hydrological connection.
2. There are some connections to the Wimmera-Mallee (surface water) water resource plan area due to the use of water on land from Victoria Murray water resource plan area, however the connection is not based on connectivity between water resources within those plan areas but based on geographical use of the water. For this reason, no significant connections have been identified between Wimmera-Mallee (surface water) water resource plan area and the Victorian Murray water resource plan area.

<<end of accredited text for s10.05(b) of the Basin Plan>>

4.3 Northern Victoria water resource plan area

4.3.1 Ovens Basin (SS4)

The Ovens Basin is located in north-east Victoria and covers an area of 798,500 ha. The area extends from the Great Dividing Range in the south to the River Murray in the north, and is bordered by the Broken Basin in the west and the Kiewa Basin in the east. The topography of the Ovens Basin is diverse, ranging from riverine plains near the River Murray and broad alluvial valleys around Myrtleford, to rugged alpine peaks and plateaus around the Great Dividing Range. Mt Buffalo, a large granite massif in the south of the Ovens Basin, is an important landscape feature.

The Ovens Basin represents 0.7 percent of the total area of the Murray-Darling Basin and generates approximately 6 percent of the runoff.

Table 4-7: Ovens Basin key statistics

Catchment area	0.7% of the Murray–Darling Basin
Annual streamflow	1,758 GL (at Peechelba)
River length	191 km
Major tributaries	Morses Creek, Buckland, Buffalo and King rivers
Major towns/cities	Bright, Beechworth, Myrtleford and Wangaratta
Major water storages	Lake Buffalo (24 GL) Lake William Hovell (14 GL)
Key water users	Irrigated agriculture, urban water supply and stock and domestic



4.3.1.1 Land and stream network

The Ovens River runs from the steep forested mountains of the Victorian Alps through wide valleys and open plains to terminate at the River Murray near Lake Mulwala. The Ovens River is one of the last largely unregulated rivers in the Victorian section of the Murray–Darling Basin.

The Ovens River and its upstream tributaries, the Buckland, Catherine, Dandongadale, Buffalo and Rose rivers, have their headwaters in the Great Dividing Range, in the section extending between Mt Cobbler and Mt Hotham. The King River, situated west of the Ovens River, has its headwaters in the Great Dividing Range east of Mt Buller. The Ovens and the King Rivers meet on the riverine plain near Wangaratta. The main storages in the Ovens Basin are Lake Buffalo on the Buffalo River and Lake William Hovell on the King River.

In the central section of the Ovens Basin, wide valleys have been developed for agriculture. Below Wangaratta, the Ovens River takes in the waters of Reedy and Fifteen Mile creeks and meanders northward across the riverine floodplain to flow into Lake Mulwala on the River Murray in the north-west corner of the Ovens Basin.

4.3.1.2 Rainfall and surface hydrology

Rainfall is higher in the south of the catchment than in the northern regions closer to the River Murray. The high country generally contributes greater runoff due not only to greater precipitation, but also to the steep slopes and thin soils.

Rain is the main form of precipitation in the Ovens Basin. However, at elevation above 1,400 m, which includes Mt Buffalo, Mt Feathertop and Mt Hotham, a large proportion of the winter precipitation falls as snow and much of the high ground is covered in snow from June to October.

Sixty-five percent of the average annual precipitation occurs during winter, while in summer the prevailing weather is warm and dry. However sometimes this warm air can carry large quantities of water, so although summer rain is infrequent and erratic, the few falls that occur are often heavy. Corresponding to the rainfall pattern, streamflow is highest in winter and early spring, with some of the spring flow attributable to snow-melt.

The Ovens River is considered semi-regulated, because there are only two dams in the Ovens Basin which are relatively small compared to the annual streamflow. Lake Buffalo on the Buffalo River was completed in 1965 and Lake William Hovell on the King River was finished in 1973. The streamflow below Lake Buffalo and Lake William Hovell has changed as a direct result of the reservoirs.

Lake Buffalo is used to supplement flows in the Ovens River for irrigation in summer mainly for vineyards, and for urban water supply. Its capacity of 24 GL represents only 6 percent of the mean annual flow in the Buffalo River. Lake William Hovell's smaller capacity of 14 GL supplies water for irrigated crops, vineyards and grazing properties and powers a 1.6 MW hydro-electric generator when water is released.

Water recovery

The baseline diversion limit of surface water determined by the Basin Plan for the Ovens SDL resource unit is 83 GL per year. This level of diversion was considered sustainable and no local reduction in take was required. Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Ovens SDL resource unit is 2.7 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

4.3.1.3 Entitlements and diversions

In the declared part of the Ovens Basin Goulburn-Murray Water harvests water in Lake Buffalo and Lake William Hovell and is obligated to supply this water to water share holders and North East Water. There is no irrigation district in the Ovens Basin so water share holders take water directly from the river. They have a water share which describes their share of the available resource and a works licence which gives them the authority to take water through a pump which sits along the edge of the river. The works licence instructs when the water share holder can take the water. The licence has requirements for the holder to stop pumping if restrictions are issued.

Goulburn-Murray Water does monthly assessments of the resource availability and identifies if spill-reliability water is available and if restrictions are required currently or in the future. If restrictions are required, water share holders and North East Water must reduce their take from the river to support passing flows and the environment. In the unregulated part of the Ovens Basin North East Water holds bulk entitlements to supply towns' urban water needs. Entitlements to water in the Ovens Basin are outlined in [Table 4-8](#).

Table 4-8: Entitlements held in the Ovens Basin

Water entitlements
Bulk Entitlement (Ovens System – Goulburn-Murray Water) Conversion Order 2004
- High-reliability water shares - Low-reliability water shares
Bulk Entitlement (Ovens System – Moyhu, Oxley and Wangaratta – North East Water) Conversion Order 2004
Bulk Entitlement (Bright) Conversion Order 2000
Bulk Entitlement (Chiltern) Conversion Order 2000
Bulk Entitlement (Glenrowan) Conversion Order 1999
Bulk Entitlement (Harrietville) Conversion Order 1999
Bulk Entitlement (Myrtleford) Conversion Order 2001
Bulk Entitlement (Springhurst) Conversion Order 1999
Bulk Entitlement (Whitfield) Conversion Order 1999
Take and use licences – unregulated surface water

In addition to the entitlements outlined here the largest volume of water harvested in the Ovens Basin is from farm dams (run off dams) under section 8 rights. The capacity of farm dams for the Ovens Basin is estimated based on GIS mapping. See [Chapter 11](#).

4.3.1.4 Environmental assets and water for the environment

The Ovens River is significant for its diverse aquatic habitats, and contains a range of threatened species such as the Murray cod, trout cod and the Murray spiny crayfish.

The Lower Ovens River is the only lowland river nominated for environmental values under the Victorian Heritage Rivers Act. The relatively intact river red gum canopy associated with Lower Ovens River is considered one of the healthiest in the Murray-Darling Basin. Forming part of the Warby–Ovens National Park, the Lower Ovens floodplain wetland complex is classified as nationally significant, supporting native fish habitats and bird breeding sites.

Water from the Ovens Basin also feeds into the Murray Basin, helping to maintain the Murray Basin's environmental assets.

In the Ovens Basin held environmental water is made up of high-reliability water shares held for the environment in the Buffalo and King rivers.

In the Ovens basin planned environmental water is identified in these instruments:

- Bulk Entitlement (Ovens System – Goulburn–Murray Water) Order 2004
- Upper Ovens River Water Supply Protection Area Water Management Plan (2011)

For more information about how much water is contained in each entitlement listed here see [Appendix E](#) or the entitlements on the Victorian Water Register. For more information about environmental water management see [Chapter 12](#).

4.3.2 Broken Basin (SS5)

The Broken River is one of the tributaries of the Goulburn River in north eastern Victoria. The Broken basin also includes the catchment of Upper Broken Creek which diverges from the Broken River and flows in a north westerly direction to the River Murray. The Broken Basin occupies 772,386 ha or 0.7 percent of the Murray-Darling Basin and receives an average of 308 GL of streamflow per year.

Table 4-9: Broken Basin key statistics

Catchment area	0.7% of the Murray–Darling Basin
Annual streamflow	308 GL per year
River length	Broken River: 174 km
Major tributaries	Lima East, Blind, Holland and Ryans Creeks
Major distributaries	Upper Broken Creek
Major towns/cities	Benalla
Major water storages	Lake Nillahcootie (40 GL)
Key water users	Irrigated agriculture, urban water supply and industry

4.3.2.1 Land and stream network

The Broken Basin contains two connected stream networks, that of the Upper Broken River in the southern and western section and the Broken Creek.

The Broken River flows westward from its sources in the Tolmie Highlands, swings to the north near Mt Strathbogie before entering Lake Nillahcootie. The Broken River continues north through undulating farmland towards Benalla and takes in the waters of Moonee, Blind, Holland and Ryans creeks. North of Benalla the Broken River swings to the west and overflows to Broken Creek at Casey's Weir. It then continues on a westward course across the riverine plain and joins the Goulburn River just south of Shepparton.

Broken Creek flows north from Casey's Weir through a swampy area then swings to the west and takes in the waters of Boosey Creek at Katamatite. It meanders westward past Nathalia and joins the River Murray upstream from Barmah.

4.3.2.2 Rainfall and surface hydrology

The average annual rainfall is highest at Mt Strathbogie and in the Tolmie Highlands in the south of the Broken Basin. Light snowfalls are fairly regular in winter above 750m. From the higher plateaux, mean annual rainfall decreases to about 55 percent of that at Mt Strathbogie on the Benalla Plain. Rainfall usually continues to decrease northward.

Reliability of rainfall varies notably over the Broken Basin, being greatest in the elevated areas of high water production such as on the Tolmie Highlands, and lowest on the plains. Typically, summer is hot and winter is mild in the plains region. Streamflow within the Broken Basin is extremely variable over the seasons and between years. The three months from July to September account for over half of average annual flow.

Lake Nillahcootie is the largest storage in the Broken Basin and holds 40,400 ML of water at full supply level. It is operated by Goulburn-Murray Water mainly to supply irrigation customers. Other storages in the catchment include Loombah Reservoir and McCall Say Reservoir, which are operated by North East Water and supply urban water needs for Benalla.

At Casey's Weir water diverted into the Broken Creek is managed in two separate sections. The Upper Broken Creek is managed to meet irrigation requirements in the Upper Broken Creek and Majors Creek. Broken River customers and Upper Broken Creek and Majors Creek customers hold Broken system water shares (zone 2A). The Lower Broken Creek is managed for Murray Valley Irrigation Area customers who hold Goulburn system (zone 1A) or Lower Broken Creek (zone 6B) water shares. The Lower Broken Creek and the Murray Valley Irrigation Area is discussed in the Murray Basin [Section 4.2.3](#).

Water recovery

The baseline diversion level of surface water determined by the Basin Plan for the Broken SDL resource unit was 56 GL per year. This level of diversion was considered sustainable and no local reduction in take was required. Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Broken SDL resource unit is 1.3 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

4.3.2.3 Entitlements and diversions

The Broken system (south of Lake Nillahcootie) is regulated and declared, so consumptive users hold water shares (zone 2A). To access their water, water share holders hold a water-use licence which describes how much water can be applied to the land, and a works licence which allows

the irrigator to pump water directly from the river. North East Water has a bulk entitlement to supply the townships of Tungamah, Devenish and St James from the Broken system, but currently does not use this because it has built a pipeline to supply these towns from its bulk entitlement held in the Murray system.

The system was significantly restructured in 2010 when Lake Mokoan was decommissioned. Lake Mokoan was used as a mid-catchment storage for the Broken system from the 1970s until 2010, but because of declining inflows and high evaporation losses, the lake was decommissioned and transformed back to its natural state as Winton Wetlands. Decommissioning the lake was designed to restore environmental flows and improve the health of the Broken, Goulburn, Snowy and Murray Rivers. Now unregulated water flows from the Broken River and into the River Murray where 44 GL is allocated to the Victorian Environmental Water Holder as an unregulated entitlement in the Victorian Murray. The rest is captured and stored in the Mid-Murray Storages as described in the section on the Murray irrigation area (see [Section 4.2.3](#)).

North East Water holds the bulk entitlement to all inflows into the Loombah and McCall Say reservoirs, but must release passing flows to the river. This bulk entitlement is used to supply the town of Benalla. Entitlements to water in the Broken Basin are outlined in [Table 4-10](#).

Table 4-10: Entitlements held in the Broken Basin

Water entitlements
Bulk Entitlement (Broken System – Goulburn-Murray Water) Conversion Order 2004
High-reliability water shares
Low-reliability water shares
Bulk Entitlement (Broken System – Tungamah Devenish and St James – North East Water) Conversion Order 2004
Loss provision
Bulk Entitlement (Loombah McCall Say) Conversion Order 2001
Take and use licences – unregulated surface water

As well as the entitlements outlined here, water is harvested in the Broken Basin from farm dams (or runoff dams) under section 8 rights. The capacity of farm dams for the Broken Basin is estimated based on GIS mapping (see [Chapter 11](#)).

4.3.2.4 Environmental assets and water for the environment

The waterways in the Broken Basin support ecological values and have retained healthy in-stream and streamside vegetation in many reaches of the upper catchment. The waterways contain a diverse native fish population, including several important species such as Murray cod, silver perch, Macquarie perch, freshwater catfish and Murray River rainbow fish. The upper reaches of the Broken River and Broken Creek support platypus and common long-necked turtles. Wetlands and floodplains support a diversity of frogs and waterbirds, including the nationally endangered Australasian bittern. Water from the Broken Basin also feeds into the Goulburn and Murray basins, helping to maintain significant environmental assets within those basins.

In the Broken Basin held environmental water is made up of high-reliability water shares held for the environment.

In the Broken Basin planned environmental water is identified in Bulk Entitlement (Broken System – Goulburn-Murray Water) Order 2004.

For more information about how much water is contained in each entitlement listed above see [Appendix E](#) or the entitlements on the Victorian Water Register for more information about environmental water management see [Chapter 12](#).

4.3.3 Goulburn Basin (SS6)

The Goulburn Basin covers 1,619,158 ha in central Victoria, where the Goulburn River extends from the Great Dividing Range near Woods Point to the River Murray in the north-west near Echuca.

The waters of the Goulburn River have been diverted for irrigation and urban use since the 1880s, and the Goulburn River is one of the most regulated rivers of the Murray-Darling Basin.

Table 4-11: Goulburn key statistics

Catchment area	1.6% of the Murray–Darling Basin
Annual streamflow	3,363 GL ⁽¹⁾ per year
River length	570 km
Major tributaries	Rubicon, Acheron, Yea and Broken Rivers
Major distributaries	East Goulburn Main Channel, Stuart Murray Canal, West Waranga Chanel and Cattnach Canal
Major towns/cities	Shepparton, Kyabram, Seymour and Mansfield
Major water storages	Lake Eildon (3,334 GL) Goulburn Weir (26 GL) Waranga Basin (432 GL) Greens Lake (33 GL)
Key water users	Irrigated agriculture, urban water supply environmental and industry

(1) This inflow figure includes inflows received from the Broken River as per the Victorian Water Accounts

4.3.3.1 Land and stream network

Terrain in the Goulburn Basin varies from the mountains of the Great Dividing Range to the Murray plain. The southern boundary of the Goulburn catchment runs along the Hume Range and the Great Dividing Range, then swings northward to Mt Buller, the highest point in the Goulburn Basin at 1,804 m.

Lake Eildon lies in the south east of the Goulburn Basin and collects flows from the Upper Goulburn, Jamieson, Big, Howqua and Delatite rivers as well as Ford and Merton creeks. From Lake Eildon, the Goulburn River flows in a westerly direction through a broad agricultural valley bordered by foothills. The major tributaries along this reach include the Rubicon, Acheron and Yea rivers.

Near Seymour the river swings to the north and continues through the Goulburn Weir near Nagambie. After taking in the waters of the streams draining the northern face of the Strathbogie Ranges, the Goulburn River flows past Shepparton to finally join the River Murray just upstream from Echuca. The northern half of the Goulburn Basin is relatively flat and much of the land has been cleared. Past Shepparton the valley widens and merges with the Murray Plains.

4.3.3.2 Rainfall and surface hydrology

Climate varies substantially from the headwaters of the Goulburn River to its confluence with the River Murray. The high country in the south east experiences cool winters with persistent snow.



Rainfall is highest at Mt Buller and decreases in a north westerly direction. Mansfield, Yea and Alexandra lie in rain shadows and generally experience a lower annual rainfall. Rainfall continues to decrease northward and in the far north of the Basin precipitation is only a third of annual evaporation in that region.

Streamflow along the Goulburn River has been modified by two major features, Lake Eildon and the Goulburn Weir. Under natural conditions the average annual flow of the Goulburn River increased by approximately 44 percent between Eildon and Nagambie. The three months of greatest flow were from July to September, accounting for 52 percent of the annual total, and the three months of least flow were from January to March, accounting for 5 percent. The operation of Lake Eildon has reduced the July to September flows passing Eildon to 33 percent of the annual total, allowing an increase of the January to March flows of 23 percent of the annual total.

The Goulburn Weir near Nagambie raises the water in the Goulburn River so that water can be diverted by gravity along the Stuart Murray Canal, Cattnach Canal and the East Goulburn Main Channel. Diversions to the East Goulburn Main Channel supply the Shepparton Irrigation Area and can supply Lower Broken Creek and the Murray Valley Irrigation Area. The Stuart Murray Canal supplies part of the Central Goulburn Irrigation Area. Both the Stuart Murray Canal and Cattnach Canals are used to divert water to Waranga Basin for further supplies to the Goulburn irrigation system. The Waranga Basin harvests water when there are unregulated flows in the Goulburn River, mainly during winter and spring. Water stored in Waranga Basin can be directed into the Waranga Western Channel to supply the Central Goulburn, Rochester-Campaspe and Loddon Valley Irrigation Areas.

The Goulburn Basin is one of the main sources of water for the Goulburn-Murray Irrigation District (GMID) (see [Section 3.2.4](#)). The GMID sits across the four basin areas of the River Murray, Goulburn, Rochester-Campaspe and Loddon. It is split according to the river from where the water is sourced. The Murray Valley Irrigation Area and Torrumbarry Irrigation Area source water from Murray resources (zone 6 and zone 7), while the Shepparton, Central Goulburn, Rochester and Loddon Valley Irrigation Areas all source water primarily from Goulburn resources (zone 1A). As well contributing to the inflows for the Goulburn Basin during wet years, the Campaspe and Loddon systems contribute resources to the Goulburn Basin through a Loddon and Campaspe supplement.

Water recovery

The baseline diversion level of surface water determined by the Basin Plan for the Goulburn SDL resource unit was 1,689 GL per year. The required local reduction in take to achieve an environmentally sustainable level of diversion was determined to be 344 GL per year. Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Goulburn SDL resource unit is 186.4 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

4.3.3.3 Entitlements and diversions

Goulburn-Murray Water, Coliban Water, Goulburn Valley Water, Grampians Wimmera Mallee Water, the three Melbourne retailers City West Water, South East Water and Yarra Valley Water and AGL Hydro Ltd all hold bulk entitlements in the Goulburn Basin. Surface water is also diverted by licensed diverters and is harvested in farm dams (or runoff dams).

The majority of water use in the Goulburn Basin is in the regulated declared system. Goulburn-Murray Water operates the regulated system and is obliged to supply primary entitlement holders, meet passing flows and to operate the irrigation districts.

In the lower reach of the Goulburn River below Goulburn Weir, customers are not delivered water through the irrigation district but access it directly from the river. These customers hold zone 3 water shares and must hold a water-use licence describing how much water can be applied to the land and a works licence allowing the irrigator to pump water directly from the river.

The three Melbourne retailers City West Water, South East Water and Yarra Valley Water all invested in part of the GMW Connections Project Stage 1 and received bulk entitlements for their investment which give them a share of the water savings from the irrigation modernisation project. To access this water, Melbourne Water built and operates the North-South pipeline which runs from the Goulburn River to Sugarloaf Reservoir. Rules associated with the operation of the North-South pipeline are found in the bulk entitlements held by the Melbourne retailers and the Statement of Obligations (System Management) 2015.

Entitlements to the unregulated sections of the Goulburn Basin supply many towns in the high country and are operated by Goulburn Valley Water. Goulburn Valley Water operates on-stream and off-stream dams as well as pumps off the river to supply the towns. Euroa is the biggest town supplied from water resources that do not come from the regulated Goulburn River.

Melbourne Water holds a bulk entitlement to divert surface water from the Silver and Wallaby Creeks through an aqueduct to Toorourrong and Yan Yean Reservoirs. Weirs were constructed on Silver and Wallaby Creeks which naturally flow into the Goulburn River, to divert water to aqueducts that flow to the Cascades and down into Jacks Creek. This water supplies entitlements held by the Melbourne system primary entitlement holders City West Water, South East Water, Yarra Valley Water, Barwon Water, South Gippsland Water, Western Water and Westernport Water.

The Rubicon River is used to generate hydro-electricity. AGL Hydro Ltd holds a bulk entitlement for the Rubicon, which allows use for non-consumptive purposes. Water diverted under this entitlement is returned to the watercourse. Entitlements to water in the Goulburn Basin are outlined in [Table 4-12](#).

Table 4-12: Entitlements held in the Goulburn Basin

Water entitlements
Bulk Entitlement (Eildon – Goulburn Weir) Conversion Order 1995
• High-reliability water shares
• Low-reliability water shares
• High-reliability supply by agreements
• Low-reliability supply by agreements
• Waterworks districts
• Bulk Entitlement (Goulburn Channel System – CW) Order 2012
• Bulk Entitlement (Goulburn River – GVW) Order 2012
• Bulk Entitlement (Goulburn Channel System – GVW) Order 2012
• Bulk Entitlement (Quambatook – Grampians Wimmera Mallee Water) Order 2006
• Goulburn System – Melbourne metropolitan retail water corporations – Bulk Entitlement (Goulburn System – City West Water) Order 2012

Water entitlements

– Bulk Entitlement (Goulburn System – South East Water) Order 2012
– Bulk Entitlement (Goulburn System – Yarra Valley Water) Order 2012
• Environmental Entitlement (Goulburn System – Living Murray) 2007
• Environmental Entitlement (Goulburn System – NVIRP Stage 1) 2012
• Bulk Entitlement (Goulburn System – Snowy Environmental Reserve) Order 2004
• Goulburn River Environmental Entitlement 2010
• Loss provision – irrigation district
Bulk Entitlement (Broadford, Kilmore and Wallan) Conversion and Augmentation Order 2003
Bulk Entitlement (Buxton) Conversion Order 1995
Bulk Entitlement (Euroa System) Conversion Order 2001
Bulk Entitlement (Longwood) Conversion Order 1995
Bulk Entitlement (Mansfield) Conversion Order 1995
Bulk Entitlement (Marysville) Conversion Order 1995
Bulk Entitlement (Pyalong) Conversion Order 1997
Bulk Entitlement (Strathbogie) Conversion Order 2012
Bulk Entitlement (Thornton) Conversion Order 1995
Bulk Entitlement (Upper Delatite) Conversion Order 1995
Bulk Entitlement (Violet Town) Conversion Order 1997
Bulk Entitlement (Woods Point) Conversion Order 1995
Bulk Entitlement (Yea) Conversion Order 1997
Bulk Entitlement (Rubicon – Southern Hydro Ltd) Conversion Order 1998
Bulk Entitlement (Silver and Wallaby Creeks – Melbourne Water) Order 2014
Silver and Wallaby Creeks Environmental Entitlement 2006
Take and use licences – unregulated surface water

As well as entitlements outlined here water is harvested in the Goulburn Basin from farm dams (or runoff dams) under section 8 rights. The capacity of farm dams for the Goulburn Basin is estimated based on GIS mapping. See [Chapter 11](#).

4.3.3.4 Environmental assets and water for the environment

Waterways of the Goulburn Basin support ecological values including native freshwater fishes such as Murray cod, silver perch, trout cod, freshwater catfish and the endemic barred galaxias. The Goulburn River downstream of Lake Eildon is a declared Victorian Heritage River in recognition of its important ecological and social values.

Remnant native vegetation on the floodplains of the Goulburn Basin is dominated by river red gum forests and black box woodlands and provide habitat for many species of native mammals, reptiles, birds and amphibians. The lower Goulburn River downstream of Goulburn Weir which contains a wetland of national significance, native fish habitat and floodplain national park, as well as Reedy Swamp, a regionally significant wetland that is part of the Lower Goulburn National Park and which contains drought refuge and significant habitat for colonial nesting birds.

Water from the Goulburn Basin feeds into the Murray Basin and helps to maintain internationally significant environmental assets such as Gunbower Forest and the Hattah Lakes within the Murray Basin.

In Victoria's Goulburn Basin held environmental water is made up of these components:

- Environmental Entitlement (Goulburn System – Living Murray) 2007
- Goulburn River Environmental Entitlement 2010
- Environmental Entitlement (Goulburn System – NVIRP Stage 1) 2012
- Bulk Entitlement (Goulburn System – Snowy Environment Reserve) Order 2004
- High-reliability water shares and low-reliability water shares held by the VEWH for the Snowy River
- High-reliability water shares and low-reliability water shares held by the Commonwealth Environmental Water Holder for the environment
- High-reliability water shares and low-reliability water shares held by the Murray-Darling Basin Authority for the environment
- Silver and Wallaby Creeks Environmental Entitlement 2006, which provides passing flow rules on Silver and Wallaby Creeks

There is no planned environmental water in the Goulburn River.

For more information about how much water is held in each entitlement listed here see [Appendix E](#). For the entitlements on the Victorian Water Register for more information about environmental water management see [Chapter 12](#).

4.3.4 Campaspe Basin (SS7)

The Campaspe Basin occupies 417,914 ha of north central Victoria. The Campaspe River extends 150 km south from the Great Dividing Range to the River Murray and the Campaspe Basin is 45 km wide at the widest point.

The Campaspe Basin is 0.4 percent of the area of the Murray-Darling Basin, and it provides 0.9 percent of inflow for the Murray-Darling Basin.

Table 4-13: Campaspe Basin key statistics

Catchment area	0.4% of the Murray–Darling Basin
Annual streamflow	352 GL
River length	220 km
Major tributaries	Coliban River, Axe, McIvor, Mt Pleasant and Sheepwash Creeks
Major towns/cities	Kyneton, Rochester, Echuca

Major water storages	Lake Eppalock (305 GL) on the Campaspe River; Malmsbury (18 GL) ^a , Lauriston (20 GL) and Upper Coliban (32 GL) Reservoirs on the Coliban River
Key water users	Urban water supply, industry, stock and domestic, irrigation

a. Malmsbury Reservoir has an original capacity of 18 GL however due to dam safety issues the current operating level is 12 GL.

4.3.4.1 Land and stream network

The Campaspe River rises between Daylesford and Woodend in Victoria's Central Highlands which form part of the Great Dividing Range. The river rises about 20 km east of the Loddon headwaters and flows north and slightly east, while the Loddon River flows north and slightly west.

The Campaspe River experiences extreme variations in flow from year to year. Its principal tributaries are the Coliban River and the Axe, McIvor, Mt Pleasant and Sheepwash creeks. The Coliban River contains the Malmsbury, Lauriston and Upper Coliban reservoirs in the south, and flows north to meet the Campaspe River just south of Lake Eppalock, the major storage in the catchment.

The lower part of the Campaspe catchment contains the Rochester-Campaspe Irrigation District Area which is supplied mainly by Goulburn resources through the Waranga Western Channel. See Goulburn Basin in [Section 4.3.3](#).

The course and condition of the Campaspe and Coliban rivers changed substantially as European settlers took up landholdings in the south of the catchment through the 1830s and 1840s. Land was cleared, stream banks grazed and the waterways de-snagged. In the 1850s, the gold rush in the region resulted in erosion of the waterways.

The growing population centres required reliable water and a reservoir was built on the Coliban River. An additional two reservoirs were built in 1903 and 1941 to supply domestic water to residents of both the Loddon and Campaspe catchments. The Campaspe Irrigation District did not become a significant irrigation area until the construction of Lake Eppalock in 1963. The irrigation district operated until 2010 when the irrigation district was decommissioned.

4.3.4.2 Rainfall and surface hydrology

The climate of the Campaspe Basin is fairly uniform, with hot summers experienced particularly in the north. The effect of the topographic variation of increasing elevation in the south is reflected in the higher rainfall in that area.

The waters of the Campaspe River and its main tributary, the Coliban River, are highly regulated and natural flows have been disrupted. However environmental flows are important to maintain several threatened vegetation communities, aquatic life and habitat for many terrestrial species.

Streamflows in the lower catchment have been significantly altered with regulation. They are now high in summer and low in winter, which has affected the native species in the river and wetland environments. Now as a result of extensive historic mining and modern land use practices, the lower reaches of the catchment have some water quality issues.

Lake Eppalock is the largest storage in the Campaspe Basin. It is owned and operated by Goulburn-Murray Water (GMW) and Coliban Water has an active share. Coliban Water has an right to 18 percent of the storage capacity, inflows and contribution proportionally to evaporation and environmental flow requirements in the Campaspe River downstream of the storage. Coliban Water also owns and operates the Malmsbury, Lauriston and Upper Coliban reservoirs on the Coliban River in the southern part of the catchment.

The Coliban supply system captures water in the Upper Coliban, Lauriston and Malmsbury storages and transfers from the reservoirs to supply rural customers around Harcourt, Castlemaine, Axe Creek, Goornong, Raywood, Marong and Bendigo, and to urban water customers in Bendigo and surrounding towns via the Coliban Main Channel. The Coliban Main Channel transports water across the catchment boundary to the Loddon Basin where the majority of it is used. Coliban Water also transport water from Lake Eppalock to Bendigo through the Bendigo-Eppalock pipeline which also crosses into the Loddon Basin.

The Campaspe supply system primarily supplies irrigators who divert water from the Campaspe River downstream of Lake Eppalock and the Victorian Environmental Water Holder. This system is managed by GMW. It sources water from Lake Eppalock which regulates the water in the Campaspe River downstream. In years with enough resources, water from Lake Eppalock is also used to supplement the Waranga Western Channel that supplies irrigation customers in the Rochester-Campaspe and Loddon irrigation areas.

As well as the Coliban supply system and Campaspe supply system, the Campaspe Basin hosts a significant section of the Goldfields Superpipe. This is a 133.5 km pipeline which runs from the Waranga Western Channel near Colbinabbin to Ballarat and can transfer water from the Waranga Western Channel to Lake Eppalock, and water from Lake Eppalock to Bendigo and to White Swan Reservoir to supply Ballarat. The Goldfields Superpipe runs across four basins, from Goulburn Basin to Campaspe Basin to Loddon Basin and through to Moorabool Basin, which is outside the Murray-Darling Basin. The Goldfields Superpipe is capable of supplying 18 GL per year to Ballarat and 20 GL per year to Bendigo.

Central Highlands Water and Coliban Water hold water shares in the Goulburn system and Campaspe system to supply urban needs.

Water recovery

The baseline diversion level of surface water determined by the Basin Plan for the Campaspe SDL resource unit is 153 GL per year. The required local reduction in take to achieve an environmentally sustainable level of diversion is 18 GL per year. Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Campaspe SDL resource unit is 13.2 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

4.3.4.3 Entitlements and diversions

Goulburn-Murray Water, Coliban Water and Western Water hold bulk entitlements in the Campaspe Basin. Surface water is also diverted by licensed diverters and harvested in farm dams (or runoff dams).

Entitlements include rights granted to individuals, such as water shares and take and use licences, and rights granted to authorities such as bulk entitlements granted to water corporations or the Victorian Environmental Water Holder. Rights to water in the Campaspe Basin are outlined in [Table 4-14](#).

Table 4-14: Surface water entitlements in the Campaspe Basin

Water entitlements
Bulk Entitlement (Campaspe System – Goulburn-Murray Water) Conversion Order 2000
High-reliability water shares

Water entitlements

Low-reliability water shares
Bulk Entitlement (Axeedale Goornong and Rochester) Conversion Order 1999
Environmental Entitlement (Campaspe River – Living Murray Initiative) 2007
Campaspe River Environmental Entitlement 2013
Operating provisions (whole of system)
Bulk Entitlement (Campaspe System – Coliban Water) Conversion Order 1999
Rural entitlements
Urban commitments
Bulk Entitlement (Trentham) Conversion Order 2012
Bulk Entitlement (Woodend) Conversion Order 2004
Take and use licences – unregulated surface water

As well as entitlements outlined here, water is harvested in the Campaspe Basin from farm dams (or runoff dams) under section 8 rights. The capacity of farm dams for the Campaspe Basin is estimated based on GIS mapping. See [Chapter 11](#).

4.3.4.4 Environmental assets and water for the environment

The waterways of the Campaspe Basin have important environmental values, with native fish including golden perch and Murray cod, platypus and river red gum streamside communities. Water from the Campaspe Basin also feeds into the Murray River, helping to maintain internationally significant environmental assets such as Gunbower Forest.

In the Campaspe Basin held environmental water is made up of these components:

- Campaspe River Environmental Entitlement 2013
- Environmental Entitlement (Campaspe River – Living Murray Initiative) 2007
- High-reliability water shares and low-reliability water shares held by the Commonwealth Environmental Water Holder for the environment.

There is no planned environmental water in the Campaspe system.

For more information about how much water is held in each entitlement listed above see [Appendix E](#) or the entitlements on the Victorian Water Register for more information about environmental water management see [Chapter 12](#).

4.3.5 Loddon Basin (SS8)

The Loddon Basin extends almost 300 km from the Great Dividing Range between Daylesford and Creswick to Swan Hill on the River Murray. The catchment varies in width from 15 km at Swan Hill to 100 km along the Divide. The Loddon Basin covers 1,531,998 ha.

The Loddon catchment is about 2.3 percent of the area of the Murray-Darling Basin and it provides 1.7 percent of inflow for the Murray-Darling Basin.

Compared with other catchments, flows from the Loddon River do not contribute much water to the River Murray, but are a significant water source for important wetlands in northern Victoria such as the Boort Wetlands and the Ramsar-listed Kerang Lakes. About 75 percent of the water

used in the catchment is transferred in from other catchments, with urban water for Bendigo in the central catchment supplied mainly from the Campaspe River catchment (see [Section 4.3.4](#)), and areas including Loddon Valley Irrigation Area in the north supplied mainly by the Goulburn catchments (see [Section 4.3.3](#)).

Table 4-15: Loddon Basin key statistics

Catchment area	2.3% of the Murray–Darling Basin
Annual streamflow	201 GL (Laanecoorie Weir)
River length	310 km
Major tributaries	Bet Bet and Tullaroop creeks
Major distributaries	Gunbower, Reedy, Pyramid and Barr creeks in the northern plains; Bullock and Bendigo Creeks in the central catchment, Piccaninny and Mt Hope creeks in the east
Major towns/cities	Bendigo, Maryborough, Castlemaine, Kerang and Daylesford
Major water storages	Cairn Curran Reservoir (147 GL) Tullaroop Reservoir (73 GL) Laanecoorie Reservoir (8 GL)
Key water users	Irrigated agriculture, urban water supply environmental and industry

4.3.5.1 Land and stream network

Mt Alexander is the highest point within the Loddon Basin, peaking at 741 m in the Great Dividing Range. The foothills of the range extend over much of the southern section of the Loddon Basin, where the hilly to undulating land is generally above 300 m. The northern two-thirds of the Loddon Basin contain the flat alluvial plains of the Murray Valley with the rocky granite residuals of Mt Terrick, Pyramid Hill and Mt Hope rising about 8 to 100m above the general level of the plains.

Eighty percent of the land has been cleared for agriculture while areas of forest remain between Daylesford and Castlemaine, Maryborough and Laanecoorie, and in the vicinity of Bendigo, Bridgewater and Wedderburn.

In the upper part of the catchment two reservoirs, Hepburns Lagoon and Newlyn Reservoir, are managed by Goulburn–Murray Water for the Bullarook regulated water system.

In the middle of the catchment the Loddon River is dammed to form Cairn Curran Reservoir and further downstream Laanecoorie Reservoir. Tullaroop Reservoir is constructed on the Tullaroop Creek, which is a tributary of the Loddon River. All the rivers in the Loddon Basin drain south to north, with the Loddon River principally draining the western sections of the Loddon Basin. A series of other creeks such as Gunbower, Reedy, Pyramid and Barr creeks traverse the northern plains. Bullock Creek drains the north-central zone and Bendigo Creek carries runoff to Kow Swamp, one of the Mid-Murray Storages.

The lower part of Loddon River below Loddon Weir is practically unregulated and in dry times can have very little to no flow. The Loddon River flows into the Little Murray River, an anabranch of the River Murray, and the south boundary of Pental Island. The Little Murray River flows back into the Murray River with Loddon River flows at Swan Hill.

The course and condition of the Loddon River was changed substantially as European settlers took up landholdings in the southern areas of the catchment through the 1830s and 1840s. The



land was cleared, stream banks grazed and the waterways de-snagged. In the 1850s, the gold rush in the region resulted in erosion of the waterways.

After the potential of irrigated agriculture was recognised on the riverine plains around Kerang and Boort construction of Laanecoorie Reservoir on the Loddon River began in 1889. Irrigation water was also supplied into the region from the Torrumbarry Weir on the River Murray, which was built in 1919. The Cairn Curran and Tullaroop reservoirs were built on the Loddon in the 1950s to meet expanding production. The irrigation areas of northern Victoria are also supplied with water from the Goulburn River through the Waranga Western Channel.

With regulation, streamflows in the catchment have been reversed to high in summer and low in winter, and this has had a significant effect on native species in the river and wetland environments. Water quality issues within the catchment include high salinity and algal blooms and are a result of historic mining and modern land use.

4.3.5.2 Rainfall and surface hydrology

Rainfall is generally low and variable in the Loddon Basin and the physical characteristics of the area make it prone to flooding, particularly on the flat terrain of the northern plains. Average annual rainfall increases with elevation, and is greater in the southern highlands. Kerang and Boort in the more arid regions of the north have average annual rainfalls that are around 55 percent of rainfall in the southern highlands. Runoff from rainfall within the Loddon Basin is relatively low and declines to negligible levels in the semi-arid north west. Most of the runoff comes from the southern highlands where rainfall is higher. However Bendigo Creek also receives substantial runoff flowing to Kow Swamp, which is part of the Victorian Murray system.

The Loddon system is split into three distinct sections of the Bullarook system, the Loddon system and the lower part of the Loddon River.

The Bullarook system in the south is supported by Hepburns Lagoon and Newlyn Reservoir on the Bullarook and Birch creeks respectively. These supply the Bullarook irrigation customers who are mainly potato farmers in the Central Highlands region.

The Loddon system is created by the Tullaroop, Cairn Curran and Laanecoorie reservoirs which release water to supply primary entitlement holders in the Loddon system and this is the main regulated section of the river. Primary entitlement holders include Coliban Water, the Victorian Environmental Water Holder and irrigators who pump directly from the river.

The lower section of the Loddon River is joined by Pyramid Creek at Kerang at which point the Loddon becomes part of the River Murray floodplain. Below Loddon Weir the river receives passing flows and environmental water deliveries from the Victorian Environmental Water Holder. It also receives unregulated flow from tributaries when they are flowing. During dry conditions the river can become disconnected and may not meet the River Murray.

The area contains the Loddon Valley Irrigation Area, which it is supported mainly by water from the Goulburn system. The Loddon Valley Irrigation Area sources water from the Waranga Western Channel, but when there are sufficient resources in the Loddon system, Loddon resources can also be used to address capacity constraints in the Waranga Western Channel. The lower part of the Loddon Basin supports the Torrumbarry Irrigation Area which is supported by River Murray resources and is discussed in the Victorian Murray water resource plan area.

Water recovery

The baseline diversion level of surface water determined by the Basin Plan is 179 GL per year for the Loddon SDL resource unit. The required local reduction intake to achieve an environmentally sustainable level of diversion is 12 GL per year. Victoria also has a combined 'shared reduction' target of 425.3 GL per year, which must be recovered from Victorian catchments connected to the Murray system. The shared reduction target for the Loddon SDL resource unit is 9.8 GL per year. Victoria's BDLs have been revised, this is explained further in [Appendix C](#).

4.3.5.3 Entitlements and diversions

In the Loddon Basin, surface water is diverted by Goulburn-Murray Water (GMW), Central Highlands Water, Coliban Water and the Victorian Environmental Water Holder (VEWH), which all hold bulk entitlements in the Loddon Basin. Surface water is also diverted by licensed diverters and harvested in farm dams. The Bullarook system storages are owned and operated by GMW, which is obliged to deliver water to primary entitlement holders and meet passing flow requirements. The primary entitlement holders in the system include irrigators who pump directly from the river, Central Highlands Water and the VEWH, which has a provisional entitlement to 100 ML for environmental purposes.

The Loddon system storages are also owned and operated by GMW which is obliged to deliver water to primary entitlement holders and meet passing flow requirements. The primary entitlement holders in the system include irrigators who pump directly from the river, Central Highlands Water which takes water from Tullaroop reservoir for Maryborough, Coliban Water, which takes water from the river to supply Bridgewater, Inglewood, Serpentine and Jarklin, and the VEWH.

The lower reach of the Loddon River is not regulated for water share customers. However, the VEWH regularly makes deliveries of held environmental water to sections of this reach and to the wetlands in the area. Agricultural use also occurs in this area as there are stock and domestic users and take and use licences supplied from the lower reaches of the Loddon River.

Entitlements to water in the Loddon Basin are outlined in [Table 4-16](#).

Table 4-16: Entitlements held in the Loddon Basin

Water entitlements
Bulk Entitlement (Loddon System – Goulburn-Murray Water) Conversion Order 2005
High-reliability water shares – Loddon
Low-reliability water shares – Loddon
Bulk Entitlement (Loddon River – Environmental Reserve) Order 2005
Bulk Entitlement (Loddon System – Part Maryborough – Central Highlands Water) Conversion Order 2005
Bulk Entitlement (Loddon System – Coliban Water) Conversion Order 2005
Goulburn supplement
Bulk Entitlement (Bullarook system – Goulburn-Murray Water) Conversion Order 2009
High-reliability water shares – Bullarook

Water entitlements

• Low-reliability water shares – Bullarook
• Bulk Entitlement (Bullarook System – Central Highlands Water) Conversion Order 2009
• Environmental Entitlement (Birch Creek – Bullarook System) 2009
Bulk Entitlement (Creswick) Conversion Order 2004
Bulk Entitlement (Daylesford –Hepburn Springs) Conversion Order 2004
Bulk Entitlement (Evansford – Talbot System – Part Maryborough – Central Highlands Water) Conversion Order 2006
Bulk Entitlement (Lexton) Conversion Order 2004
Take and use licences – unregulated surface water

As well as the entitlements outlined here, water is harvested in the Loddon Basin from farm dams (or runoff dams) under section 8 rights. The capacity of farm dams for Loddon Basin is estimated based on GIS mapping. See [Chapter 11](#).

4.3.5.4 Environmental assets and water for the environment

The waterways of the Loddon Basin support a number of ecological values. Native fish are present, particularly in the upper catchment, and river blackfish are found in Tullaroop and Serpentine creeks. The rare Murray-Darling rainbow fish are found in the middle sections of the Loddon River. Pyramid Creek supports large-bodied native fish such as golden perch, Murray cod and silver perch and is an important corridor for fish migration between the Loddon and Murray systems.

In the Loddon Basin held environmental water is made up of these components:

- Bulk Entitlement (Loddon River – Environmental Water Reserve) Order 2005
- The Environmental Entitlement (Birch Creek – Bullarook System) 2009
- High-reliability water shares and low-reliability water shares held by the Commonwealth Environmental Water Holder for the environment
- High-reliability water shares water shares held by the VEWH for the Snowy River

There is no planned environmental water in the Loddon system.

For more information about how much water is held in each entitlement listed above see [Appendix E](#) or the entitlements on the Victorian Water Register for more information about environmental water management see [Chapter 12](#).

4.3.6 Significant connections in the Northern Victoria water resource plan area

Figure 4-1 maps the significant hydrological connections between water resource plan areas, and within water resource plan areas. The Basin Plan describes the SDL resource units and labels which apply here. Significant hydrological connectivity means there is a clear connection between different resources and a high likelihood of impacts from the use of one resource on the other.

4.3.6.1 Significant connections between water resource plan areas

The Basin Plan requires Victoria's North and Murray Water Resource Plan to identify and have regard to the water resources that have a significant hydrological connection with other water resources. Significant connections are outlined below.

The Northern Victoria water resource plan area (SW3) is connected to the Victorian Murray water resource plan area (SW2) because all the major rivers in the Northern Victoria water resource plan area run into the Murray River and contribute resources to the Murray River in accordance with the sharing arrangements defined in the Murray-Darling Basin Agreement.

The Ovens River (SS4) flows into the River Murray (SS2) below Lake Hume (see [Section 4.3.1](#), the Broken River (SS5), via the Broken Creek flows into the River Murray (SS2) at Barmah (see [Section 4.3.2](#)), the Goulburn River (SS6) flows into the River Murray (SS2) upstream of Echuca (see [Section 4.3.3](#)), the Campaspe River (SS7) flows into the River Murray (SS2) at Echuca (see [Section 4.3.4](#)), the Loddon River (SS8) flows into the Little Murray River (SS2) which flows into the River Murray at Swan Hill (see [Section 4.3.5](#)).

Although all these rivers flow directly into the River Murray for the purpose of Victoria's North and Murray Water Resource Plan, it is considered that they connect only to the Victorian Murray water resource plan area (SW2) which then connects to the New South Wales Murray and Lower Darling water resource plan area (SW8).

Water can be diverted from the Northern Victoria water resource plan (SW3) area to the Victorian Murray water resource plan area (SW2) through channels to supply irrigation areas located in the Victorian Murray water resource plan area, such as the Murray Valley Irrigation Area that can receive water from the Goulburn Basin via the East Goulburn Main Channel.

4.3.6.2 Significant connections between SDL resource units

The Broken River (SS5) flows into the Goulburn River (SS6) at Shepparton, and the water entering the Goulburn River is managed as inflows as per the Bulk Entitlement (Eildon-Goulburn Weir) Conversion Order 1995 or as an Inter-Valley Transfer as per the trading rules (see [Section 4.3.2](#)).

The Goulburn River (SS6) connects to the Campaspe and the Loddon systems via the Waranga Western Channel (see [Section 4.3.3](#)). This water is managed under the Bulk Entitlement (Eildon-Goulburn Weir) Conversion Order 1995. Water can also flow from the Campaspe and Loddon rivers into the Goulburn-Murray Irrigation Area in the form of supplements (see [Section 4.3.3.3](#)). The rules are outlined in the respective bulk entitlements.

The Goulburn River (SS6) connects to Lake Eppalock (SS7) via the Waranga Western Channel and the Goldfields Superpipe, which then also connects to Bendigo in the Loddon system (SS8) and further on to outside the Murray-Darling Basin to supply water to White Swan Reservoir, which is a storage for Ballarat. The Goldfields Superpipe can also source water from the Campaspe Basin and deliver it to White Swan Reservoir.

The Goulburn system (SS6) connects to outside the Murray-Darling Basin via the Silver and Wallaby Creeks which are tributaries of the Goulburn River, which are diverted at their headwaters via a diversion aqueduct which connects to the Melbourne headworks system. The Goulburn River also connects to the Melbourne headworks system via the North-South Pipeline. The rules relating to these connections are in the bulk entitlements and the statement of obligations.

The Campaspe River (SS7) connects to the Loddon system (SS8) via the Waranga Western Channel which transports water from east to west. The Coliban River, a tributary of the Campaspe River (SS7), supplies water to Bendigo from Malmsbury Reservoir via the Coliban Main Channel (see [Figure 4-1](#)).

4.3.6.3 Significant connections between surface water and groundwater

The Ovens River (SS4), Broken River (SS5), Goulburn River (SS6), Campaspe River (SS7) and Loddon system (SS8) are significantly connected to both Goulburn-Murray: Highlands (GS8b) and Goulburn-Murray: Sedimentary Plain (GC8c) SDL resource units.

4.3.6.4 Other non-significant connections

The Goulburn system is connected to the Wimmera-Mallee water resource plan area at the far west end of the Waranga Western Channel and supplies towns which lie outside the Northern Victoria water resource plan area, including Quambatook.

The South West Loddon Pipeline also creates a link between the Northern Victoria water resource plan area and the Wimmera-Mallee water resource plan area. This link supplies stock and domestic water to rural communities surrounding the town of Wedderburn. This pipeline can source water from the Waranga Western Channel and the Wimmera Mallee Pipeline. Stage 2 of the project will also connect towns and rural customers in the Loddon Basin.

Landholders along the Victorian side of the River Murray and water corporations that source water from the Murray River can divert water from the Victorian Murray water resource plan area for use in the Northern Victoria water resource plan area and the Wimmera Mallee water resource plan area. Some of these diversions can be large, but the use is at a customer scale and does not connect to other systems, so it is not considered significant.

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1. Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. The following significant connections have been identified between the Victorian Murray water resource plan area and the Northern Victoria water resource plan area:
 - a. the Ovens River, Broken River (via Broken Creek), Goulburn River, Campaspe River and Loddon River have a significant hydrological connection with the River Murray. These rivers are in the Northern Victoria water resource plan area, however connect through to the River Murray via the Victorian Murray water resource plan area. The connections in the River Murray relate to the New South Wales Murray and Lower Darling water resource plan area, and the South Australian River Murray water resource plan area;
 - b. the Goulburn River has a significant connection to the River Murray via the East Goulburn Main Channel which comes off the Goulburn River and diverts water into the Lower Broken Creek and the Murray Irrigation Area connecting the Northern Victorian water resource plan area to the Victorian Murray water resource plan area.
2. Where surface water is significantly hydrologically connected from the Northern Victoria water resource plan area and the Victorian Murray water resource plan area into the River Murray the connected resources are primarily managed through the Murray-Darling Basin Agreement.
3. Where surface water is significantly hydrologically connected within Victoria, bulk entitlements issued under the *Water Act 1989* (Vic) contain arrangements for the management of those resources. Rules relating to system management and in setting those rules consideration is given as to how water is taken by individual users from the system.

AND

1. In the Northern Victoria water resource plan area, the following resources have a significant hydrological connection:
 - a. the Broken River flows into the Goulburn River;
 - b. the Goulburn River is connected to the Campaspe River and the Loddon River via the Waranga Western Channel;

- c. the Goulburn River (via the Waranga Western Channel) is connected to the Campaspe system (Lake Eppalock) via the Goldfields superpipe;
 - d. the Goulburn system is connected to resources outside the Basin in Southern Victoria via an aqueduct transfer from Silver and Wallaby Creeks to Yan Yean Reservoir the Melbourne headworks system;
 - e. the Goulburn River is connected to resources outside the Basin in Southern Victoria (from the Waranga Western Channel to Sugarloaf Reservoir in the Melbourne headworks system) via the North-South pipeline;
 - f. the Goulburn River is connected to resources outside the Basin in Southern Victoria (from the Waranga Western Channel to White Swan Reservoir in the Ballarat urban water supply system) via the Goldfields Superpipe;
 - g. the Campaspe River is connected to the Loddon River via the Waranga Western Channel;
 - h. the Campaspe Basin (Lake Eppalock) is connected to the Loddon Basin via the Eppalock-Bendigo pipeline (to supply Bendigo);
 - i. the Coliban River (Campaspe Basin) is connected to the Loddon Basin via the Coliban Main Channel (to supply Bendigo);
 - j. the Campaspe system is connected to resources outside the Basin in Southern Victoria (from Lake Eppalock to White Swan Reservoir in the Ballarat urban water supply system) via the Goldfields Superpipe.
2. Where surface water is significantly hydrologically connected within Victoria, bulk entitlements issued under the *Water Act 1989* (Vic) contain arrangements for the management of those resources. In setting rules relating to system management consideration is given as to how and where water is taken by individual users from the system.

<<end of accredited text for s10.05(b) of the Basin Plan>>



4.4 Goulburn-Murray groundwater basin/water resource plan area

In the Goulburn-Murray water resource plan area there are five groundwater catchments, and, like surface water catchments water in groundwater catchments has a northerly and westerly flow towards the River Murray. The catchments in the Goulburn-Murray water resource plan area are, Upper Murray, Ovens, Goulburn Broken, Campaspe and Loddon. The resources and water sharing instruments in each catchment are described below. The groundwater management unit boundaries in Goulburn-Murray Water's administrative area are shown in [Figure 2-4](#).

Groundwater resources in the Goulburn-Murray water resource plan area are managed by Goulburn-Murray Water (GMW), which as the Minister's delegate, issues licences for groundwater use and bore construction and also carries out the development and implementation of groundwater management plans.

As described in [Chapter 2](#), Victoria uses groundwater catchments for planning and reporting on groundwater conditions. These areas represent regions of connected groundwater resources and are based on groundwater flow systems, as well as administration and surface water management boundaries. The Victorian Water Act provides the legislative arrangements for the delegated authority to manage take of all groundwater resources.

Areas with intensive use of groundwater may either be covered by a water supply protection area or a groundwater management area. Water supply protection areas are declared under section 27 of the Victorian Water Act. Following a declaration, a management plan is prepared by the delegated authority and approved by the Minister to establish additional rules to manage the resources and address the local risks. Areas of less intensive use but which still require management are managed in line with local management plans prepared by the delegated authority local management rules. Local management plans describe how the authority manages the resources including management tools for dry conditions. For areas without intensive use groundwater take is managed in line with the Victorian Water Act and department policies.

Permissible consumptive volumes (PCVs) are limits which are set by the Minister for Water and limit the volume of water that may be taken for consumptive use. These have been set for all groundwater management areas and water supply protection areas, except the Upper Ovens River water supply protection area where a PCV is not required because the statutory management plan prevents additional licensed volume being issued. PCVs are an important tool to protect the environment and the reliability for existing entitlements.

The Basin Plan splits resources in the Goulburn-Murray water resource plan area into four SDL resource units, these are:

- Goulburn-Murray: Shepparton Irrigation Region (GS8a) - All groundwater in the Shepparton Irrigation Region water supply protection area to a depth of 25 metres below the land surface
- Goulburn-Murray: Highlands (GS8b) - All groundwater in the outcropping Palaeozoic rocks (or the in situ weathered horizon where it is within 5 metres of the surface) from the land surface to 200 metres below the surface
- Goulburn-Murray: Sedimentary Plain (GS8c) - All groundwater from the land surface to 200 metres below the surface or 50 metres below the base of the Tertiary sediments, whichever is the deeper, excluding groundwater in GS8a
- Goulburn-Murray: deep (GS8d) - All groundwater, excluding groundwater in items GS8a, GS8b and GS8c

For more information see [Chapter 2](#).

Victorian management groundwater units are geographically based and while Basin Plan groundwater management units (SDL resource unit) are laterally based. Therefore, within each

Victorian groundwater management unit there will be more than one Basin Plan SDL resource unit. For example, in the Goulburn-Murray: Highlands SDL resource unit runs across all groundwater catchments, surface water SDL resource units and multiple groundwater management units.

Goulburn-Murray: Shepparton Irrigation Region SDL resource unit is the section of the sedimentary plain which is located under the GMID where due to the irrigation district, groundwater is managed to promote usage to reduce the impact of rising water tables and salinity on land.

The Goulburn-Murray: Highlands SDL resource unit is situated in the south of Goulburn-Murray water resource plan area and is recharged from rainfall into the fractured rock aquifers.

The Goulburn-Murray: Sedimentary Plain SDL resource unit, which includes (from oldest to most recent) the Renmark formation, the Calivil formation, the Shepparton Formation and Coonambidgal Formation aquifer. The most recent units overlie and confine the older deeper units, however, the depth and thickness of each formation also reflects the shape of the basin.

The Goulburn-Murray: deep SDL resource unit underlies the Highlands and Sedimentary Plain and is not considered significantly hydrologically/hydraulically connected anywhere. There is a high degree of connectivity between the larger SDL resource units, especially the units horizontally and vertically adjacent to each other. This is shown in [Table 4-17](#).

Table 4-17: Surface water to groundwater connectivity

	Connected to these groundwater SDL resource units		
SS2 Victorian Murray	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain	
SS3 Kiewa	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain	
SS4 Ovens	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain	
SS5 Broken	GS8a – Goulburn-Murray: Shepparton Irrigation Region	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain
SS6 Goulburn	GS8a – Goulburn-Murray: Shepparton Irrigation Region	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain
SS7 Campaspe	GS8a – Goulburn-Murray: Shepparton Irrigation Region	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain
SS8 Loddon	GS8b – Goulburn-Murray: Highlands	GS8c – Goulburn-Murray: Sedimentary Plain	

Across the boarder, Victorian groundwater SDL resource units are connected to equivalent SDL resource units in New South Wales where they have similar hydrogeological profiles. The four New South Wales groundwater SDL resource units that are situated along the boarder with their Victorian equivalents are shown in [Table 4-18](#).

Table 4-18: Victoria – New South Wales Groundwater Connectivity

New South Wales SDL resource units	Victorian groundwater resources	Victorian SDL resource units
GS20 – Lachlan Fold Belt MDB	Hydrogeologically equivalent to GS8b – Goulburn-Murray: Highlands	GS8b – Goulburn-Murray: Highlands GS8c – Goulburn-Murray: Sedimentary Plain
GS27a – Lower Murray Shallow Alluvium	Hydrogeologically equivalent to GS8a – Goulburn-Murray: Shepparton Irrigation Region and GS8c – Goulburn-Murray: Sedimentary Plain	GS8a – Goulburn-Murray: Shepparton Irrigation Region GS8c – Goulburn-Murray: Sedimentary Plain
GS27b – Lower Murray Deep Alluvium	Hydrogeologically equivalent to GS8c – Goulburn-Murray: Sedimentary Plain	GS8c – Goulburn-Murray: Sedimentary Plain
GS46 – Upper Murray Alluvium	Hydrogeologically equivalent to GS8c – Goulburn-Murray: Sedimentary Plain	GS8c – Goulburn-Murray: Sedimentary Plain

Note: connections between the New South Wales and Victorian units occur at the boundary of the units – that is, the connectivity and potential flow of groundwater will occur at the border of New South Wales and Victoria.

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- Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. For groundwater to surface water connections:
 - the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit is significantly connected to surface water in the Campaspe, Goulburn and Broken SDL resource units.
 - the Goulburn-Murray: Sedimentary Plain SDL resource unit is significantly connected to surface water (in the Kiewa, Ovens, Goulburn, Broken, Campaspe and Loddon SDL resource units) except where it underlies the Shepparton Irrigation Region SDL resource unit (GS8a). In the Upper Ovens River Water Supply Protection Area where groundwater and surface water are highly connected, groundwater in the Goulburn-Murray: Sedimentary Plain SDL resource unit (GS8c) is managed under rules consistent with surface water.
 - the Goulburn-Murray: Highlands SDL resource unit (GS8b) is significantly connected to surface water in the Victorian Murray, Kiewa, Ovens, Goulburn, Broken, Campaspe and Loddon SDL resource units. Typically, a 1:1 relationship is assumed, however there is a delayed response to pumping and the impact of taking groundwater from the Highlands SDL resource unit is extended over the year.
- Where groundwater and surface water is significantly hydrologically connected, where connection is local to regional but is not of a similar timing volume or reliability, consideration will be given to the need to cap the total available take from licensed groundwater use for the area location for construction of bores for both licensed and domestic and stock to prevent unacceptable drawdown in the

water table at the connected feature, and for issuing licences to take to prevent unacceptable drawdown in the water table at the connected feature.

<<end of accredited text for s10.05(b) of the Basin Plan>>

4.4.1 Upper Murray groundwater catchment

The Upper Murray groundwater catchment is located in north-east Victoria and lies within part of the River Murray Basin. The Upper Murray groundwater catchment extends from the Victorian Alps to the River Murray. Major rural centres in the catchment include Omeo, Tallangatta and Corryong.

In the Upper Murray Basin the shallow aquifer system consists predominately of outcropping Palaeozoic-aged sedimentary rocks intruded in places by granites which are surrounded by associated metamorphic rocks. Older volcanic basalts cover a small area in the south of the Upper Murray Basin. Many of the streams have significant alluvial deposits along their tracts. The bulk of the resource is fresh, however a small region containing groundwater of marginal quality is located in the south east corner of the Upper Murray Basin.

The Upper Murray groundwater catchment contains the Upper Murray and Kiewa groundwater management areas, for which plans were approved in June 2014, and a small part of the Upper Ovens River water supply protection area. Groundwater resources supply licence entitlements, domestic and stock use and the town of Dinner Plain.

4.4.2 Ovens groundwater catchment

The Ovens groundwater catchment is located in northern Victoria. It extends from the River Murray in the north to the Great Dividing Range in the south, and contains the Kiewa and Ovens basins.

Within the Ovens Basin there are two shallow aquifer systems. In the northern half of the Ovens Basin, 'shoe string' sands are randomly distributed throughout the predominantly silty and clayey Shepparton formation of the riverine plain. However, it is widely used for stock and domestic purposes and for irrigation. Palaeozoic basement rocks composed of folded sediment, metamorphic rock and granite underlie the southern half of the Ovens Basin, and extend up the western boundary and also the Baranduda and Pilot Ranges. Aquifers in these rocks yield relatively fresh water from fractures and weathered profiles.

A deep sand aquifer known as the Caviil/Renmark Aquifer underlies the Shepparton formation in the north where it lies approximately 80 to 100 metres below the surface. This is confined downstream of Wangaratta but is unconfined and shallower upstream. Dredging for gold occurred as far upstream as Harrietville, and most of the finer silts and clays normally found in rivers valley were washed out in the search for gold, leaving behind sands that result in highly connected alluvial aquifers along the valley floor.

Groundwater is also found in the highly fractured bedrock in the Goulburn-Murray: Highlands SDL resource unit and underlying basement to the valley floor in the Upper Ovens River water supply protection area, which are referred to as Zone 2 in the management plan.

Groundwater quality in the Ovens Basin is generally good, especially that yielded from Caviil/Renmark formation and the basement aquifer. The Shepparton formation aquifer in the northern third of the Ovens Basin contains groundwater of variable quality.

The Ovens groundwater catchment contains the Barnawartha groundwater management area, Lower Ovens groundwater management area, Upper Ovens River water supply protection area. The Upper Ovens River water supply protection area management plan (GMW, 2012) manages groundwater in the unconsolidated sedimentary aquifer as a connected system with surface



water. Groundwater is also used as a backup supply for Wangaratta and six other towns in the area.

Groundwater in the Ovens groundwater catchment is an available urban water option supply for Bright and Wangaratta.

4.4.3 Goulburn Broken groundwater catchment

The Goulburn Broken groundwater catchment is located in northern Victoria and contains the Goulburn and Broken River basins. The hydrogeology of this groundwater catchment includes two distinct geological regions — the highlands of bedrock with sedimentary valleys in the south and the plains with layers of sedimentary aquifers in the north.

For the southern portion of Goulburn Broken, the basin in the highlands, shallow aquifers occur in the Palaeozoic basement rocks of folded sediments, metamorphic and granite, whereas in the northern portion contains the riverine plain, the shallow aquifer is a complex network of shoestring sands of the Shepparton Formation. The deep aquifer system is restricted to the north of the Goulburn Broken Basin in the buried sand sheet of the Calivil/Renmark Aquifer.

Groundwater quality varies throughout the. Usable resources lie mostly in the far north and the south with these areas containing good quality water. The minor resources in the Goulburn Broken Basin are mostly located in the central region and quality is generally brackish. The shallow aquifer systems of the Goulburn Basin occur in three main hydrogeological situations. The Shepparton Formation aquifer lies throughout the northern section and is composed of shoestring sands amongst silt and clay. The quality of groundwater contained in this aquifer is generally brackish. The remaining central and southern portion of the Goulburn Broken Basin comprises outcropping basement rocks overlain by Quaternary alluvial sand and gravel in the valleys within the highlands. Groundwater in these two units is largely of good quality.

A deep aquifer system in the form of buried sand sheet known as the Calivil/Renmark Aquifer is found in the far north of the Goulburn Broken Basin at a depth of more than 80 metres underlying the Shepparton Formation.

The total groundwater resource is estimated to be 53,800 ML per year. More than 70 percent of the usable resource is of brackish quality, with the remainder of marginal quality. The minor resource is generally of fresh to brackish quality. Bores are concentrated in the north-east of the Goulburn Broken Basin, where water quality varies from brackish to saline. Less saline waters are drawn from those bores sunk in the western section of the Goulburn Broken Basin. The water quality usually declines from east to west. (see [Chapter 14](#) and [Appendix A](#) for more information on water quality).

The Goulburn Broken groundwater catchment contains the West Goulburn groundwater management area, Mid Goulburn groundwater management area, most of the Shepparton Irrigation Region groundwater management area which also extends into the Campaspe groundwater catchment, the Strathbogie groundwater management area, the Upper Goulburn groundwater management area, Eildon groundwater management area and the Katunga water supply protection area.

Groundwater resources supply irrigation, domestic and stock use and urban use in Katunga and Strathmerton.

4.4.4 Campaspe groundwater catchment

The shallow aquifers predominant in the Campaspe Basin are the sandy units within the Shepparton Formation in the north, the Quaternary alluvial deposits scattered in the central and southern zone, and the minor aquifer of Palaeozoic basement rocks throughout the southern part of the Campaspe Basin, overlain in places by volcanic rock aquifers.

Underlying the more extensive Shepparton Formation is the Calivil/Renmark deep aquifer which is in the north and follows the Campaspe River valley north of Lake Eppalock. Bores drawing on this aquifer system are concentrated around Rochester where the water is used for irrigation. The reduction in the hydraulic pressure in the aquifer caused by this development would also have the additional benefit of reducing the onset of regional land salinity for the Campaspe Basin.

Most of the usable resource is considered of marginal quality, while the minor resource is generally brackish. Groundwater is generally more saline in the central and northern sections of the Campaspe Basin while better quality water is drawn from southern bores.

A local management plan approved by GMW applies to the Central Mineral Springs Groundwater Management Area and the Shepparton Irrigation Region Groundwater Management Area. The Lower Campaspe Valley water supply protection area management plan approved by the Minister for Water operates in the Campaspe groundwater catchment.

The Campaspe groundwater catchment contains the Lower Campaspe Valley water supply protection area, part of the Shepparton Irrigation Region groundwater management area which extends into the Goulburn Broken catchment, part of the Central Victorian Mineral Springs groundwater management area which extends into the Loddon catchment. Groundwater resources supply irrigation, domestic and stock use and the towns of Elmore and Trentham.

4.4.5 Loddon groundwater catchment

The Loddon groundwater catchment is located in the northern region and broadly corresponds with the Loddon Basin. The catchment covers an area between Creswick and Swan Hill. Neighbouring groundwater catchments are Avoca to the west, Otway-Torquay to the south and Campaspe to the east.

The riverine plain in the north of the Loddon Basin is underlain by the shallow shoestring sand aquifers of the Shepparton Formation. These sands are surrounded by a matrix of clay and silt. The watertable in the far north is very shallow and in places actually outcrops. Where the watertable is shallow, the groundwater is highly saline and there is significant land salinisation. The quality of groundwater in the Loddon River valley improves towards the south. Within the highlands, the shallow aquifer system is represented by the Newer Volcanics and Quaternary alluvium associated with the present drainage system. Elsewhere the minor and heterogeneous fractured rock aquifers occur in the Palaeozoic basement of folded sediments, granite and metamorphics. Only 20 percent of the divertible resource is considered fresh, the remainder being marginal to saline, and all of the minor resource is brackish.

The Loddon groundwater catchment includes the Mid-Loddon groundwater management area, Loddon Highlands water supply protection area, and part of the Central Victorian Mineral Springs groundwater management area which extends into the Campaspe catchment.

Groundwater is used for irrigation, commercial, domestic and stock use and also to supply the six towns of Clunes, Daylesford, Forest Hill, Learmonth, Maryborough and Waubra.

4.4.6 Significant groundwater connections in the Goulburn-Murray water resource plan area

The Basin Plan requires water resource plans to be prepared having regard to the management and use of any water resources which have a significant hydrological connection to the water resources of the water resource plan area, and describe the way in regard has been had (section 10.05 of the Basin Plan). Significant hydrological connectivity means there is a clear connection between different resources and a high likelihood of impacts from the use of one resource on the other.



Basin Plan also requires water resource plans to describe the rules for groundwater trade and this requires an assessment of sufficient hydraulic connectivity (sections 12.24 (a), 12.25(a) and 12.26(a) of the Basin Plan). Sufficient hydraulic connectivity is considered to exist in a groundwater system through which groundwater may flow, which has discrete boundaries and which has areas of groundwater recharge and discharge. It may include a single aquifer, a group of connected aquifers, or groundwater and surface water elements in conjunction, that are connected by a groundwater flow path.

The groundwater in within the Goulburn-Murray water resource plan area SDL resource units are all connected along the boundaries or the SDL resource units to varying degrees. Significant connections are noted between Goulburn-Murray: Highlands SDL resource unit and the Goulburn-Murray: Sedimentary Plain SDL resource unit along flow pathways, between Goulburn-Murray: Shepparton Irrigation Region SDL resource unit and the Goulburn-Murray: Sedimentary Plain SDL resource unit, and to outside the Goulburn-Murray water resource plan area to southern and western Victoria to Lower Murray Alluvium shallow; Shepparton Formation and deep; Renmark Group and Calivil Formation.

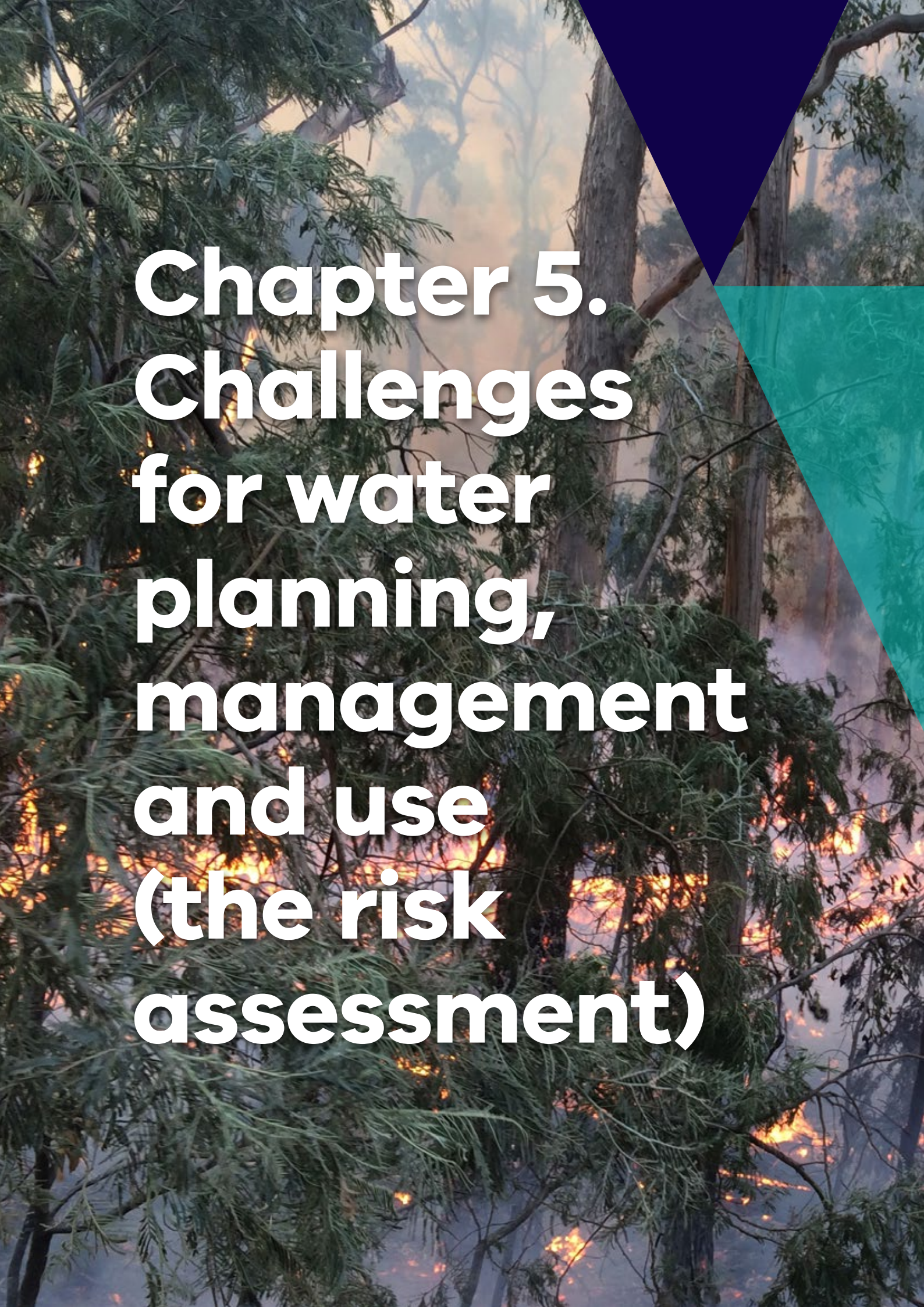
**Basin Plan
s10.05(b)**

1. Victoria's North and Murray Water Resource Plan was prepared having regard to the management and use of water resources that have a significant hydrological connection to the water resources in the water resource plan area. In the Goulburn-Murray water resource plan area the following significant hydrological connections are identified:
 - a. Goulburn-Murray: Shepparton Irrigation Region (GS8a) is connected to Goulburn-Murray: Sedimentary Plain (GS8c)
 - b. Goulburn-Murray: Highlands (GS8b) is connected to Goulburn-Murray: Sedimentary Plain (GS8c)
 - c. Goulburn-Murray: Sedimentary Plain (GS8c) is connected to Lower Murray Shallow Alluvium (GS27a), Lower Murray Deep Alluvium (GS27b)
 - d. Goulburn-Murray: Sedimentary Plain (GS8c) is connected to Southern Victoria outside of the Basin.
2. The Renmark aquifer within the Goulburn-Murray water resource plan area extends into the Wimmera-Mallee: Sedimentary Plan SDL resource unit, and into New South Wales and South Australia. There is generally very little development of this aquifer in Goulburn-Murray water resource plan area where it underlies the Calivil formation and none in the Wimmera-Mallee (groundwater) water resource plan area where it is typically too saline for productive use, or too deep to be economically developed, or both. As such, the use of this resource is unlikely to have a material impact on the connected groundwater resources and is therefore not considered a significant connection for the purposes of the Basin Plan.
3. Management of connected resources occurs through establishment of groundwater management areas, declaring water supply protection areas under the *Water Act 1989* (Vic) and mitigating third party impacts (including on the environment) through Victoria's entitlement framework.
4. The groundwater resources along the border region of Victoria and NSW are variously contained within shared or common aquifers. Although cross border statutory arrangements are not currently in place to manage these shared aquifers, the existing state legislation in Victoria and New South Wales enables policy and management to deliver equitable water sharing of stock and domestic rights, groundwater entitlements and entitlements of linked surface water users and dependent or partially dependent ecosystems. In the Goulburn-Murray water resource plan area, these arrangements include prescriptions in the Katunga

WSPA and Lower Campaspe WSPA plans to limit use to permissible consumptive volumes, apply restrictions based on water level triggers and zone limits/intensity rules to limit licences and trades within a localised area. Groundwater level and salinity monitoring prescriptions are also included in these WSPA plans to monitor the groundwater resources. Victoria will continue to work with New South Wales to explore joint management arrangements for addressing the impacts of groundwater extraction in one state, on other uses across the border.

<<end of accredited text for s10.05(b) of the Basin Plan>>



The background of the slide is a photograph of a forest fire. In the foreground, there are dark, silhouetted branches of evergreen trees. In the background, a dense forest of tall, thin trees is visible, with bright orange and yellow flames rising from the ground and catching on the lower branches. The sky is a hazy, light blue-grey color. Overlaid on the right side of the image are two large, solid-colored triangles: a dark blue one at the top and a teal one below it, both pointing towards the left.

Chapter 5. Challenges for water planning, management and use (the risk assessment)



5. Challenges for water planning, management and use (the risk assessment)

This chapter outlines the current and future risks to the availability and condition of water resources in Victoria's North and Murray water resource plan area. These were identified through the risk assessment that was completed to meet the requirements of Part 9 of Chapter 10 of the Basin Plan.

5.1 Victoria's approach to the risk assessment

Water resource plans must take into account current and future risks to the condition and continued availability of water in Victoria's share of the Murray-Darling Basin. The plans must identify these risks and describe how the risks assessed as medium or high will be managed.

The Basin Plan describes the requirements for determining risk. Under the provisions of the Basin Plan the risk assessment must consider risks relating to:

- water availability and condition for economic, social, cultural, Indigenous and other public benefit values
- water not being of a suitable quality for use including salinity
- environmental water requirements for priority environmental assets and ecosystem functions (identified in Victoria's long-term watering plans) and the health of water-dependent ecosystems
- groundwater systems (including structural damage and groundwater / surface water connections)
- interception activities
- water quality degradation
- extreme events

5.1.1 Conducting the risk assessment

Victoria carried out a comprehensive risk assessment to assess current and future risks over the life of the water resource plan. The assessment took place over a 12-month period and was overseen by an expert advisory panel of key stakeholders, including water corporations, catchment management authorities and technical experts.

The assessment examined risks in a consistent, structured and transparent way across each Victorian water resource plan area. It used the same method for all areas while recognising regional differences.

Risks were assessed taking into account Victoria's comprehensive water management arrangements and influencing factors like environmental management, land use planning and emergency management to determine the residual risks. The assessment has also been based on the assumption that the Basin Plan is in place and that the Basin Plan does not in itself represent or impose a threat to the continued availability and condition of the water resources.

The approach for the risk assessment aligns with international and national standards, assessing risk as the product of the likelihood and consequence of a threat impacting on an asset. The flexible method used for the assessment means it can be updated as new risks emerges and conditions change.

In addressing the risks, water resource plans must describe the risk and the factors that contribute to those risks. Adequate information must be, and has been, captured in the data gathering process to enable the development of a description of the risk and the factors contributing to the risks. The risks and the factors that have contributed to these risks and the assumptions underlying the risk assessment have been set out in [Appendix B](#).

5.1.1.1 Assessing risks – causes, threats and uses of water

Risks were assessed based on the requirements of International Organisation for Standardisation -ISO 31000:2009 as required by the Basin Plan. Combining a number of factors such as causes, threats and beneficial uses and testing these across different future scenarios allowed risk levels to be determined. Developed scenarios cover a range of possible future situations and are not 'forecasts' of a most likely future. Instead they are useful for contingency planning and system stress testing.

Risk levels - ranging from no plausible risk to very high - were determined as a product of likelihood and the consequence of a risk occurring. When considering the consequence of the risk occurring, it was done on a water resource plan scale rather than on a local scale.

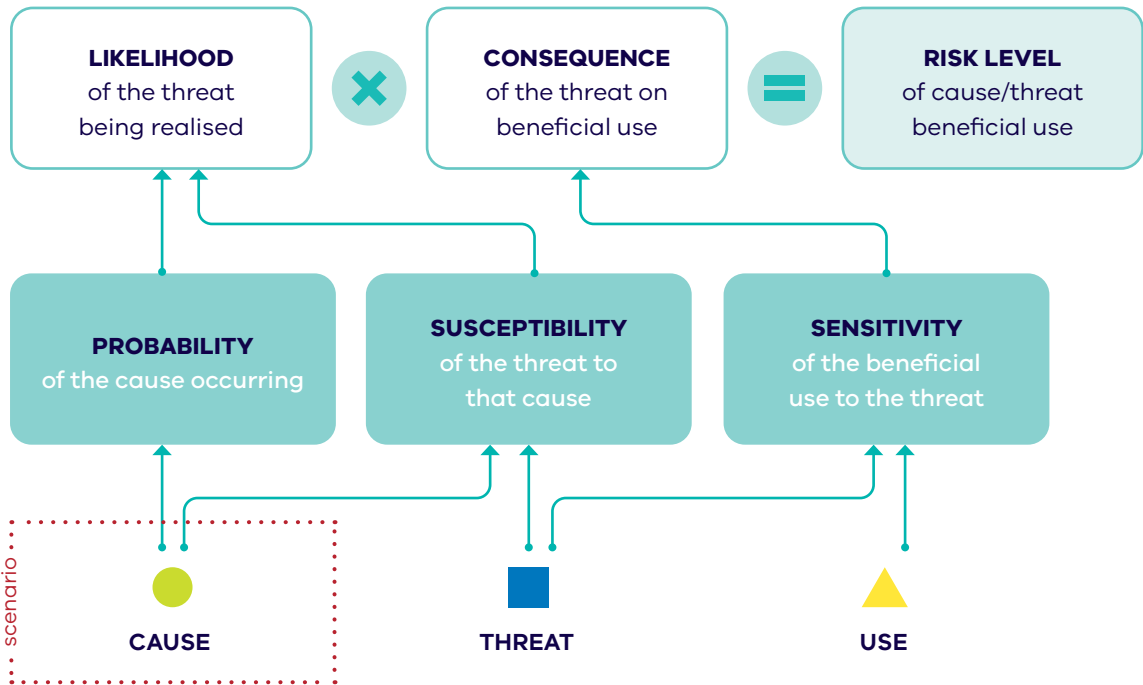


Figure 5-1: The risk assessment process

Worked example

A cause (e.g. extreme drought) may result in a threat (e.g. decline in water availability) that impacts on a use (e.g. consumptive use) of water.

A summary of the identified causes, threats and beneficial uses considered in the risk assessment is set out in [Table 5-1](#).

The risk assessment included:

- 16 separate causes and scenarios
- 13 threats
- 37 beneficial water use categories

Table 5-1: Summary of the identified causes, threats and beneficial uses considered in the risk assessment

 CAUSE	 THREAT	 USE
An event or events that can lead to a threat.	A deviation from an agreed starting point that may affect beneficial uses.	The water resource plans protect the 'condition and continued availability' of Basin water resources for beneficial uses.

● CAUSE	■ THREAT	▲ USE
Causes considered in this assessment: - climate change - extreme drought - extreme wet periods - flooding - land use change (affecting availability) - land use change (affecting condition) - farm dams - bushfires - increased utilisation of water access rights - increase in the number of rights and volume of entitlements - non-compliance with the <i>Water Act 1989</i> - changes to timing and location of demands - earth resource extraction - failure to continue to invest in best practice land use initiatives - point source discharges - major asset failures - pest animals and weeds	Threats are: - adverse changes in the volume or pattern of water - continuation or changes in water quality that renders it not fit for purpose Threats considered in this assessment to: Availability Surface water: - reduction in volume - changes to seasonal pattern - changes to the interannual pattern Groundwater: - decline in inflow to the aquifer - adverse change to the seasonal pattern of inflow to the aquifer - condition of the (water) resource Water quality: - elevated levels of salinity - elevated levels of suspended sediment and/or nutrients - elevated levels of toxicants (pesticides, herbicides, heavy metals, hydrocarbons) - pathogens (giardia, cyanobacteria) - other (water temperature, pH and/or dissolved oxygen) Structural form of priority environmental assets - wetlands and rivers: - longitudinal connectivity - lateral connectivity - instream physical habitat Structural form of aquifers	Beneficial uses have been assessed in terms of: - consumptive uses - environmental uses - social/recreational uses, and - indigenous/Aboriginal uses These beneficial uses have been assessed based on assessment of risk to: - surface water availability based on categories that define the legal entitlement or right to water - groundwater availability based on categories that reflect the physical attributes of the aquifer from which water is derived - water quality condition based on the State Environment Protection Policy (Waters)¹ beneficial use categories

¹ -The State Environment Protection Policy (Waters of Victoria) was originally in place when the risk assessment was completed, it defined the beneficial uses which are used in this risk assessment. The policy has since been replaced with the State Environment Protection Policy (Waters) which continues to use the same beneficial uses.

5.2 Risks identified in the water resource plan areas

Risk assessment results summary

More than 95 percent of the high and medium risks identified by the risk assessment were found to be associated with:

- causes such as climate change, extreme drought, and land use practices if there is a failure to proceed with existing strategies and improved management programs
- threats such as suspended sediment and nutrients, salinity, other water quality issues and a reduction in the volume of water available
- lack of information about the availability (or absence) of water for Aboriginal use, either for cultural flows or for Aboriginal environmental outcomes as proposed by the Murray-Darling Basin Authority

These causes and threats usually have a negative impact on all water uses. However lack of information about the availability or absence of water for Aboriginal cultural uses was assessed as having significantly more risks than any other beneficial use. This arises because there is limited information to determine how Aboriginal cultural uses of water might be affected by changes in water resources. For example, Aboriginal cultural uses of water may be affected by salinity but there is no information available on which to base this relationship. As a consequence, Aboriginal uses of water were assumed to have a very high sensitivity to any changes to surface water or groundwater.

A description of causes and threats which generate the majority of risks is provided in **Table 5-2**.

Table 5-2: Summary description of causes and threats which generate the majority of risks across all water resource plan areas

 CAUSE	Climate change	Climate change was found to be a common cause of risk across all water resource plan areas. The high level of risk was associated with its very high probability of occurring, and when climate change occurs, it typically impacts over wide spatial areas and for periods that extended over the life of the water resource plan and beyond. Climate change was identified as a risk to both the availability and condition of water resources.
	Extreme drought	Extreme drought was found to be a common cause of risk. Although extreme drought has a lower likelihood than climate change of occurring within the life of the water resource plans, the risk typically had higher magnitudes of impact on water availability and condition, with a similar span and extent to climate change.
	Failure to continue to invest in best practice land use initiatives	Existing land use practices were found to be a common cause of risk. These risks are associated with the end of support for existing programs to improve catchment and waterway management. Stopping support for programs of waterway and catchment management would result in failure of significant past investment in soil conservation works and failure to address existing barriers to fish passage and other land and waterway management issues.
	Land use – future changes	Potential changes to land use could impact on the condition of the water resource which generates a number of medium to very high risks in both surface water and groundwater water resource plan areas. These land use changes include increased dairy production and increased cropping. These have the potential to increase sediment and nutrient loads in waterways and toxicant impacts on groundwater.
	Earth resource development	Earth resource development was found to be a cause of risk in the Northern Victoria surface water resource plan area. This risk was associated with sand and gravel extractions from the floodplain of the mid Goulburn River (groundwater). Cessation of mining and associated groundwater pumping (e.g. in the Bendigo area) was found to be a significant localised risk in the Goulburn-Murray water resource plan area.
	Changes to the timing and location of demands	Changes to the timing and location of water demands were found to have very high risks in the water resource plan areas that cover surface water. These risks are associated with changing demands associated with agricultural and environmental water deliveries and the potential impact of these deliveries on rivers and wetlands.

 THREAT	Water availability - reduction in volume of water	The risk assessment showed that a decline in surface water volumes is a significant and common threat across the surface water areas. A decline in inflow to aquifers or an adverse increase in inflow were also identified as a significant threat to groundwater resources.
	Water condition - salinity	Salinity was found to be a common threat across water resource plan areas. Salinity is an issue linked to both extreme wet periods (rising salinity) and extreme dry periods (saline pools in river systems).
	Water condition - suspended sediment and nutrients	Suspended sediments and nutrients were identified as a common threat to the water resources of the surface water resource plan areas. The threat arises from many causes including climate change, extreme wet periods, extreme drought, bushfire and change in land use.
	Water condition - toxicants	Increasing toxicant levels have been identified as a potential risk to the groundwater resources. The risks could arise from earth resource development, point source discharges and changes to land use.
	Water condition - adverse change in the seasonal pattern of inflow to aquifers	As a result of climate change and extreme drought, adverse changes to the inflow of water to aquifers was identified as a common threat to the beneficial use of groundwater. Higher temperatures and extended periods of low rainfall can result in increased evapotranspiration and reduced infiltration, resulting in a decline in inflow to aquifers.

5.2.1 Description of risks

The Basin Plan requires all the identified risks (cause and threats) to be listed in the water resource plan. A list has been provided in table form in [Appendix B, Section 2.1](#) of [Appendix B](#) refers to the Northern Victoria water resource plan area, [Section 2.2](#) refers to the Goulburn-Murray water resource plan area and [Section 2.3](#) to the Victorian Murray water resource plan area. Supporting tables also assess the quantified uncertainty of each risk.

Almost 900 potential risks are included in these tables. A hierarchical structure has been adopted to manage the analysis and management of these risks. Importantly, this hierarchical structure did not result in the arbitrary exclusion of risks. The approach adopted has enabled detailed analysis of specific risks and grouping of risks into themes that allows broad analysis of issues.

The water resource plans must either describe a strategy to address medium, high and very high risks or explain why any such risk cannot be addressed in a water resource plan. For these risks there are a number of strategies to manage the risk and these are described in [Table 4.2.1](#) of [Appendix B](#).

5.3 Summary – Northern Victorian water resource plan area (surface water)

A total of 130 consolidated risks were identified for environment, consumptive, social and Indigenous uses assessed against water availability, structural form and condition (water quality) in the Northern Victoria water resource plan area. Of these, 87 were identified as medium to very high risk.

Causes associated with the highest occurrence of medium to very high risk were:

- climate change
- extreme drought
- failure to continue to invest in best practice land use initiatives
- farm dams
- major asset failure
- pests and weeds

5.3.1 Water availability

Water availability was assessed in terms of the form of legal entitlement to the surface water (see [Table 5-3](#)).

Climate change was the only cause of risk that generated **very high risks** to water availability for environmental and consumptive uses. Extreme drought caused **high risk** to environmental and consumptive uses.

The risk assessment found that climate change could trigger a reduction in volume of water and a change to seasonal pattern (threats) which would have a **very high risk** for the environment's low reliability and uncontrolled (above cap) water. A reduction in volume (threat) would also be a **high risk** to the environment's high reliability water.

The risk assessment found extreme drought could trigger a reduction in volume of water (threat) would be a **high risk** for the environment's low reliability and uncontrolled (above cap) water, and could trigger a change to interannual patterns (threat) and would have a **high risk** for the environment's uncontrolled (above cap) water.

The risk assessment found that climate change could trigger a reduction in volume of water (threat) and a change to seasonal pattern (threat) which would have a **very high risk** for the consumptive use of low reliability water and section 51 licences. A reduction in volume would also have a **high risk** to consumptive uses of high reliability water, section 51 licences and section 8 stock and domestic rights. A change to seasonal pattern (threat) would also have a **high risk** to consumptive uses of section 8 stock and domestic rights.

The risk assessment found extreme drought could trigger a reduction in volume of water (threat) which would be a **high risk** for consumptive uses of low reliability water, and could trigger a change to interannual patterns (threat) and would have a **high risk** for consumptive uses for section 51 licence and section 8 stock and domestic rights.

Table 5-3: Northern Victoria water resource plan area summary of risks to availability of surface water

Cause	Threat	Use									
		Environmental					Consumptive				
		High reliability	Low reliability	Controlled water – passing flows	Uncontrolled water – above cap water	Very high reliability	High reliability	Low reliability	System operating water	S51 licences	S8 stock and domestic
Climate change	Reduction in volume										
	Change to seasonal pattern										
	Change to interannual pattern										
Extreme drought	Reduction in volume										
	Change to seasonal pattern										
	Change to interannual pattern										
Bushfires	Reduction in volume										
	Reduction in volume										
Land use change: availability	Reduction in volume										
	Reduction in volume										

Cause	Threat	Use									
		Environmental					Consumptive				
		High reliability	Low reliability	Controlled water – passing flows	Uncontrolled water – above cap water	Very high reliability	High reliability	Low reliability	System operating water	S51 licences	S8 stock and domestic
Farm dams	Reduction in volume										
Timing and location of demands	Change to seasonal pattern										
Major asset failure	Change to seasonal pattern										

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.3.2 Water quality (condition)

Water quality assessments were based on the beneficial uses and users of water established in Victoria's State Environment Protection Policy (Waters for Victoria) which was originally in place when the risk assessment was completed. It has since been replaced with the State Environment Protection Policy (Waters) (EPA, 2018) which continues to use the same beneficial uses.

The risk assessment (see [Table 5-4](#)) found that climate change could trigger pathogens (threat) and other impacts on water quality (threat), and earth resource development could trigger toxicants (threat) and these would have a **very high risk** for environmental uses.

The risk assessment found climate change could trigger salinity and suspended solids and nutrients (threats), extreme drought could trigger toxicants and pathogens (threats) and earth resource development could trigger salinity (threats), and failure to continue to invest in best practice land use initiatives could trigger salinity, suspended solid and nutrients and pathogens (threats) and pest and weeds could trigger suspended solids and nutrients (threat) all which would have a **high risk** for environmental uses.

The risk assessment found that climate change could trigger pathogens (threat) and would be a **very high risk** for consumptive users including the use of water for human drinking, agriculture and irrigation, aquaculture and fish and crustacean consumption. Climate change could also trigger other water quality impacts (threat) and would be a **very high risk** for consumptive users including the use of water for agriculture and irrigation, aquaculture and human consumption of fish and crustaceans.

The risks assessment found that earth resource development could trigger toxicants (threat) and would have a **very high risk** for consumptive users including the use of water for human drinking, agriculture and irrigation, aquaculture and fish and crustacean consumption.

The risk assessment found that climate change could trigger salinity and suspended solids and nutrients (threats) and would be a **high risk** for consumptive users including the use of water for agriculture and irrigation, and fish and crustacean consumption.

The risk assessment found that extreme drought could trigger toxicants and pathogens (threats) and would be a **high risk** for consumptive users including the use of water for agriculture and irrigation, aquaculture.

The risk assessment found that extreme wet could trigger suspended solids and nutrients (threats) and would be a **high risk** for consumptive users including the use of water for human drinking, agriculture and irrigation, aquaculture, and fish and crustacean consumption.

The risk assessment found that failure to continue to invest in best practice and use initiatives could trigger salinity, suspended solids and nutrients and pathogens (threats) and would be a **high risk** for consumptive users including the use of water for human drinking, agriculture and irrigation, aquaculture, and fish and crustacean consumption.

The risk assessment found pests and weeds could trigger suspended solids and nutrients (threat) and would have a **high risk** for consumptive users including water for human drinking, agriculture and irrigation, aquaculture, and fish and crustacean consumption.

The risk assessment found that earth resource development could trigger salinity and toxicants (threat) and would be a **high risk** for consumptive users including the use of water for human drinking agriculture and irrigation, and fish and crustacean consumption.

Social uses were categorised as primary contact recreation (for example swimming) secondary contact recreation (for example fishing) and aesthetics. The risk assessment found that climate change could trigger pathogens (threat) and other impacts on water quality (threat), and earth resource development could trigger toxicants (threat) and these would have a **high to very high risk** for primary and secondary contact recreation, and pathogens (threat) is a **very high risk** for aesthetics.

The risk assessment found that failure to continue to invest in best practice and use initiatives could trigger pathogens (threat) and would be a **high risk** for primary contact recreation.

Table 5-4: Northern Victoria water resource plan area summary of risks to water quality (condition) of surface water

Cause	Threat	Use								
		Environment	Consumptive				Social			
		Environment	Human drinking	Agriculture and irrigation	Aquaculture	Industry and commercial	Fish, crustaceans consumption	Primary contact recreation	Secondary contact recreation	Aesthetics
Climate change	Salinity									
	Suspended solids and nutrients									
	Toxicants									
	Pathogens									
	Other water quality impacts									
Extreme drought	Suspended solids and nutrients									
	Toxicants									
	Pathogens									
	Other water quality impacts									
	Salinity									
Extreme wet	Suspended solids and nutrients									

Cause	Threat	Use									
		Environment	Consumptive			Aquaculture	Industry and commercial	Fish, crustaceans consumption	Social		
		Environmental	Human drinking	Agriculture and irrigation					Primary contact recreation	Secondary contact recreation	Aesthetics
Bushfires	Suspended solids and nutrients										
	Other water quality impacts										
Land use change: condition	Salinity										
	Suspended solids and nutrients										
Failure to continue to invest in best practice land use initiatives	Salinity										
	Suspended solids and nutrients										
	Pathogens										
	Other water quality impacts										
	Salinity										
Farm dams	Suspended solids and nutrients										
	Other water quality impacts										
	Salinity										

Cause	Threat	Use								
		Environment	Consumptive						Social	
		Environmental	Human drinking	Agriculture and irrigation	Aquaculture	Industry and commercial	Fish, crustaceans consumption	Primary contact recreation	Secondary contact recreation	Aesthetics
Increased utilisation of water access rights	Salinity									
	Suspended solids and nutrients									
Non-compliance with the Water Act 1989	Salinity									
	Suspended solids and nutrients									
	Other water quality impacts									
Timing and location of demands	Other water quality impacts									
	Salinity									
Earth resource development	Suspended solids and nutrients									
	Toxicants									
	Salinity									
Major asset failure	Other water quality impacts									

Cause	Threat	Use									
		Consumptive					Social				
		Environmental	Human drinking	Agriculture and irrigation	Aquaculture	Industry and commercial	Fish, crustaceans consumption	Primary contact recreation	Secondary contact recreation	Aesthetics	
Pests and weeds	Suspended solids and nutrients										
	Other water quality impacts										

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.3.3 Social (recreational and amenity) and Aboriginal uses

Risks to recreational and amenity and Aboriginal cultural values were assessed in terms of the risks associated with both the condition/quality of water available for these purposes and the availability of water for these functions.

The social, environmental, and consumptive uses of water are relatively well understood as water resource planning concepts. However, Aboriginal uses of water are not as well understood which is why a large number of risks have been generated at this stage in the risk assessment.

Climate change, and extreme drought were identified as having **medium, high** or **very high** level risk to recreational and amenity because of the threats associated with declines in water availability.

Climate change generated **very high risks** associated with impact to Aboriginal cultural uses of water with regard to:

- reduction in volume
- changes to seasonal patterns
- salinity
- suspended solids and nutrients
- pathogens
- other water quality impacts
- loss or decline in longitudinal connectivity
- loss or decline in lateral connectivity
- loss or decline in instream physical habitat

Earth resource development also generated very **high risks** to Aboriginal cultural values with regard to salinity, toxicants and a loss or decline in instream physical habitat.

All other causes generated some medium or high risks to condition and availability of water for Aboriginal cultural values.

5.3.4 Environmental uses

Under the Risk Assessment (see [Appendix B](#)) environmental use was considered a beneficial use. Environmental use was assessed against surface water availability based on defined legal entitlements, groundwater availability, water quality conditions based on State Environment Protection Policy (Waters)¹ for beneficial use categories (water quality), and structural form of the surface water resources based on priority environmental assets (wetlands and rivers).

Surface water availability considers environment and form of access to water based on:

- high-reliability bulk or environmental entitlements
- low-reliability bulk or environmental entitlements
- controlled water (passing flows)
- uncontrolled water (above cap water) (see [Table 1.4.1](#) of [Appendix B](#))

Groundwater availability risks are considered in relation to Goulburn-Murray: Shepparton Irrigation Region SDL resource unit, Goulburn-Murray: Sedimentary Plains SDL resource unit and Goulburn-Murray: Highlands SDL resource unit, and consideration was taken around environmental water needs described in groundwater management plans (see [Table 1.4.2](#) and [Table 1.4.3](#) of [Appendix B](#)).

SEPP (Waters) beneficial uses considered water quality for environmental/aquatic ecosystems in three categories, largely unmodified, slightly to moderately modifies and highly modified (see [Table 1.4.4](#) of [Appendix B](#)), and risks to the structural form were assessed against priority

¹ At the time of preparation of the Risk Assessment the State Environment Protection Policy (Waters of Victoria) was in place, it has since been superseded by State Environment Protection Policy (Waters) which maintains the same beneficial uses

environmental assets and priority environmental functions, these were identified under the category "rivers" and "wetlands" (see [Table 1.4.5](#) of [Appendix B](#)).

For the purpose of this risk assessment the beneficial uses associated with the structural form of the water resource includes the two categories, rivers and wetlands. These categories were used to assess the risk to longitudinal connectivity, lateral connectivity and instream physical habitat (structural form) of priority environmental assets and priority ecosystem functions identified in the long-term environmental watering plans. See also [Table 4](#) and [Table 7](#) of [Appendix E](#) for a list of priority environmental assets and priority ecosystem functions. See [Table 1.3.1](#) of [Appendix B](#) for how the matters relevant to sections 10.17, 10.18, 10.19 and 10.20 of the Basin Plan were defined.

The risk assessment found that climate change generated **high** and **very high risks** with regard to the environmental health of rivers and wetlands including, loss or decline in longitudinal connectivity, loss or decline in lateral connectivity and loss or decline in instream physical habitat for rivers and wetlands.

The risk assessment found that earth resource development causing a loss or decline in instream physical habitat is **very high risk**, and the changes to the timing and location of demands causing a loss or decline in instream physical habitat is also **very high risk** for rivers and wetlands (see [Table 5-5](#)).

The risk assessment found that extreme drought causing a loss or decline in longitudinal connectivity (threat) is **high risk** for rivers, and extreme drought causing a loss or decline in lateral connectivity (threat) is **high risk** for wetlands.

The risk assessment found that changes to the timing and location of demands causing a loss or decline in instream physical habitat (threat) is **very high risk** for rivers and wetlands.

Table 5-5: Northern Victoria water resource plan area summary of risks to priority environmental assets

Cause	Threat	Rivers	Wetlands
Climate change	Loss or decline in longitudinal connectivity		
	Loss or decline in lateral connectivity		
	Loss or decline in instream physical habitat		
Extreme drought	Loss or decline in longitudinal connectivity		
	Loss or decline in lateral connectivity		
	Loss or decline in instream physical habitat		
Failure to continue to invest in best practice land use initiatives	Loss or decline in longitudinal connectivity		
	Loss or decline in lateral connectivity		
	Loss or decline in instream physical habitat		
Earth resource development	Loss or decline in longitudinal connectivity		
	Loss or decline in instream physical habitat		
Pests and weeds	Loss or decline in longitudinal connectivity		
	Loss or decline in instream physical habitat		
Changes to the timing and location of demands	Loss or decline in instream physical habitat		

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.4 Summary - Victorian Murray water resource plan area (surface water)

A total of 124 consolidated risks were identified for environment, consumptive, social and Indigenous uses assessed against water availability, structural form and condition (water quality) in the Victorian Murray water resource plan area. Of these, 78 were identified as medium to very high risk.

Causes associated with the occurrence of medium to very high risk were:

- climate change
- extreme drought
- failure to continue to invest in best practice land use initiatives
- farm dams
- major asset failure
- pests and weeds

5.4.1 Water availability

Water availability was assessed in terms of the form of legal entitlement to the surface water (see [Table 5-6](#)).

Climate change was the only cause of risk that generated **very high risks** to water availability for environmental and consumptive uses. Extreme drought caused **high risk** to environmental and consumptive uses.

The risk assessment found that climate change could trigger a reduction in volume of water (threat) which would have a very high risk for the environment's low reliability and uncontrolled (above cap) water. The risk assessment found that climate change could trigger a change to seasonal pattern (threat) which would have a **very high risk** for the environment's uncontrolled (above cap) water. A reduction in volume (threat) would also be a **high risk** to the environment's high reliability water.

The risk assessment found extreme drought could trigger a reduction in volume of water (threat) which would be a **high risk** for the environment's low reliability and uncontrolled (above cap) water, and could trigger a change to interannual patterns and would have a **high risk** for the environment's uncontrolled (above cap) water.

The risk assessment found that climate change could trigger a reduction in volume of water (threat) and a change to seasonal patterns (threat) which would have a **very high risk** for the consumptive use of low reliability water and section 51 licences. A reduction in volume would also have a **high risk** to consumptive uses of high reliability water, section 51 licences and section 8 stock and domestic rights. A change to seasonal pattern (threat) would also have a **high risk** to consumptive uses of section 8 stock and domestic rights.

The risk assessment found extreme drought could trigger a reduction in volume of water (threat) and would be a **high risk** for consumptive uses of low reliability water, and could trigger a change to interannual patterns and would have a **high risk** for consumptive uses for section 51 licence and section 8 stock and domestic rights.

Table 5-6: Victorian Murray water resource plan area summary of risks to availability of surface water

Cause	Threat	Use									
		Environment					Consumptive				
		High reliability	Low reliability	Controlled water – passing flows	Uncontrolled water – above cap water	Very high reliability	High reliability	Low reliability	System operating water	S51 licences	S8 stock and domestic
Climate change	Reduction in volume										
	Change to seasonal pattern										
	Change to interannual pattern										
Extreme drought	Reduction in volume										
	Change to seasonal pattern										
	Change to interannual pattern										
Bushfires	Reduction in volume										
Land use change: availability	Reduction in volume										

Cause	Threat	Use									
		Environment					Consumptive				
		High reliability	Low reliability	Controlled water – passing flows	Uncontrolled water – above cap water	Very high reliability	High reliability	Low reliability	System operating water	S51 licences	S8 stock and domestic
Farm dams	Reduction in volume										
	Change to seasonal pattern										
	Change to interannual pattern										

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.4.2 Water quality (condition)

Water quality assessments were based on the beneficial uses and users of water established in Victoria's State Environment Protection Policy (Waters for Victoria) which was originally in place when the risk assessment was completed. It has since been replaced with the State Environment Protection Policy (Waters) (EPA, 2018) which continues to use the same beneficial uses.

The risk assessment (see [Table 5-7](#)) found that climate change could trigger pathogens and other impacts on water quality (threats), and these would have a **very high risk** for environmental uses.

The risk assessment found extreme drought could trigger pathogens (threat) and failure to continue to invest in best practice land use initiatives could trigger salinity, suspended solid and nutrients and pathogens (threats), and pests and weeds could trigger suspended solids and nutrients (threat) all which would have a **high risk** for environmental uses.

The risk assessment found that climate change could trigger pathogens (threat) and would be a **very high risk** for consumptive users including the use of water for human drinking, agriculture and irrigation, aquaculture, and fish and crustacean consumption. Climate change could also trigger other water quality impacts (threat) and would be a **very high risk** for consumptive users including the use of water for agriculture and irrigation, aquaculture and human consumption of fish and crustaceans.

The risk assessment found that climate change could trigger other water quality impacts (threats) and would be a **high risk** for consumptive users including the use of water for drinking.

The risk assessment found that extreme drought could trigger pathogens (threat) and would be a **high risk** for consumptive users including the use of water for human drinking, aquaculture and fish and crustacean consumption.

The risk assessment found that failure to continue to invest in best practice and use initiatives could trigger salinity, suspended solids and nutrients and pathogens (threats) and would be a **high risk** for consumptive users including the use of water for human drinking, agriculture and irrigation, aquaculture, and fish and crustacean consumption.

The risk assessment found pests and weeds could trigger suspended solids and nutrients (threat) and would have a **high risk** for consumptive users including water for human drinking, agriculture and irrigation, aquaculture, and fish and crustacean consumption.

Social uses were categorised as primary contact recreation (for example swimming) secondary contact recreation (for example fishing) and aesthetics. The risk assessment found that climate change could trigger pathogens (threat) and other impacts on water quality (threat), and these would have a **high to very high risk** for primary and secondary contact recreation, and pathogens (threat) is a **very high risk** for aesthetics.

The risk assessment found extreme drought and a failure to continue to invest in best practice land use initiatives could cause pathogens (threat) which would be a **high risk** for primary contact recreation.

Table 5-7: Victorian Murray water resource plan area summary of risks to condition of surface water

Cause		Threat										
			Environment	Consumptive				Social				
			Environmental	Human drinking	Agriculture and irrigation	Aquaculture	Industry and commercial	Fish, crustaceans consumption	Primary contact recreation	Secondary contact recreation	Aesthetics	
Climate change	Salinity											
	Suspended solids and nutrients											
	Toxicants											
	Pathogens											
	Other water quality impacts											
Extreme drought	Pathogens											
	Other water quality impacts											
Extreme wet	Salinity											
	Suspended solids and nutrients											
Bushfires	Suspended solids and nutrients											
	Other water quality impacts											

Cause	Threat										
		Environment	Consumptive				Social				
		Environmental	Human drinking	Agriculture and irrigation	Aquaculture	Industry and commercial	Fish, crustaceans consumption	Primary contact recreation	Secondary contact recreation	Aesthetics	
Failure to continue to invest in best practice land use initiatives	Salinity										
	Suspended solids and nutrients										
	Pathogens										
	Other water quality impacts										
Farm dams	Salinity										
	Suspended solids and nutrients										
Non-compliance with the Water Act 1989	Suspended solids and nutrients										
Timing and location of demands	Salinity										
	Salinity										
Earth resource development	Salinity										
	Toxicants										
Major asset failure	Other water quality impacts										

Cause	Threat										
		Environment	Consumptive				Social				
		Environmental	Human drinking	Agriculture and irrigation	Aquaculture	Industry and commercial	Fish, crustaceans consumption	Primary contact recreation	Secondary contact recreation	Aesthetics	
Pests and weeds	Suspended solids and nutrients										
	Other water quality impacts										

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.4.3 Social (recreational and amenity) and Aboriginal uses

Risks to recreational and amenity and Aboriginal cultural values were assessed in terms of the risks associated to both the condition/quality of water available for these purposes and the availability of water for these functions.

The social, environmental, and consumptive uses of water are relatively well understood as water resource planning concepts. However, Aboriginal uses of water are not as well understood which is why a large number of risks have been generated at this stage in the risk assessment.

Climate change generated **very high risks** associated with impact to Aboriginal cultural uses of water with regard to:

- reduction in volume
- change to seasonal pattern
- salinity
- pathogens
- other water quality impacts

Climate change and extreme drought also posed **medium or high risks** to recreational and amenity uses because of threats associated with declines in water availability. Changes to seasonal patterns of inflows posed these risks only with regard to climate change.

5.4.4 Priority environmental assets

Under the Risk Assessment (see [Appendix B](#)) environmental use was considered a beneficial use. Environmental use was assessed against surface water availability based on defined legal entitlements, groundwater availability, water quality conditions based on State Environment Protection Policy (Waters)² for beneficial use categories (water quality), and structural form of the surface water resources based on priority environmental assets (wetlands and rivers).

Surface water availability considers environment and form of access to water based on:

- high-reliability bulk or environmental entitlements
- low-reliability bulk or environmental entitlements
- controlled water (passing flows)
- uncontrolled water (above cap water) (see [Table 1.4.1](#) of [Appendix B](#))

Groundwater availability risks are considered in relation to Goulburn-Murray; Shepparton Irrigation Region SDL resource unit, Goulburn-Murray; Sedimentary Plains SDL resource unit and Goulburn-Murray; Highlands SDL resource unit, and consideration was taken around environmental water needs described in groundwater management plans (see [Table 1.4.2](#) and [Table 1.4.3](#) of [Appendix B](#)).

SEPP (Waters) beneficial uses considered water quality for environmental/aquatic ecosystems in three categories, largely unmodified, slightly to moderately modifies and highly modified (see [Table 1.4.4](#) of [Appendix B](#)), and risks to the structural form were assessed against priority environmental assets and priority environmental functions, these were identified under the category "rivers" and "wetlands" (see [Table 1.4.5](#) of [Appendix B](#)).

For the purpose of this risk assessment the beneficial uses associated with the structural form of the water resource includes the two categories, rivers and wetlands. These categories were used to assess the risk to longitudinal connectivity, lateral connectivity and instream physical habitat (structural form) of priority environmental assets and priority ecosystem functions identified in the long-term environmental watering plans. See also [Table 4](#) and [Table 7](#) of [Appendix E](#) for a list of priority environmental assets and priority ecosystem functions. See [Table 1.3.1](#) of [Appendix B](#)

² At the time of preparation of the Risk Assessment the State Environment Protection Policy (Waters of Victoria) was in place, it has since been superseded by State Environment Protection Policy (Waters) which maintains the same beneficial uses

for how the matters relevant to sections 10.17, 10.18, 10.19 and 10.20 of the Basin Plan were defined.

The risk assessment found that changes to the timing and location of demands causing a loss or decline in instream physical habitat (threat) is **very high risk** for rivers and wetlands (see [Table 5-8](#)).

Climate change, extreme drought, failure to continue to invest in best practice land use initiatives and pests and weeds generated **medium risks** to the health of rivers and wetlands in the Victorian Murray water resource plan area.

Table 5-8: Victorian Murray water resource plan area risks to priority environmental assets

Cause	Threat	Rivers	Wetlands
Climate change	Loss or decline in longitudinal connectivity		
	Loss or decline in lateral connectivity		
	Loss or decline in instream physical habitat		
Extreme drought	Loss or decline in longitudinal connectivity		
	Loss or decline in lateral connectivity		
Failure to continue to invest in best practice land use initiatives	Loss or decline in longitudinal connectivity		
	Loss or decline in lateral connectivity		
	Loss or decline in instream physical habitat		
Pests and weeds	Loss or decline in longitudinal connectivity		
	Loss or decline in instream physical habitat		
Changes to the timing and location of demands	Loss or decline in instream physical habitat		

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.5 Summary – Goulburn-Murray water resource plan area (groundwater)

A total of 68 consolidated risks were identified for environment, consumptive, social and Indigenous uses against water availability, structural form and condition (water quality) in the Goulburn-Murray groundwater water resource plan area. Of these, 34 were identified as **medium to very high risk**.

Causes associated with the high occurrence of moderate to **very high risk** were:

- climate change
- extreme drought
- land use change: availability
- land use change: condition
- earth resource development
- point source discharges
- major asset failure

5.5.1 Water availability

Groundwater availability was assessed in terms of the biophysical attributes of the aquifer (see [Table 5-9](#)).

Climate change was the only cause of risk that generated **very high risks** to water availability for environmental and consumptive uses.

The risk assessment found that climate change could trigger a decline in inflow to, or increase in extraction from, aquifers (threat) in the upland layered valley and uplands which would have **very high risks** for environment and consumptive uses, and would have **high risks** for basin margin shallow for environment and consumptive uses and **high risk** for basin margin deep for consumptive use.

The risk assessment found that climate change could trigger an adverse change to the seasonal pattern of inflow to, or extraction from, aquifers (threat) in the basin margin shallow, upland layered valley and uplands which would have **very high risks** for environment and consumptive uses, and would have **high risks** for basin margin deep for consumptive uses.

Table 5-9: Goulburn-Murray groundwater water resource plan area summary of risks to availability

Cause	Threat	Use								
		Environment					Consumptive			
		Basin margin deep (Goulburn-Murray: deep SDL resource unit)	Basin margin shallow (Goulburn-Murray: Sedimentary Plains SDL resource unit and Goulburn-Murray: Shepparton Irrigation Region SDL resource unit)	Upland layered valley (Goulburn-Murray: Sedimentary Plains SDL resource unit)	Uplands (Goulburn-Murray: Sedimentary Plains SDL resource unit and Goulburn-Murray: Highlands SDL resource unit)		Basin margin deep (Goulburn-Murray: deep SDL resource unit)	Basin margin shallow (Goulburn-Murray: Sedimentary Plains SDL resource unit and Goulburn-Murray: Shepparton Irrigation Region SDL resource unit)	Upland layered valley (Goulburn-Murray: Sedimentary Plains SDL resource unit)	Uplands (Goulburn-Murray: Sedimentary Plains SDL resource unit and Goulburn-Murray: Highlands SDL resource unit)
Climate change	Decline in inflow to, or increase in extraction from, aquifer									
	Adverse change to the seasonal pattern of inflow to, or extraction from, aquifer									
	Salinity									
	Decline in inflow to, or increase in extraction from, aquifer									
Extreme drought										

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.5.2 Water quality (condition)

Groundwater quality (condition) assessments were based on the beneficial uses and users of water established in Victoria's State Environment Protection Policy (Groundwaters for Victoria) which was originally in place when the risk assessment was completed. It has since been replaced with the State Environment Protection Policy (Waters) (EPA, 2018) which continues to use the same beneficial uses.

The risk assessment found that climate change could trigger threats related to increased salinity which poses a **high risk** to the consumptive use of water for agricultural and irrigation and consumption of fish and crustaceans (see [Table 5-10](#)).

Table 5-10: Goulburn-Murray groundwater water resource plan area summary of risks to condition

Cause	Threat	Consumptive				
		Human drinking	Agriculture and irrigation	Aquaculture	Industry/ commercial	Fish, crustaceans consumption
Climate change	Salinity					
Land use change: condition	Salinity					
	Toxicants					
Earth resource development	Salinity					
	Toxicants					
Point source discharges	Salinity					
	Toxicants					

Legend	5	4	3
	Very high risk	High risk	Medium risk

5.5.3 Social (recreational and amenity) and Aboriginal uses

Risks to recreational and amenity and Aboriginal cultural values were assessed in terms of the risks associated to both the condition and quality of water available for these purposes and the availability of water for these functions.

The social, environmental, and consumptive uses of water are relatively well understood as water resource planning concepts. However, Aboriginal uses of water are not as well understood which is why a large number of risks have been generated at this stage in the risk assessment.

Climate change generated **very high risks** associated with impact to Aboriginal cultural uses of water with regard to:

- decline in inflow to, or increase in extraction of water from, aquifers
- adverse change to the seasonal pattern of inflow to, or extraction of water from, aquifers
- salinity

These were followed by **high risk** of extreme drought, land use changes affecting water condition, earth resource development, point source discharges and major asset failure which generated high risks to Aboriginal cultural values of water across a variety of threats.

Climate change also posed **medium risks** with regard to recreational and amenity uses, because of threats associated with declines in water availability and changes to seasonal patterns of inflows to or extraction from aquifers.

5.6 Strategies for addressing medium and higher-level risks

Under the provisions of the Basin Plan, water resource plans are required to address medium or higher-level risks.

In addressing the risks, water resource plans must describe the risks and the factors contributing to those risks. Adequate information must be captured in the data gathering process to develop a description of the risk and the factors contributing to risks for the risk register and the risk assessment.

The tables provided in **Part 3.2**, **Part 3.3** and **Part 3.4** of **Appendix B** provide a description of risks and describe the causes, threats and impact of users/use types.

Under Victorian legislation there is no one 'water resource plan'. Further in addition to the risk assessment undertaken here, Victoria's water resource planning frameworks is carried out through a range of processes, plans and strategies, many of which embed risk management practices. Water resource management in Victoria occurs at a local, catchment, regional and State-wide scale.

Based on the themes identified in the risk assessment, the medium to high-level risks identified will be addressed through continuing development and implementation of existing broad-scale policies and improvement programs identified through *Water for Victoria* (DELWP, 2016) and existing policies and programs.

Addressing risks will be achieved through a combination of state-based policy and program development, collaboration with regional water managers and engagement with regional stakeholders and interstate water planning agencies.

Examples of such planning and policy development include:

- review and enhancement of climate change adaption policy and practice
- review and enhancement of drought management policy and practice
- implementation of updated state-wide water quality policy
- reaffirmation of continued commitment to support existing management programs, including waterway management, soil conservation, forestry management, and dairy, grazing and irrigation management.

Thirty five strategies were identified as part of Victoria's water and catchment management framework. Continued implementation of these strategies will address the risks identified for the availability and condition of water resources.

These strategies combine the policy directions contained and reinforced through *Water for Victoria* (DELWP, 2016) and existing regulations and guidelines, and are identified in **Table 4.2.1** of **Appendix B**. Each medium or high-level risk has been linked to the strategies where they contribute to the management of that risk. All risks are treated by a combination of strategies to reflect Victoria's approach to water resource management.

5.6.1 Surface water risks

Appendix B Part 3.2 identifies the medium or higher-level risks and confidence level and identifies the strategies to address the risk for the Northern Victoria water resource plan area for surface water as follows:

- **Table 3.2.1** to **Table 3.2.9** are related to consumptive uses
- **Table 3.2.10** to **Table 3.2.18** are related to environmental uses
- **Table 3.2.19** to **Table 3.2.28** are related to Aboriginal uses
- **Table 3.2.29** to **Table 3.2.33** are related to recreational uses
- **Table 3.2.34** to **Table 3.2.35** are related to critical human water needs
- **Table 3.2.36** to **Table 3.2.39** are related to priority environmental assets
- **Table 3.2.41** to **Table 3.2.42** are related to interception activities
- **Table 3.2.43** to **Table 3.2.44** are related to non-compliance.

Appendix B Part 3.4 identifies the medium or higher-level risks and confidence level and identifies the strategies to address the risk for the Victorian Murray water resource plan area for surface water as follows:

- **Table 3.4.1** to **Table 3.4.8** are related to consumptive uses
- **Table 3.4.9** to **Table 3.4.16** are related to environmental uses
- **Table 3.4.17** to **Table 3.4.26** are related to Aboriginal uses
- **Table 3.4.27** to **Table 3.4.30** are related to recreational uses
- **Table 3.4.31** to **Table 3.4.32** are related to critical human water needs
- **Table 3.4.33** to **Table 3.4.36** are related to priority environmental assets
- **Table 3.4.38** to **Table 3.4.39** are related to interception activities
- **Table 3.4.40** to **Table 3.4.41** are related to non-compliance.

5.6.2 Groundwater risks

Appendix B Part 3.3 identifies the medium or higher-level risks, confidence level and strategies to address the risk for the Goulburn-Murray water resource plan area (groundwater) as follows:

- **Table 3.3.1** to **Table 3.3.3**: are related to consumptive uses
- **Table 3.3.4**: is related to environmental uses
- **Table 3.3.5**: to **Table 3.3.14** are related to Aboriginal uses
- **Table 3.3.15** is related to recreational uses
- **Table 3.3.16** to **Table 3.3.17** is related to critical human water needs
- **Table 3.3.18** is related to priority environmental assets dependent on groundwater and surface water connections and environmental outcomes relating to groundwater from climate change
- **Table 3.3.19** is related to risks to the productive base of groundwater
- **Table 3.3.21** to **Table 3.3.22** are related to interception
- **Table 3.3.23** to **Table 3.3.24** is related to non-compliance.

5.7 Managing compliance risks - the Basin Compliance Compact

Victoria's water resource compliance and enforcement framework is designed to protect the environment and existing entitlement holders from illegal take and use of water. Non-compliance with the Victorian Water Act includes the unauthorised take and/or use of water or the constructing, altering or operation of works without consent.

The Water Compliance Report 2017–18 (DELWP, 2018) reported 1,625 cases of alleged compliance breaches of the Victorian Water Act in non-urban systems across Victoria. Among others, this included 786 advisory letters and 740 warning notices. Fourteen prosecutions for breaches of the Victorian Water Act were initiated in 2017-18 and 10 prosecutions were finalised during this period.

While Victoria has low levels of water theft, risks to compliance can increase during drought when there is more competition for the available water or where there are constraints on delivering water during peak demand. Demand for water is increasing and we can expect increased competition in the water market. The risk assessment reviewed the risk of non-compliance with the Victorian Water Act, including the unauthorised take and/or use of water or the constructing or altering of works without consent.

The assessment found that there were limited **medium-level risks** associated with non-compliance related to impacts on water condition affecting consumptive, environmental and Aboriginal uses in the Northern Victoria and Victorian Murray water resource plan areas. In the Goulburn-Murray water resource plan area condition risks were limited to Aboriginal uses due to lack of information about these uses.

Risks of non-compliance with the Victorian Water Act to water availability were limited to Aboriginal uses in the Northern Victorian and Victorian Murray water resource plan areas and Goulburn-Murray water resource plan area, again due to the lack of information about these uses. In short, compliance issues are not associated with high levels of risk to other users or the environment at the scale of the water resource plan areas.

However as noted by the Independent Reviewer of the Basin Compliance Compact:

'Public confidence in the management of water in the Murray-Darling Basin has been seriously undermined by a series of reports dating from a Four Corners report in July 2017 of governments failing to adequately enforce compliance and demonstrate integrity in the management of water in the Basin, particularly the northern Basin'.

These incidents highlighted the importance of having effective compliance and enforcement systems across the entire Murray-Darling Basin. Effective compliance helps maintain community confidence in entitlements and water markets as people know that everybody is held to account to the same rules.

Water corporations in Victoria are responsible for administering entitlements, including metering water use and managing compliance. *Water for Victoria* (DELWP, 2016) noted that the compliance and enforcement regime in the Victorian Water Act requires updating and committed the government to modernise the enforcement regime to align with best practice regulation. It noted that water corporations will adopt a consistent risk-based approach to manage compliance and enforcement, with improved oversight and reporting.

On 8 June 2018 the Murray-Darling Basin Ministerial Council signed an interim Basin Compliance Compact. The Basin Compliance Compact commits all Basin states and the Australian Government to improve the transparency and accountability of water management and put more consistent compliance and enforcement into action across the Basin states.

Compliance and enforcement is discussed in more detail at [Section 6.7](#). A number of actions and complementary strategies identified in the Risk Assessment ([Appendix B](#)) also address

compliance and enforcement. Implementation of the Basin Compliance Compact is reflected in strategy 32 further described in [Table 4.2.1](#) in [Appendix B](#) on 'strengthening and modernising compliance arrangements'.

5.8 Updates to original Risk Assessment for inter valley transfers

During the development of Victoria's North and Murray Water Resource Plan, the Technical Advisory Group was asked to reconsider the outcomes of the Risk Assessment and test whether the risks identified continued to represent the current environment.

The agricultural landscape in northern Victoria is continually changing. Recent changes have been in part driven by the introduction of the CEWO and the purchases of water for the environment, but also structural changes following the Millennium Drought, and the growth in horticulture production in the Mallee region. Water use in the GMID has fluctuated significantly over the last ten years in response to seasonal conditions and water availability. 1,337 GL was used in GMW districts in 2017-18, 21% less than the volume used in 2004-05.

Further the water market facilitates water moving to the highest bidder, which in a scarce market is likely to be those with permanent plantations common in the Mallee region. The Victoria water market is influenced by conditions in the southern connected Murray-Darling Basin (Victoria, New South Wales and South Australia). The volume of allocation trade in northern Victoria shows people are increasingly using the water market to deal with changes in commodity prices, climate and seasonal conditions.

As at June 2018 the CEWH held 620 GL of Victorian high-reliability water shares. 497 GL of this had been purchased from other entitlement holders, with a further 7.4 GL issued from Sunraysia modernisation project and 115 GL from the GMW Connections project. Water savings projects have also increased the total volume of water shares available.

In mid-2018 Goulburn-Murray Water (GMW) and the Goulburn Broken Catchment Management Authority (CMA) advised that the emerging issue of the risk to the environment due to changes in delivery patterns in response to changes in the timing, volume and location of water demands was not accurately represented in the risk assessment. Additional studies had been undertaken and showed the risk was greater than was originally thought when the risk assessment was completed for the water resource plan in 2016.

It has been identified that changing delivery patterns may impact priority environmental assets (particularly rivers) identified in Victoria's Long-Term Water Plans including the Goulburn River, Campaspe River, Loddon River, Gunbower Creek and Gunbower Forest.

Although changes to the timing and location of demands were considered in the 2016 assessment, in terms of its impact on the availability of water and its condition, the impacts on environmental assets were considered manageable.

However, new information showed that the risk was greater than originally considered and there were increased risks to the physical condition of the Upper Goulburn and the Lower Goulburn River related to increasing reliance on inter-valley transfer water delivery to meet demands in the River Murray downstream of the Barmah Choke. The Risk Assessment (see [Appendix B](#)) was updated based on the new information presented by in a report commissioned by the Goulburn Broken CMA (Cottingham et al, 2018).

Community feedback during public consultation on the Draft Water Resource Plan identified concern about the impact high unseasonal flows from spring through to autumn are having on the Lower Goulburn River because of the transfer of water downstream.

5.8.1 Identifying Inter-Valley Transfer risks in the Risk Assessment

Under the 2016 risk assessment (outlined in [Appendix B](#) of the Comprehensive Report) inter-valley transfer risks were identified as *changes to the timing, volume and changes of water demands*. This risk is mainly caused by the increased utilisation of the water market to move demand from one area to another.

Changes to the timing, volume and location of demands for water within the river system can give rise to a range of threats to water availability, condition (quality of water) and environmental assets. Changes to the timing and location of demands that may arise from a range of processes including:

- change in timing, volume and location of consumptive demands (e.g. trade for new horticultural developments in Sunraysia from the Goulburn-Murray Irrigation District),
- change in timing, volume and location of demands for environmental purposes (e.g. changes to the delivery and use patterns of water for wetlands and instream use in the lower reaches of the Murray)

The difficulty in assessing inter-valley transfers under Basin Plan is that individual system risks differ across Victoria's North and Murray water resource plan area, which means overall risk may not reflect the risk level of an individual system. For example, the use of inter-valley transfers can produce negative impacts as outlined in the risk assessment which identifies there is a **very high risk** to the loss or decline of instream physical habitat due to changes in the timing and location of demands. However this may have a positive impact during drought as it might ensure downstream systems receive flows greater than passing flows which may help support native fish populations.

The level of risk is highly dependent on the regional circumstances, and management or treatment of risk needs to be considered in light of consequential impacts on connected resources.

5.8.1.1 2016 Risk Assessment scenario

The 2016 scenario considered that additional water could come from all areas of the Goulburn-Murray Irrigation District (GMID) (except Murray Valley Irrigation Area (Zone 6) due to choke limits) including Goulburn-supplied irrigation areas and Torrumbarry irrigation areas. Historical total annual water usage in the GMID is around 1,000 GL in these areas, so movement of 10% is equivalent to 100 GL additional demand in Lower Murray Water's (LMW) diversions area. 100 GL would represent about half the "confirmed" new development applications in the tristate area of 200 GL as advised by LMW.

In addition, LMW also flagged another 200+ GL of possible additional development over the next decade. A 25% shift (or 250 GL) is likely. The demand could be higher up to 400 GL, and while this is less likely, it introduces significant additional implications.

The implication of the shift in location of the demand also represents a shift in the timing of the demand. Where demand peaks shift from the spring and autumn period as common for dairy farmers to predominantly summer which is when the Sunraysia region has peak demands. Environmental water delivery is also expected to increase and evolve as water recovery progresses under Basin Plan is finalised.

5.8.1.2 2018 Risk Assessment Scenario

A shift of 400 GL of water demand from the GMID to the Mildura and lower Murray areas associated with increased intensive horticulture together with a shift in the timing of water for environmental outcomes.

5.8.1.3 Identifying threats to priority environmental assets

The effect of the changes in inter-valley transfers include:

- Operational water deliveries may provide an inappropriate watering regime to achieve environmental watering outcomes
- Ecological impacts such as loss of habitat for native fish and impact upon fringing native vegetation recruitment
- adverse impacts upon Commonwealth and State listed ecological species and communities such as Murray cod, Murray-Darling rainbowfish and the Lowland Riverine Fish Community of the Southern Murray-Darling Basin

The above effects were considered as part of the Risk Assessment. Identified threats to priority environmental assets and ecosystem functions considered in the risk assessment includes threats to the structural form of priority environmental assets (rivers and wetlands) and ecosystem functions relating to surface water and the meeting of environmental watering requirements, identified in Victoria's long-term watering plans.

Threats to structural form were considered in terms of:

Loss or decline in longitudinal connectivity	Defined to comprise barriers to fish passage and other barriers such as vegetation connectivity
Loss or decline in lateral connectivity	Defined to comprise loss of floodplain connectivity such as levees
Loss or decline in physical habitat	Defined to comprise the loss or decline in condition of instream physical habitat such as sedimentation, erosion and loss of large wood

5.8.2 Overview of 2018 risk assessment updates

Additional technical information and advice from the CMAs and GMW proved that this issue is relevant, not just to the lower Goulburn River, but also to other systems and related priority environmental assets (Cottingham et al, 2018). These risks to ecological condition of the various priority environmental assets from increased demands and/or changing patterns of demands should be updated for both surface water resource plan areas based on this new information.

The new information demonstrated that the risk is present over the life of the water resource plan, will require ongoing management and that there is uncertainty about how it will evolve. Further information and updates to the river flow modelling is required to better understand the risk.

The scenario related to the cause of the risk "changes to the timing and location of demand" was updated to include not just the GMID but also other systems identified and to make specific reference to threats to the structural form of Priority Environmental Assets. The update is provided below:

Changes to the timing and location of demand: a significant shift in the volume and/or timing of water demands from the Goulburn, Loddon, or Campaspe rivers to the lower Murray associated with increased intensive agriculture and/or changing environmental water demands.

The risk was reassessed with the probability being assessed as probable over the 10-year life of the plan, the susceptibility of a loss or decline in instream physical habitat assessed through a

combination of magnitude of impact, spatial extent and duration of the impact as high to very high, and sensitivity was moderate.

The updated risk rating resulted in changes to the timing, volume and location of demands causing a loss or decline in instream physical habitat and of priority environmental assets was very high. Confidence in the assessment was assessed as moderate.

Case Study – increased risks to the Goulburn River

The Goulburn River is a listed heritage river from Eildon Dam to the River Murray. The Goulburn River is Victoria's largest river, the Goulburn River and its tributaries (including Broken River) has an average annual streamflow of 3,363 GL and contributes 11 percent of total Murray-Darling Basin water. The Goulburn River is critical to the continued viability of the GMID and a key river for the success of the Murray-Darling Basin Plan.

Downstream of Goulburn Weir, the river supports a wetland of national significance, native fish habitat and a floodplain national park.

Community feedback during consultation on the Draft Water Resource Plan identified significant concern regarding the impact that constant high flows, from spring through to autumn, is having on the Goulburn environmental assets. These high flows are to deliver water to downstream users. The mid Goulburn has already experienced banks slumping and collapsing, loss of bank side vegetation, build-up of sediment where gravel banks and beaches have traditionally been and loss of vegetation due to streamflow and land use practices.

New information has demonstrated that these risks are ongoing and present over the life of the water resource plan, and that the risk will require ongoing management. Further, there is uncertainty about the risk because water demand is continually changing. To better understand the risks, we need updated river monitoring and real-time gauging plus flow modelling to identify the increased risk.

The Victorian Environmental Water Holder has funded the Goulburn Broken Catchment Management Authority to undertake further bank vegetation and condition assessments before and after the delivery of inter-valley trade in the lower Goulburn River in 2018-19.

Strategies to address risk

The Basin Plan requires that medium or higher-level risks have a strategy or strategies to address them. The key strategy being progressed to address the risk is strategy 23 which links to Water for Victoria Action 9.6. Strategy 23 is identified in the Risk Assessment in [Table 4.2.1](#) in [Appendix B](#) as *Maximising the effectiveness of the grid and markets across the state*. Under the strategy the government will continue to examine broader system operational issues, including changes resulting from environmental water holdings and delivery, and changing patterns of land and water use in the agricultural sector. More information is provided in [Table 4.2.1](#) in [Appendix B](#).

The implementation of Strategy 23 in the Risk Assessment is linked to action 9.6 of Water for Victoria which provides for an improvement to trading rules in northern Victoria. This action provides:

The Department of Environment, Land, Water and Planning will:

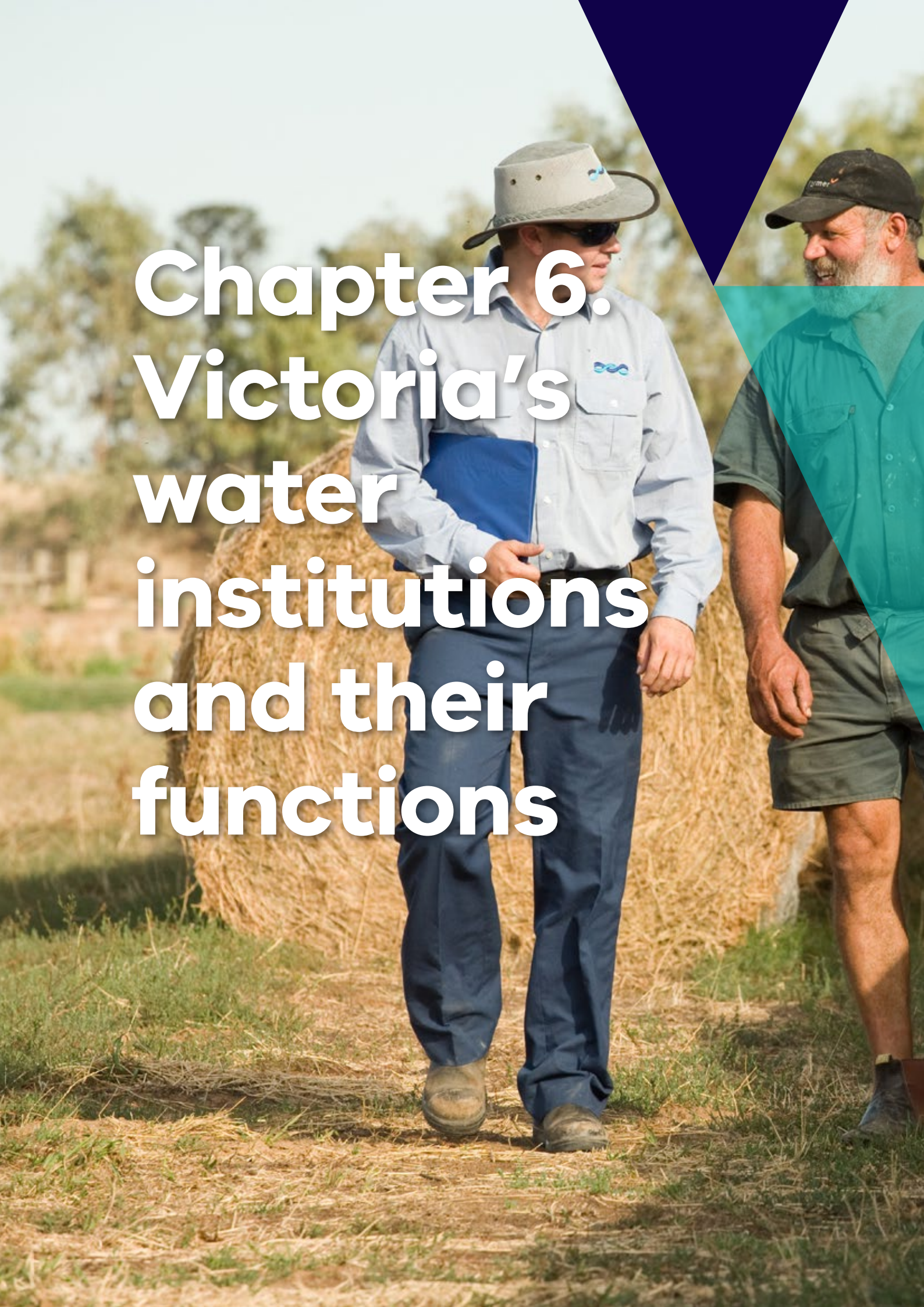
- *ensure trading rules in northern Victoria are appropriate given physical, environmental and operational constraints*
- *work with the Murray–Darling Basin Authority to:*
 - *provide appropriate and timely information for northern Victorian water users about the risk of congestion in the southern-connected Murray system*
 - *improve transparency in applying water trading rules in the southern connected system.*

Additionally, complementary strategies identified in **Table 4.2.1** of the Risk Assessment at **Appendix B** include:

- Strategy 3 – deliver Long-Term Watering Plans
- Strategy 5 – Environmental water management in a changing climate
- Strategy 9 – Improving public reporting on water availability and use: user-focused information and reporting

For more information on each strategy please refer to **Appendix B**.



The background image shows two men in a rural setting. The man on the left is wearing a light blue long-sleeved shirt, dark blue trousers, a wide-brimmed hat, and sunglasses. He is holding a blue folder. The man on the right is wearing a dark cap, a teal shirt, and dark shorts. They are standing in front of large hay bales. A large blue geometric shape, resembling a triangle, is overlaid on the right side of the image. The text 'Chapter 6. Victoria's water institutions and their functions' is written in white, bold, sans-serif font across the middle of the image.

Chapter 6. Victoria's water institutions and their functions



6. Victoria’s water institutions and their functions

This chapter describes the institutional arrangements for the Victorian water sector (see **Figure 6-1**). It outlines the roles and responsibilities of the agencies that must have regard to the Basin Plan. These include the Minister for Water, water corporations, catchment management authorities and the Victorian Environmental Water Holder.

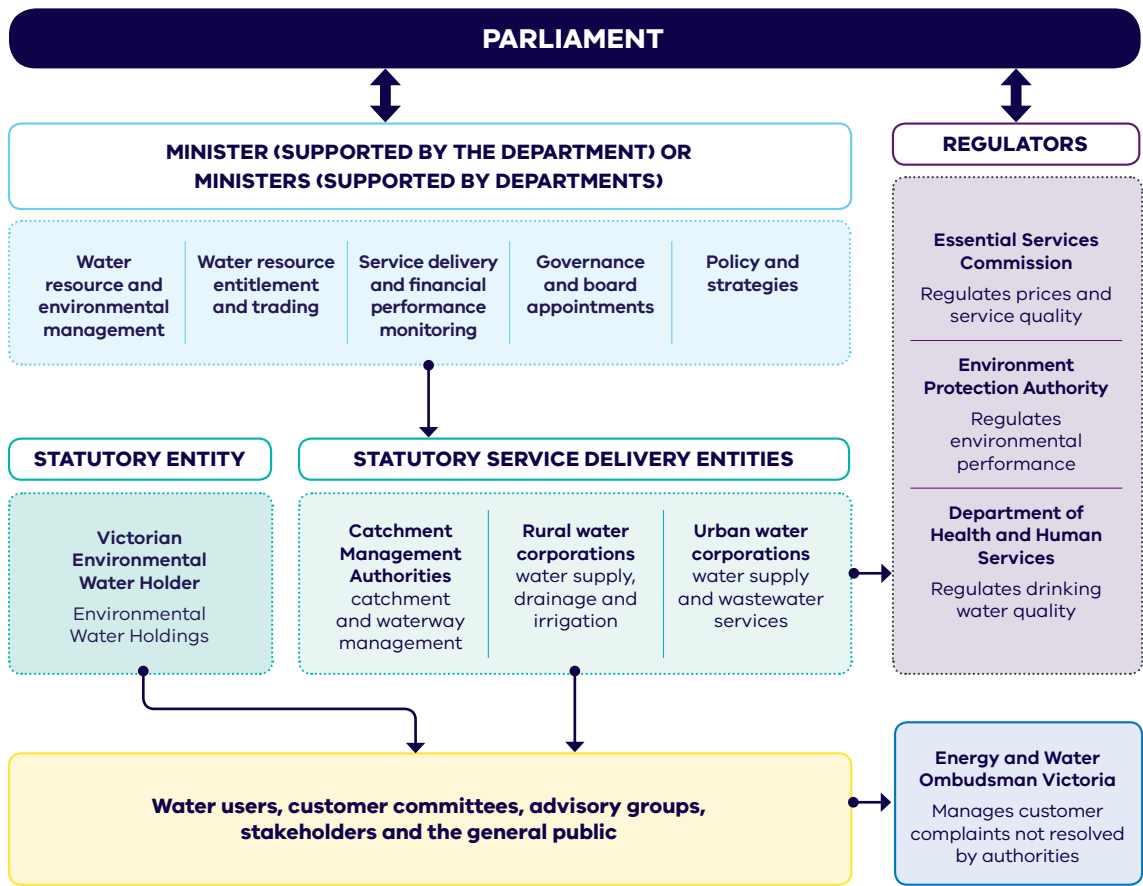


Figure 6-1: Structure of the Victorian water sector



6.1 Overview

Under the Victorian Water Act the Minister for Water is responsible for issuing water entitlements and managing Victoria's water resources and supply. Amongst other things, the Minister for Water has responsibilities for the development of water policy and governance of the water sector.

Under the Victorian Water Act, rural water corporations have functions which include delivery of surface water and irrigation drainage services, as well as having delegated responsibility for administering water shares and take and use licences issued under the Act. These services are critical for agricultural water users. Rural water corporations are also responsible for administering the diversion of water from waterways and the extraction of groundwater under delegation from the Minister.

Urban water corporations manage water supply and wastewater services in cities and towns.

The Victorian economic regulation framework, established under the *Essential Services Commission Act 2001* and the *Water Industry Act 1994*, guides rural and urban water corporation pricing and investment decisions. The Essential Services Commission oversees this economic regulatory framework.

The quality of water supplied by urban water corporations is independently regulated by the Department of Health and Human Services in accordance with the *Safe Drinking Water Act 2003*. The environmental performance of water corporations in relation to wastewater discharge is independently regulated by the Environment Protection Authority Victoria in accordance with the *Environment Protection Act 1970*.

The Victorian Environmental Water Holder (VEWH) is the independent statutory body responsible for the use of environmental water across the state. It holds a number of environmental water entitlements in its own right and manages entitlements on behalf of Snowy Water Initiative (see [Section 12.5.5](#)) and the Living Murray Program (see [Section 12.5.4](#)). The VEWH relies on the services of rural water corporations and storage managers to deliver environmental water where it is required.

At the national level, the Commonwealth Environmental Water Holder (CEWH) holds and manages water entitlements in line with the Murray-Darling Basin Plan. The CEWH's entitlements have been recovered for the environment through water purchases and infrastructure investments in the Murray-Darling Basin. Delivery of the Commonwealth's environmental water in Victoria is managed by the VEWH in partnership with the CEWH and catchment management authorities (CMAs) see [Chapter 12](#).

Victoria has a well-established catchment management framework to conserve our environment while maintaining and increasing productivity from our land and water resources. The *Catchment and Land Protection Act 1994* is the legislative basis for catchment management in Victoria. Under the Act, 10 CMAs have been established across the state that each develop a regional catchment strategy for their area. It also establishes the Victorian Catchment Management Council to advise on statewide matters.

In regulated water systems with multiple entitlement holders, water corporations appointed as storage managers or resource managers are responsible for managing the available water resources on behalf of entitlement holders.

Planning in unregulated surface and groundwater systems generally involves developing arrangements so that available resources are managed equitably and sustainably. The management arrangements set out the triggers for rosters, restrictions and bans on extractions during periods of limited resource availability.

6.2 The Minister

The Minister for Water is accountable to Parliament and responsible for governance of the water sector under the Victorian Water Act and the *Catchment and Land Protection Act 1994*. The ministers for environment and health and the Treasurer have some responsibilities for elements of the water sector's regulatory framework, but these are not significantly affected by the Basin Plan.

The Minister for Water has specific responsibilities for issuing water entitlements and managing Victoria's water resources and supply.

The Minister:

- makes and amends bulk and environmental entitlement orders
- appoints the storage manager and sets storage management objectives
- issues water shares
- issues take and use licences in groundwater and unregulated systems - in most cases this function is delegated to rural water corporations
- determines water trading rules and oversees the water market
- declares water shortages and qualifies rights
- establishes metering and reporting requirements
- is responsible for maintaining a register of all entitlements
- oversees the entitlement compliance framework
- ensures a water resource assessment program is in place
- ensures regional water strategies are prepared
- issues statements of obligation that set out the Minister's expectations about the activities carried out by water corporations and catchment management authorities

6.2.1 Issuing authorisations to take and use water

The Minister for Water is responsible for issuing entitlements under the Victorian Water Act. Section 7 of the Act provides for the continuation of Crown rights to the use, flow and control of all the water in a waterway and all groundwater in Victoria. Under this right the Minister may authorise individuals to take, use and hold water via entitlements.

The types of entitlements to take water (water access rights) available in Victoria's North and Murray water resource plan area are outlined in [Section 7.2](#).

An authorisation typically has these key characteristics:

1. authorises the taking of water
2. identifies the water resource or system from which the water can be taken or diverted
3. identifies the holder of the entitlement and the volume that the person or company is authorised to take.

An authorisation to take (and the authorisation to use) water is typically subject to arrangements or conditions that include, but are not limited to:

- the time at which the person is permitted to take the water
- the rate at which the person may take or divert the water
- the place at which the person may take the water
- annual use limits



- metering requirements (see also [Section 6.7.1](#) for more information)
- reporting requirements

The standard conditions typically applied to a take and use licence are contained in Schedule 2 of the Ministerial Policies for Take and Use Licences (DEPI, 2014).

6.2.2 Limits on issuing new entitlements

The authorisation to take water complements the concepts of *permitted take* and *actual take* under the Basin Plan which is explained in [Section 9.3](#).

The Victorian Water Act requires the Minister to consider a number of matters when determining whether to issue a new entitlement, including:

- every power, discretion, function, authority and duty of the Minister and the Authority must be construed subject to the *Groundwater (Border Agreement) Act 1985*, the *Murray-Darling Basin Act 1993* and the Murray-Darling Basin Agreement under section 6
- the Crown must not exercise a right conferred by section 7(1) of the Victorian Water Act so as to limit a right to water conferred on any other person by section 8(1)(b), (c), or (d) or section 8(4) (c) of that Act
- a right must not be conferred on another person under a licence to take and use water unless regard is had to the need to maintain the environmental water reserve in accordance with the environmental water objective
- where a permissive consumptive volume (PCV) is determined under section 22A of the Victorian Water Act, the Minister may not issue a licence to take and use water if the issue of the licence will cause the PCV to be exceeded (see section 55 of the Victorian Water Act)

In addition to these matters, the Commonwealth Water Act requires the Minister and water corporations to act in accordance with a water resource plan. A water resource plan requires Victoria to demonstrate how it will determine permitted take for an accounting period of one year to meet the sustainable diversion limit prescribed in the Basin Plan.

Furthermore, the water resource plan must identify rules that ensure actual take by water users does not exceed permitted take for the accounting period. Determining permitted take is outlined in [Section 9.3.2](#) and the rule for ensuring actual take does not exceed permitted take in [Section 9.3.3](#). For more details on permitted and actual take see the Methods Report at [Appendix C](#).

This means that in Victoria new entitlements cannot be issued where it would:

- result in actual take exceeding permitted take
- result in exceeding permissible consumptive volumes as determined under the Victorian Water Act
- impact on other water users including the Victorian Environmental Water Holder

Practically speaking, new entitlements cannot be issued in most areas across Victoria because the current volume of entitlements is equal to the volume that can be sustainably diverted for the relevant system. There are some areas where groundwater may be available, or savings can be made through infrastructure upgrades which may result in new entitlements.

6.3 Water corporations

Victoria's water and wastewater services are provided by 19 state-owned corporations established under the Victorian Water Act. The water corporations provide a range of water services to customers within their areas consisting of water supply, sewage and trade waste disposal and treatment, water delivery for irrigation, drainage and salinity mitigation services.

The water corporations are funded by fees and charges they collect from their customers.

The water corporations are subject to the *Financial Management Act 1994* and the *Public Administration Act 2004* and are also affected by:

- independent regulation of prices by the Essential Services Commission
- regulation of water quality by the Department of Health in accordance with the *Safe Drinking Water Act 2003*
- regulation of environmental impacts by the Environment Protection Authority

Water corporation customer complaints that are not resolved directly by the water corporation can be referred to the Energy and Water Ombudsman Victoria for consideration.

Water corporations may hold bulk entitlements, water shares and take and use licences to supply or support the supply of water to their customers.

The water corporations are responsible for meeting water needs of their customers and are required to carry out short and long-term planning. They are also required to have emergency management plans to minimise service disruptions.

Water corporations can participate in the water market.

6.3.1 Urban Water Corporations

Urban water corporations are responsible to their urban customers for water supply (including recycled water), sewage and trade waste disposal services.

In Victoria's North and Murray water resource plan area these corporations are:

- Central Highlands Water
- Coliban Water
- Goulburn Valley Water
- Grampians Wimmera Mallee Water
- Lower Murray Water
- North East Water
- East Gippsland Water
- Western Water

Melbourne retailers, City West Water, South East Water and Yarra Valley Water also hold entitlements in the water resource plan area.

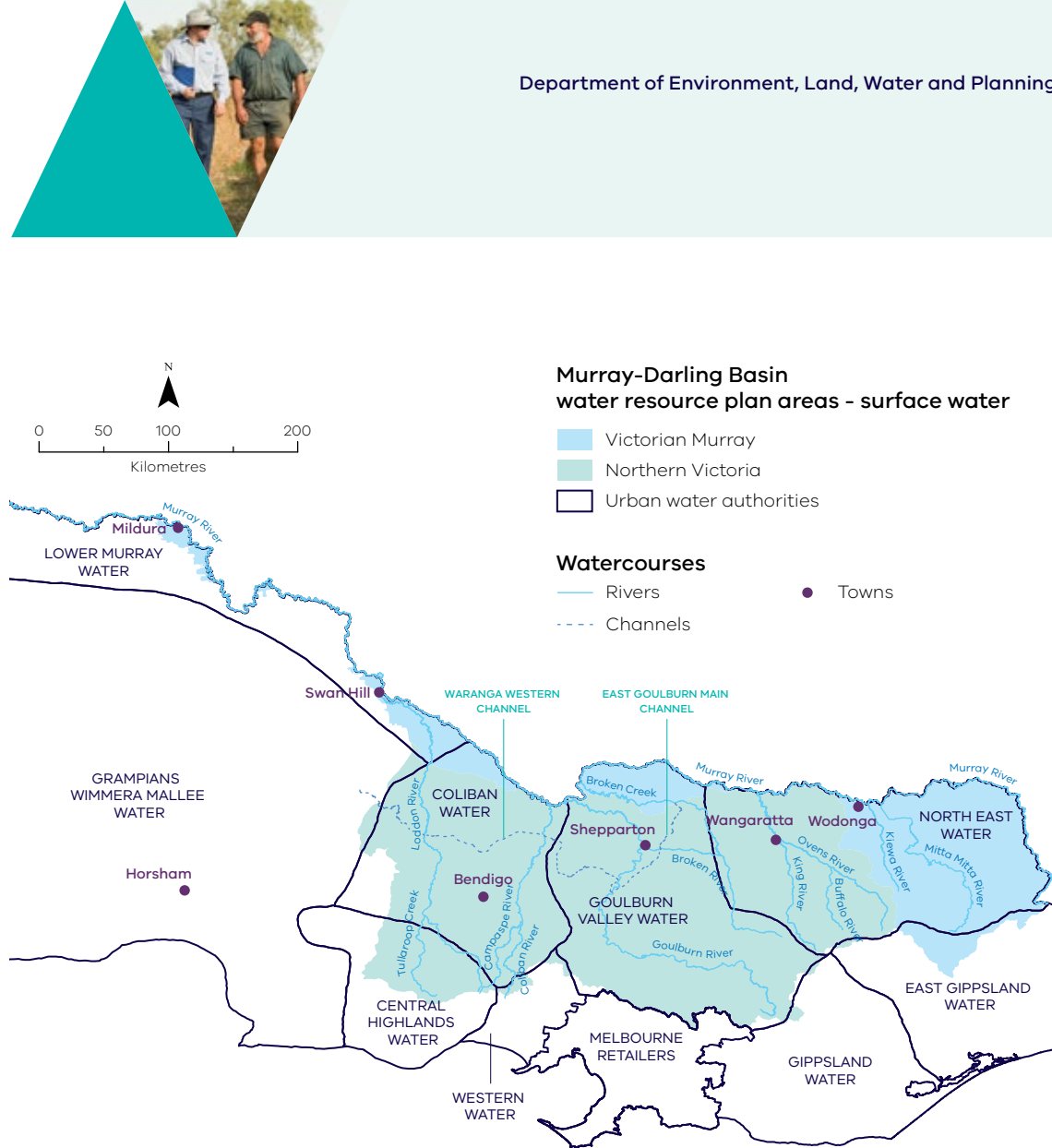


Figure 6-2: Urban water corporations in the water resource plan area

6.3.2 Rural Water Corporations

Rural water corporations provide services such as water supply, irrigation drainage and salinity mitigation services for irrigation and land management. They have the authority to operate surface water and groundwater management infrastructure including storages, channels, weirs and bores, and work with catchment management authorities to protect and improve land, waterways, the environmental water reserve and the environmental values of waterways, in line with decisions of the VEWH. The rural water corporations in Victoria's North and Murray water resource plan area are shown in [Figure 6-3](#).

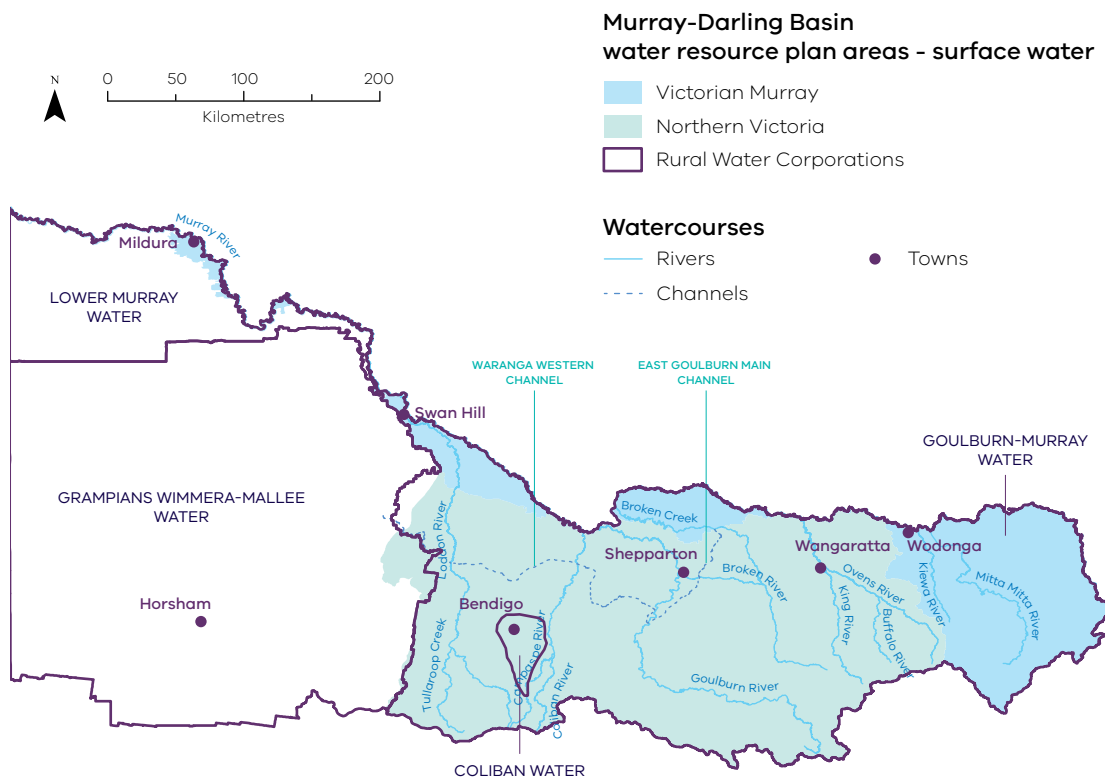


Figure 6-3: Rural water corporations in the water resource plan area

6.3.2.1 Goulburn-Murray Water

Goulburn-Murray Water (GMW) manages the bulk water delivery and transfer for around 30 percent of Victoria's land area, or around 68,000 km². There is more information on these irrigation districts in [Chapter 4](#).

GMW operates 22 storages in its region, including Murray-Darling Basin Authority storages managed by Victoria. Goulburn-Murray Water's regulated area of operation includes the Ovens, Broken, Goulburn, Campaspe and Loddon basins, as well as the River Murray as far as Lock 11 and Mildura Weir.

Goulburn-Murray Water operates an extensive network of water distribution channels, pipelines and natural carriers, including unregulated waterways, to deliver raw water to its customers.

GMW provides information on the quality of water supplied to customers so that they can make informed choices about their water use. Under the *Safe Drinking Water Act (2003)*, GMW must also advise customers of the non-potable nature of water supplied by the water corporation.

GMW supplies raw or untreated water for irrigation, stock and domestic purposes and for other bulk entitlement commitments. The quality of the water can vary due to a variety of factors such as algal levels, land uses, changes in flow, floods and drought.

Goulburn-Murray Water works with catchment partners to identify ways of reducing the impacts of land use and development in catchments. This includes water quality monitoring, implementation of land and water management plans and requiring that certain standards are met for developments.

GMW's incident response procedures include notifying customers and the general public if poor water quality is detected. GMW monitors its storages and supply systems for various water



quality parameters, including nutrients, salinity and blue-green algae. For more information see [Section 10.3.4](#).

6.3.2.2 Lower Murray Water

Lower Murray Water's area of operation extends alongside the River Murray from Koondrook for urban supply and Miralie-Corcamba road at Wood Wood for rural supply to the South Australian border, taking in the municipalities of Mildura, Swan Hill and Gannawarra. Lower Murray Water provides both urban and rural functions. It provides the region with urban water and wastewater services, and it supplies raw water to domestic and stock users as well as irrigation customers. It also operates the subsurface irrigation drainage water collection systems.

Lower Murray Water operates four irrigation distribution systems, three other rural distribution systems and 10 urban distribution systems.

6.3.2.3 Coliban Water

Coliban Water provides water and wastewater services to about 146,000 people in 49 towns across central and northern Victoria. The largest towns it services are Bendigo, Castlemaine, Echuca and Kyneton. Coliban Water also supplies about 1,500 rural licence holders from 500 km of pipelines and open channels in the Coliban rural water supply system extending from Malmsbury to Bendigo, and to Raywood and surrounding areas.

Coliban Water's service area is within parts of the Campaspe, Loddon, Murray, Goulburn and Avoca basins. It operates two major distribution systems:

- the Goldfields Superpipe incorporating the Eppalock Pipeline which it jointly operates with Central Highlands Water
- the Coliban Main Channel which transports water from Malmsbury to Bendigo

Coliban Water operates nine urban water supply systems, including two separate groundwater systems of Elmore and Trentham and 11 rural sub-systems.

6.3.2.4 Grampians Wimmera Mallee Water

Grampians Wimmera Mallee Water (GWMWater) services a large area of about 25 percent of the state in the north-west of Victoria. It sources most of its water from a complex system of storages in the Grampians, as detailed in the Wimmera Mallee Water Resource Plan comprehensive report, but the northern part of GWMWater's rural pipeline system is supplied from the River Murray.

6.4 Catchment management authorities

Victoria's 10 catchment management authorities (CMAs) are statutory bodies established under the *Catchment and Land Protection Act 1994*. They also have waterway management functions under Part 10 of the Victorian Water Act.

The North East CMA, Goulburn Broken CMA, North Central CMA and Mallee CMA, operate in Victoria's North and Murray water resource plan area. [Figure 6-4](#) shows their boundaries.

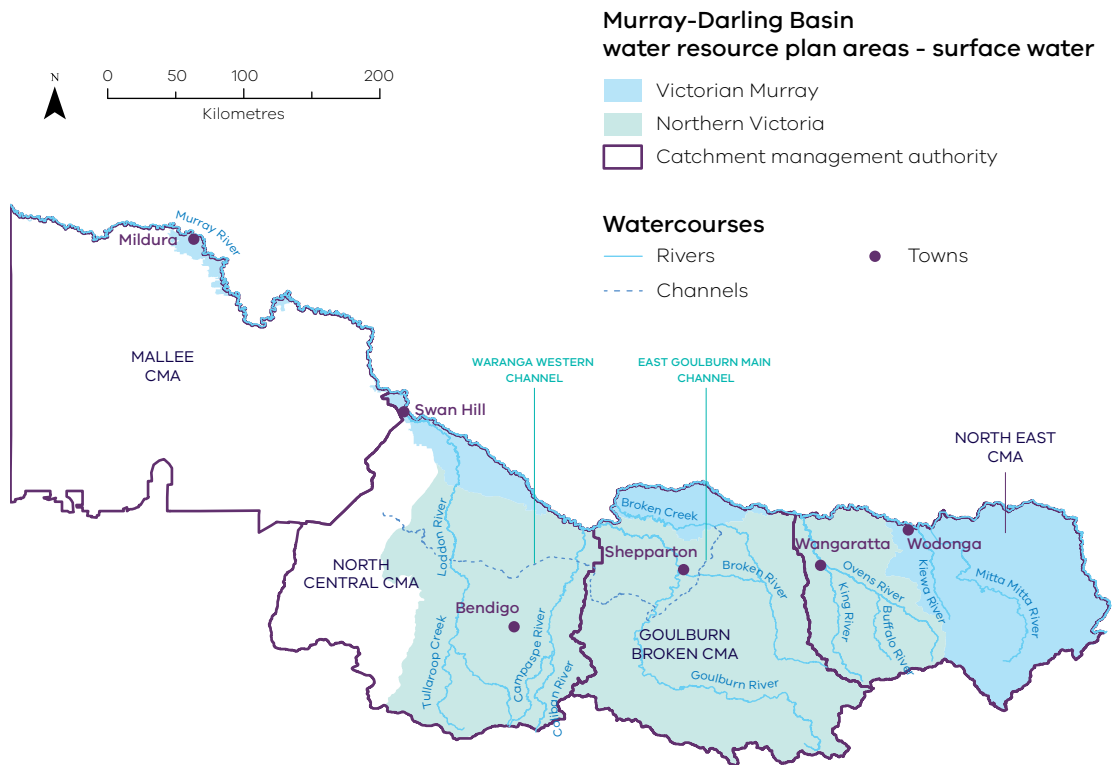


Figure 6-4: CMAs in the water resource plan area

CMAs are jointly overseen by the Minister for Water and the Minister for Energy, Environment and Climate Change, and receive their main source of funding from the Victorian and Commonwealth governments.

Their functions in the management of land and water resources include:

- advising the relevant Minister on catchment management issues and priorities
- advising the Department Secretary and municipal councils about flooding issues
- preparing and reviewing regional catchment strategies, sub-strategies and plans about catchment management issues and environmental management such as:
 - regional waterway strategies
 - seasonal watering proposals
 - environmental water management plans
 - land and water management plans addressing salinity issues
 - flood management plans
- encouraging cooperation between stakeholders
- promoting community awareness
- carrying out research and monitoring
- preparing reports on their catchment management activities

These functions apply on privately-owned land and Crown land.



CMAs also have waterway management service delivery functions and powers under Part 10 of the Victorian Water Act. These functions include:

- carrying out works and activities to protect and improve land, waterways, the delivery of the environmental water reserve and the environmental values of waterways
- providing, maintaining and operating drainage schemes, where applicable
- declaring flood levels and developing and implementing plans to minimise flooding

When carrying out these functions, the CMAs are subject to the general powers and obligations of authorities established under the Victorian Water Act. They may also:

- regulate the connection of drainage works to designated waterways
- regulate drainage diversions into and out of their area
- make bylaws in relation to their functions under Part 10 of the Victorian Water Act

6.5 Victorian Environmental Water Holder

The Victorian Environmental Water Holder (VEWH) is established by Part 3AA of the Victorian Water Act.

The VEWB is responsible for holding and managing water entitlements to improve the environmental values and health of water ecosystems for uses that depend on environmental condition. It also manages the operational delivery of Commonwealth environmental water based on an agreement between the Victorian Environmental Water Holder and the Commonwealth Environmental Water Holder.

VEWH works closely with CMAs in gathering the most up to date information to prepare a seasonal watering plan each financial year. This scopes where, when, how and why environmental water can be used across Victoria's rivers, wetlands and floodplains. For more information see [Section 12.5](#).

The VEWB has no powers to raise revenue through fees and charges, but may buy and sell water where this is consistent with its statutory objectives. It must comply with water trading rules that apply to other entitlement holders. The VEWB's decisions about applying its water holdings are not subject to Ministerial direction.

Each year the Victorian Environmental Water Holder must prepare a corporate plan for the following three years that includes details of:

- strategies and policies
- governance, funding and reporting arrangements
- performance indicators

6.6 The storage and resource managers

Responsibilities for the management of water systems are assigned by a number of instruments under the Victorian Water Act, including those appointing resource managers (section 43A(1)(b)), and storage managers (section 122ZK), and instruments appointing a water corporation to make seasonal determinations for declared systems (section 64GA).

6.6.1 The storage manager

The Minister may appoint a storage manager under section 122ZK of the Victorian Water Act on the terms and conditions specified in the instrument of appointment. Storage manager appointments are made for bulk water supply systems that supply multiple customers including bulk and environmental water holders and water shares and take and use licence customers.

Additional responsibilities are conferred on storage managers through government policy and legislative instruments, for example *Water for Victoria* (DELWP, 2016) and bulk entitlements.

The main responsibility of the storage manager is to operate the headworks system (which are defined in the instrument of appointment or relevant bulk entitlement) to supply water to meet entitlements. Other functions may include:

- calculating the amount of water available to entitlement holders
- preparing an annual supply system operating plan
- preparing a water resource outlook for the coming water year assuming wet, average, dry and drought scenarios
- reporting on operations to entitlement holders

In Victoria's North and Murray water resource plan area Goulburn-Murray Water has been appointed storage manager for Loddon, Bullarook, Goulburn and part of the Campaspe system. Coliban Water is the appointed storage manager for the Upper Coliban storages in the Campaspe system. There is no storage management appointment in the Murray system.

6.6.2 The resource manager

The Minister may appoint a resource manager under section 43A of the Victorian Water Act. Each instrument of appointment outlines the terms and conditions and the purpose of the appointment.

The responsibilities of the resource manager may include:

- monitoring compliance of bulk entitlement holders with their bulk entitlement
- mediating disputes and supervising qualifications of rights

In Victoria's North and Murray water resource plan area Goulburn-Murray Water has been appointed as the resource manager for the Campaspe, Loddon (which includes Bullarook) Goulburn, Kiewa and Murray basins.

The Ovens and Broken system appointments for Goulburn-Murray Water are combined instrument of appointments for storage and resource manager, and there is no separation as to what tasks are undertaken as a storage manager and what tasks are carried out as a resource manager.

6.6.3 Making seasonal determinations

Under section 64GA of the Victorian Water Act, the Minister may appoint an authority to be responsible for making seasonal determinations in declared water systems. For the declared systems in Victoria's North and Murray water resource plan area, Goulburn-Murray Water has been appointed the responsible authority to determine the water available in the system and make seasonal determinations.

GMW uses the Northern Victoria Resource Manager website (<http://nvrmm.net.au>) to announce seasonal determinations. As well as releasing seasonal determinations, GMW uses the Resource Manager website as a communications tool to, among other things, provide seasonal outlooks and issue spillable water declarations.

6.7 Compliance and enforcement functions

Compliance and enforcement are carried out by the Minister and Authorities, such as water corporations and catchment management authorities. Authorities may also be responsible for compliance and enforcement as delegates of the Minister.



Offences under the Victorian Water Act include those relating to:

- authorisations to take and use water
- authorisation to construct, alter or operate works including, but not limited to, works on waterways to divert, take or use of water
- authorisation to discharge into waterways and aquifers
- connection to the works of an Authority

In managing compliance with the Victorian Water Act, the Minister and Authorities have the following enforcement tools available under the Act:

- Notice to Repair under section 150, which allows an Authority to require the owner of land to repair works on their land or connect to the works of an Authority so that the Authority can provide a service to that land. Where a person fails to comply with the notice, they may be subject to penalties
- Notice of Contravention under section 151, which allows (where the Authority believes the person has contravened the Act, regulations or other instrument under the Victorian Water Act) the Authority to require, by notice, to take any action to remedy the identified contravention. This notice allows the Authority to identify the breach of Victorian water law and determine action for the person to remedy or address the breach. Where a person fails to comply with the notice, they may be subject to penalties
- the power to reduce, restrict or discontinue delivery of water under section 231, which allows an Authority to reduce, restrict or discontinue the delivery of water to a serviced property in certain circumstances. These circumstances include where the Authority believes the owner of the serviced property has contravened the Act, regulations or bylaws relating to the taking of water. This function is relevant in systems where water shares are issued. These are some of the measures detailed in respect to extreme events in [Chapter 10](#)
- Penalty infringement notices under section 295A where a person contravenes a permanent water saving plan or staged restrictions (which are some of the measures detailed in respect to extreme events in [Chapter 10](#))
- Prosecution powers under section 296 under which the Minister or Authority may institute court action to seek penalties for alleged conduct in contravention of the Victorian Water Act. Penalties under the Act are discussed in the next section
- Revoke or suspend a driller's licence issued by the Drillers' Licensing Board under section 313. A driller's licence is required for bore construction and does not contain conditions relating to the take and use of water

As well as the formal powers under the Victorian Water Act, the Minister and Authorities are able to take administrative action to support compliance, including education programs and warning letters.

The Minister and Authorities have these additional powers under the Act to support compliance monitoring and enforcement activities:

- powers under section 133 to permit an authorised person and officers of an Authority to enter private land to inspect any works or make any test to find out whether the Act, regulations or bylaws of the Authority are being complied with
- search and seizure warrant powers under sections 291E to 291H, which permit an authorised water officer to enter land to inspect any works, make any test and seize any evidence that the Act, regulations or bylaws have not been complied with

Powers to enter land are subject to conditions. In particular, where the land is used primarily for residential purposes, consent must be obtained, and entry must be between 7 am and 7 pm. There are fewer restrictions on non-residential land to account for the way general water resource and system management activities are carried out, as well as general monitoring and compliance on land that is often a significant distance from any residence.

Similarly, restrictions on the time of day for entry do not apply for non-residential land, since commercial water users can take and use their water overnight for different reasons, including reducing evaporation losses and avoiding high day time electricity costs for pumping water.

6.7.1 Metering and monitoring compliance

Water corporations carry out a monitoring program that includes on-ground inspections and metering of water use.

In Victoria meters are owned, read and maintained by water corporations and read remotely on a regular basis, or at least yearly in other instances. Victoria's Non-Urban Metering Policy (DEPI, 2014) requires all new extractions for commercial and irrigation purposes to be metered, and for the state to comply with the Australian Standard over time.

Existing licensed extraction sites must be metered if the licensed volume is 10 ML or greater for surface water, and 20 ML or greater for groundwater. Water corporations may choose to meter all commercial and irrigation extractions even where the amounts are smaller than these thresholds. Water corporations maintain asset databases of their meter fleets. Water corporation staff make inspections and spot checks for illegal bores or infrastructure and meter tampering, as well as conducting stream surveys.

Victoria is reviewing its non-urban water metering policy and state-wide implementation plan to make sure they are economically practical and of a suitable standard to meet the requirements of the Basin Compliance Compact. The Basin Compliance Compact can be found at <https://www.mdba.gov.au/publications/independent-reports/basin-compliance-compact>. Victoria's commitment are outlined in the Compliance Compact. DELWP is reporting on how Victoria is implementing the Basin Compliance Compact on <https://www.water.vic.gov.au/mdb/compliance>.

6.7.2 Compliance and enforcement strategy

As part of ensuring that the implementation of national framework activities was embedded as business as usual, in December 2015 the Minister for Water amended water corporations' statements of obligations. These are issued under the *Water Industry Act 1994*, and outline the manner in which the Minister would like water corporations to undertake their functions. The purpose of these statements is to specify the obligations of a water corporation in relation to performing its functions and exercising its powers under the Act.

Clause 7.3A of the statements provides that:

To manage and prioritise risks associated with non-compliance in enforcement of the Water Act 1989, the Corporation must:

- a. *Develop and implement policies, standards and systems based on risk-based regulatory models; and*
- b. *Adhere to any guidelines issued by the department.*

The Corporation must annually report to the Secretary on the monitoring and compliance activities it has undertaken and any enforcement actions commencing with the 2016-17 financial year.



Victoria will publish a revised compliance framework accordance with the work program outlined in to the Basin Compliance Compact including a state-wide compliance and enforcement policy, updated compliance and enforcement strategies published by rural water corporations, and guidelines issued under the statement of obligations.

6.7.3 Reporting requirements

Water corporations are required to report annually on how they have met their obligations under the statement of obligations. This reporting includes information on meeting the enforcement of the Victorian Water Act obligations outlined previously as clause 7.3A of the statement of obligations. Reporting against the statement of obligations will support reporting under Schedule 12 of the Basin Plan. Water corporations are also required to report compliance activities and the status of their metering fleets under the Basin Compliance Compact.

6.7.4 Education programs

Water corporations carry out education and community awareness-raising activities such as:

- publishing newsletters, web content, media releases, newspaper notices about prosecutions and advisory letters
- holding committee meetings, reach audits and presentations
- engaging with customers and other stakeholders

6.7.5 Complementing Murray-Darling Basin Authority enforcement

Water resource plans are designed to demonstrate how Basin states are managing Basin water resources consistently and with a common goal of river and environmental health across the Murray-Darling Basin. This is critical for sustainable water use to support continued agriculture and farming, rural communities and cities and towns without harming the environment or the ability for communities to enjoy and benefit from their environment.

As a result, water users will be subject to two regulatory regimes that manage the take of water from Victorian water resources in the Basin. The Victorian government remains responsible for managing compliance and enforcement with respect to obligations under the Victorian Water Act and any regulations made under that Act. The Commonwealth and Basin states intend that the Murray-Darling Basin Authority will step in as a "last resort" to enforce compliance with the water resource plans in accordance with the powers under Part 8 of the Commonwealth Water Act. This is reflected in the Basin Plan Implementation Agreement (7 August 2013).

This arrangement is supported on the basis that:

- water resource plans reflect state arrangements and Victorian water law contains the same or similar obligations as contained in the relevant water resource plan
- Victorian water corporations are in the best position to manage compliance and enforcement of Victorian water users
- where the Victorian State fails to take appropriate action to manage compliance with an obligation also contained in the relevant water resource plan, the MDBA could exercise its discretion to act
- to manage this relationship and to complement Commonwealth and state compliance and enforcement objectives, Victoria proposes to:
 - provide annually, in its reporting under Matter 19 of Schedule 12 of the Basin Plan, information regarding detected non-compliance in water resource plan areas that relates to obligations under Victoria's North and Murray Water Resource Plan and the action taken to address non-compliance; for example details of auditing, reporting and investigations carried out

- refer to the MDBA for consideration, non-compliance of a serious nature to assess appropriateness of state, Commonwealth or joint action
- use its best endeavours to provide the MDBA with relevant information to support enforcement action regarding non-compliance with a Victorian water resource plan area

6.7.5.1 Autonomy and referrals

While the MDBA and Victoria will work together to ensure that agencies, companies and individuals comply with the requirements of water resource plans, each party will do so while maintaining its autonomy and exercising its own discretion in relation to enforcement activities.

The Murray-Darling Basin Water Compliance Review (Compliance Review Report) released by the MDBA in November 2017 recommended the development of more structured arrangements relating to the joint enforcement of obligations under water resource plans. Enforcement under water resource plans is considered to be a joint responsibility between the MDBA and Basin states because:

- water resource plans should reflect state-based arrangements that should be enforced by the relevant Basin state
- the Commonwealth Water Act requires state agencies and individuals to comply with the requirements of water resource plans, and this obligation is enforceable under Commonwealth law
- Basin states should use best endeavours to support the MDBA in managing compliance with water resource plans

The Department of Environment, Land, Water and Planning is currently negotiating an enforcement and information sharing protocol with the MDBA. Once finalised this will be published on the DELWP website at <https://www.water.vic.gov.au/mdb/compliance>.

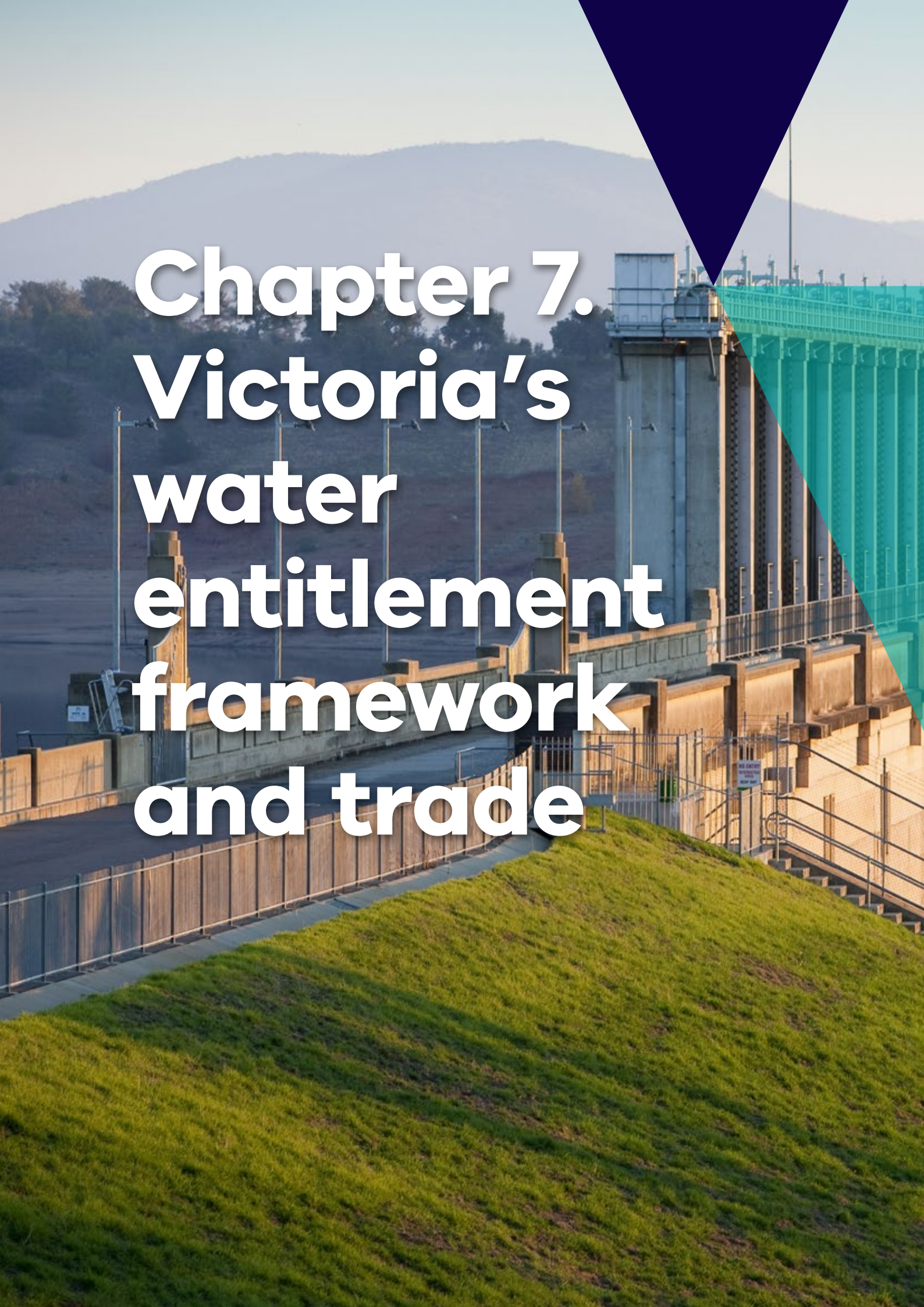
While it is anticipated that in some cases the MDBA or Victoria may refer a non-compliance issue to the other party for investigation and prosecution, Victoria considers that such a referral should be done on the following basis:

- the referral is made in confidence to allow proper investigation of the matter
- the referral is done in full, meaning that the party to whom the matter was referred has full ownership of the matter and is responsible for resolving the issue
- the MDBA and Basin states retain prosecutorial discretion over decisions on whether to pursue investigation, settle a matter administratively or investigate at all

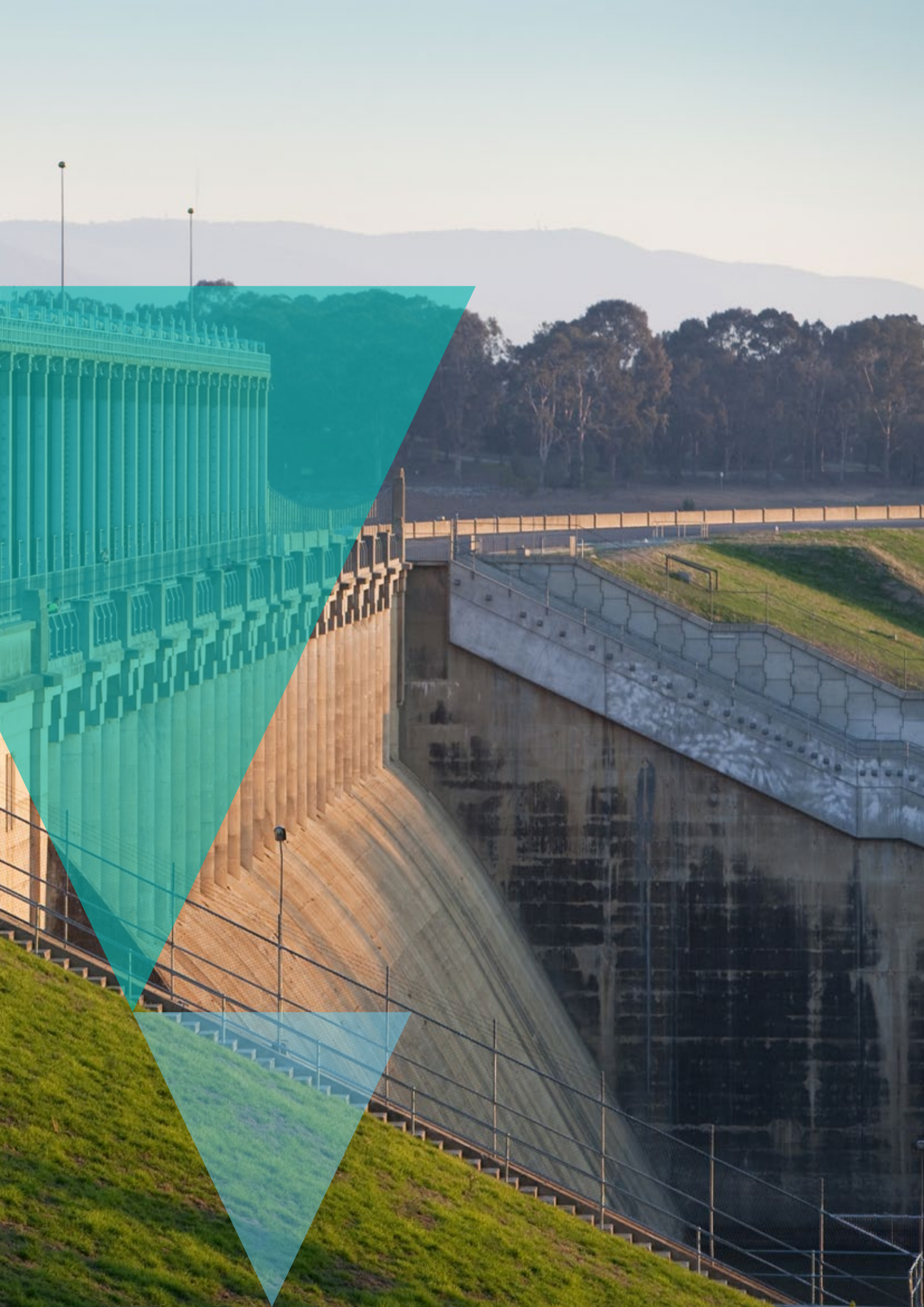
The essence of prosecutorial discretion is that the investigating or prosecuting body can exercise its discretion in relation to its compliance and enforcement strategy and risk assessment for a matter to determine whether that matter should be pursued. Regardless of whether a matter was referred to Victoria by the MDBA, the relevant water corporation will exercise its discretion on whether to investigate and prosecute non-compliance with the Victorian Water Act. This discretion will be exercised free of direction or influence from the MDBA.

The exact nature of arrangements for referral of compliance matters will be articulated in the protocol developed between the MDBA and Victoria in accordance with the requirements of the Basin Compliance Compact.



The background image shows a large concrete dam with a prominent green-painted spillway on the right side. In the foreground, there is a grassy embankment and a metal fence. The sky is clear and blue. A large white text overlay is positioned on the left side of the image.

Chapter 7. Victoria's water entitlement framework and trade



7. Victoria's water access and trading framework

This Chapter outlines Victoria's water entitlement framework and addresses Basin Plan requirements relating to groundwater trade. This Chapter meets Part 8 of Chapter 10 of the Basin Plan.

7.1 Victorian water entitlement framework

The volume of water authorised to be taken in Victoria is specified in a water entitlement or allowed for under a statutory right. The Victorian water entitlement framework is designed to ensure that individual entitlements to water are explicit, enforceable and, in appropriate circumstances, tradable.

A strong regulatory framework is an essential element in the management of water resources. The Victorian Water Act introduced in 1989 represented a fundamental change to the management arrangements for water in Victoria. It set out the framework for water resource management and provided for a secure system of rights and entitlements.

This legislation and a subsequent reform agenda produced major changes to the way water is managed in Victoria. This included the conversion of poorly defined rights to bulk entitlements, the process to trade water, the ability to separate water from land titles and the recognition of the needs of the environment.

The Victorian Water Act provides rights to water for domestic and stock use and Traditional Owner use, and water entitlements for both consumptive and environmental purposes. Consumptive uses include the supply of urban drinking water, irrigation, industrial uses and power generation. Environmental uses include delivery of water to important environmental sites such as wetlands and water flowing in waterways.

Entitlement holders are responsible for managing their own water needs as well as the risks of any water scarcity.

Existing entitlements are protected by the statutory framework which ensures the amount of water that can be taken is capped and makes it an offence to take water without authorisation. It also supports water access by allowing users to trade entitlement and allocation, which gives them the flexibility to manage their individual water needs.

7.2 Water rights and entitlements

The Victorian Water Act establishes the statutory rights and entitlements that apply in Victoria. These are supported by provisions which make it an offence to take water from a specified water source, including a waterway or aquifer, unless authorised to do so under the Act.

Authorised forms of take are set out in the Act:

- under a right (section 8 or section 8A),
- under an entitlement issued in accordance with the Act, or
- by another authorisation allowed for under the Act

Statutory rights and entitlements under the Victorian Water Act are referred to as "water access rights" under the Commonwealth Water Act and Basin Plan. A water resource plan must identify the types of water access rights (rights or entitlements) available in the water resource plan area to authorise the take and storage of water. The relevant water access rights in Victoria's North and Murray water resource plan area are outlined in **Table A** and **Table B** of Victoria's North and Murray Index Table.

Basin Plan also requires a water resource plan to include an obligation on the holder of a water access right (statutory rights or entitlements) to comply with the conditions on their water access right.

Figure 7-1 and **Table 7-1** show the ways water may be taken and used in accordance with the Victorian Water Act in Victoria's North and Murray water resource plan area.

Basin Plan s10.08(2)

The holder of a water access right must comply with the conditions specified in the water access right instrument.

Note: The types of conditions that may be imposed on a water access right are identified in Tables A and B attached to Victoria's North and Murray Index Table for surface and groundwater respectively.

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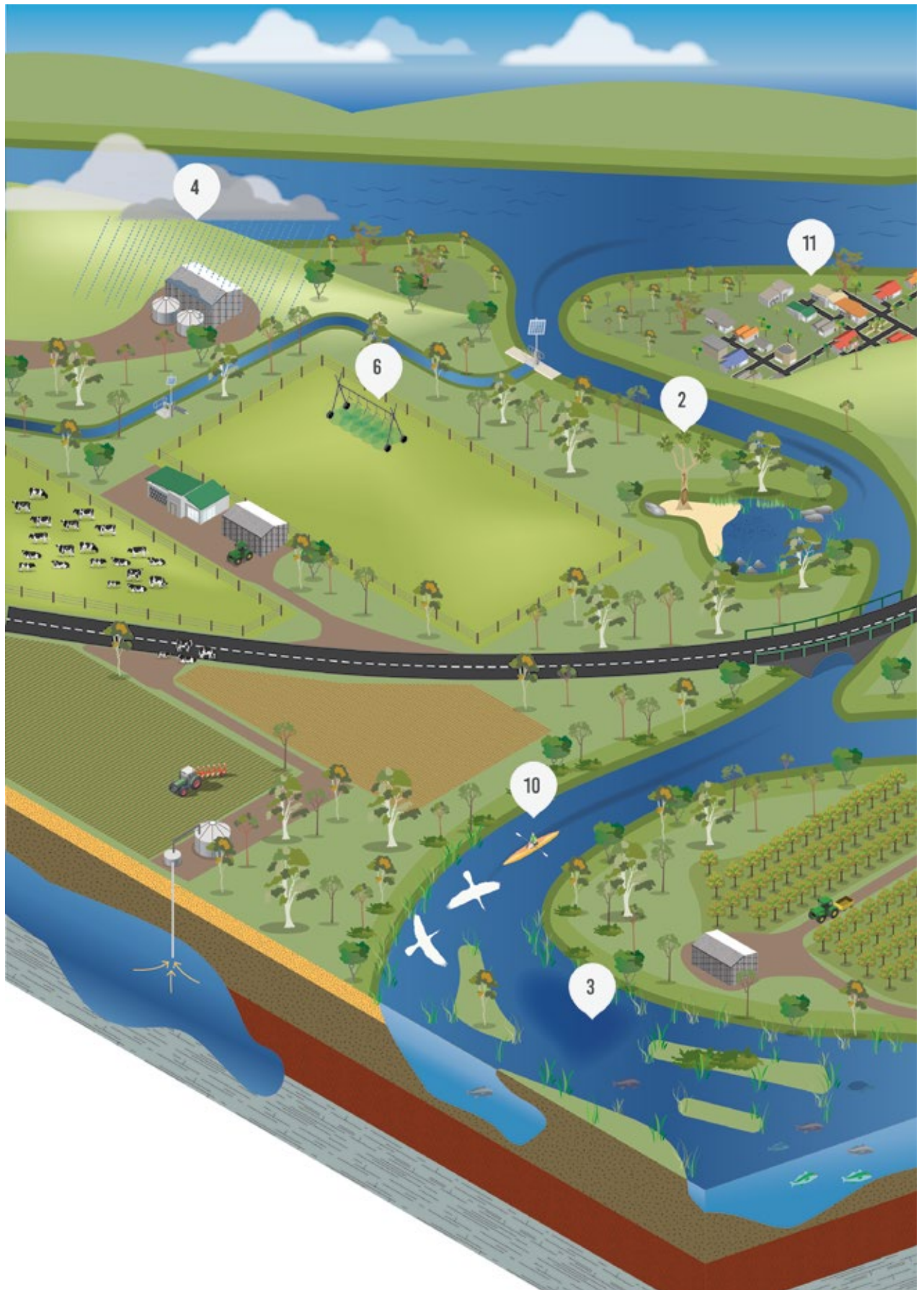


Figure 7-1: Take and use of water in Victoria's North and Murray water resource plan area



Table 7-1: Take and use of water in Victoria's North and Murray water resource plan area

	Use	Method of take	Entitlement
1	Domestic and stock	Take from a waterway (surface water) or from an aquifer (groundwater).	Statutory right – section 8 of the Victorian Water Act for domestic and stock purposes
2	Traditional Owner	Take from a waterway (surface water) or from an aquifer (groundwater).	Statutory right – section 8A of the Act for Traditional Owner groups to use water for traditional purposes, where there is a relevant agreement
3	Environmental	Take from a waterway or instream take (surface water)	- Bulk entitlement, environmental entitlement or water share held by Victorian Environmental Water Holder, Murray-Darling Basin Authority and Commonwealth Environmental Water Holder (held environmental water) - Where applicable rules-based water including minimum flows for rosters and bans set out in management plans (planned environmental water) - Other water that contributes to the environment including above cap water and system water
4	Any	Rain collected from roofs	Exempted from requirement to hold entitlement. People or businesses may collect and store water that falls on their roof without seeking authorisation to collect, store and use that water
5	Any	Interception by a farm dam or 'runoff dam' (surface water)	- Statutory right – section 8 of the Victorian Water Act for domestic and stock purposes - A take and use licence issued under section 51 of the Victorian Water Act
6	Irrigation or commercial: surface water	Take from a waterway or channel where there is a dam controlling flow (regulated surface water system), and take from a waterway where there is no dam controlling flow (unregulated surface water system)	- Water share if take is from a system which is a declared water system - A take and use licence issued under section 51 of the Victorian Water Act - Supply by agreement
7	Any	Take from an aquifer (groundwater)	- Statutory right – right to water under section 8 of the Act for domestic and stock use - Take and use licence issued under section 51 of the Victorian Water Act
8	Plantation	Interception	Currently outside the entitlement framework

	Use	Method of take	Entitlement
9	Regulating flows (including system water)	Harvesting inflows and managing losses	Bulk entitlement held by water corporation
10	Recreational	Instream use (surface water)	There is no specific entitlement for recreational water in Victoria's North and Murray water resource plan area, and no fees or service charges to recreational water users for water resources
11	Town water supply	Take from a waterway or channel where there is a dam controlling flow (regulated surface water system), and take from a waterway where there is no dam controlling flow (unregulated surface water system), or from a bore (groundwater)	- Bulk entitlement held by water corporation (no right or entitlement required by individual households) - Water corporations may hold water shares in declared water systems, or take and use licences under section 51 of the Victorian Water Act in undeclared water system - Water corporations may also hold a take and use licence under section 51 of the Victorian Water Act to access groundwater to supply towns

7.2.1 Statutory rights

Sections 8 and 8A of the Victorian Water Act provide for statutory rights to take water that apply without the need to obtain further authorisation from the Minister. These rights allow a person to take and use water in certain circumstances and under certain conditions. They are available only in the circumstances and for the specific uses as set out in the Victorian Water Act and there are limitations on who may exercise this right.

These are rights referred to as 'basic rights' in the Commonwealth Water Act and Basin Plan.

Basin Plan requires the water resource plan to identify how much water is taken for each type of water access right. While the volume of water taken under these rights is not tightly regulated as with entitlements, it is limited by the scope of the right (explained below). How the volume of water taken under statutory rights (basic rights) is outlined in [Table 9-4](#) of [Chapter 9](#) and [Table 6](#) of the Methods Report at [Appendix C](#).

7.2.1.1 Domestic and stock rights

Domestic and stock rights, also known as section 8 rights, provide the right in specified circumstances for a person to take water for their personal use for the purposes established in the Victorian Water Act.

Specified circumstances include, take from a farm dam or where a person has access to the water because they occupy the land adjacent to a waterway and that waterway has remained the property of the Crown, or they occupy a bore from which the water may be taken.

Water taken for domestic and stock purposes may only be used for:

- household purposes
- pets
- cattle or other stock

- on the land around a house and outbuilding, to a maximum of 1.2 ha for fire prevention purposes with water from a spring or soak or dam
- watering a kitchen garden

With the exception of water used on land for fire prevention purposes which may be taken as set out above, water may be taken from a:

- spring
- soak
- dam
- waterway
- groundwater

Broadly speaking, a 'kitchen garden' for this purpose is a domestic garden from which no produce is sold. Use for commercial purposes such as dairies, piggeries, feedlots, poultry or intensive or commercial use is excluded.

7.2.1.2 Traditional Owner rights

Section 8A of the Victorian Water Act provides that any member of a Traditional Owner group who has a natural resource agreement with the relevant conditions under the *Traditional Owner Settlement Act 2010* may take and use water from a waterway or bore for traditional purposes in accordance with an authorisation order made under that Act. Traditional purposes mean providing for the personal, domestic or non-commercial communal needs of the group members.

An authorisation order may include the terms and conditions relating to the right to take and use water under this provision. As at August 2018, only the Dja Dja Wurrung Clans Aboriginal Corporation may use this right to access water within Victoria's North and Murray water resource plan area in accordance with the authorisation order.

7.2.2 Water entitlements

The statutory entitlements provided for under the Victorian Water Act are:

- bulk entitlements
- environmental entitlements
- water shares
- take and use licences (also called section 51 licences)
- registration licences

All water entitlements are recorded in the Victorian Water Register, which provides an authoritative record of the entitlement volumes and associated transactions, including allocations and trade. Useful information for water users about water entitlements and related arrangements can be found on the [Victorian Water Register](#) website.

These entitlements are referred to as 'water access rights' in the Commonwealth Water Act and the Basin Plan.

Protection of the resource and of existing entitlement holders is supported by safeguards in the Victorian Water Act including:

- offences for unauthorised take of water
- requirements relating to notification regarding new entitlements



- matters for consideration when dealing with applications for new entitlements or amending entitlements
- processes for consultation before amending entitlements
- a cap on the total amount of water that may be authorised – including, for example, a permissible consumptive volume
- in the case of bulk entitlement, provision for either House of Parliament to disallow the creation of a bulk entitlement

Basin Plan requires the water resource plan to identify how much water is taken for each type of water access right. How the volume of water taken under each type of entitlement or form of take is calculated is outlined in [Table 9-4 of Chapter 9](#) and [Table 6](#) of the Methods Report at [Appendix C](#). The volume of take measured or estimated is outlined in [Table 15-1](#).

7.2.2.1 Bulk and environmental entitlements

Bulk entitlements

Under the Victorian Water Act, the Minister for Water may make an order granting a bulk entitlement to allow the holder to take a volume of water subject to conditions specified in the bulk entitlement.

A bulk entitlement may only be held by a water corporation, the Minister administering the *Conservation, Forests and Land Act 1987*, a generation (power) company within the meaning of the *Electricity Industry Act 2000*, or the Victorian Environmental Water Holder (VEWH).

In northern Victoria, bulk entitlements have been granted to water corporations, the VEWH and power companies. In unregulated systems, bulk entitlements have been granted to water corporations that supply water to urban water users and power companies. In regulated systems 'source' bulk entitlements have been granted to Goulburn-Murray Water (GMW). These give GMW the right to harvest water and the obligation to deliver water to primary entitlement holders. These primary entitlement holders include water share holders, other bulk entitlement holders such as urban water corporations and the VEWH.

A bulk entitlement does not have a specified term or period and is therefore an ongoing entitlement. A bulk entitlement may be issued subject to conditions and obligations.

These typically provide for the:

- rate, location and conditions of take
- obligations to release environmental and passing flows
- metering, accounting, financial and reporting obligations

The general structure of all bulk and environmental entitlements is described in [Figure 7-2](#). However, all entitlements are unique as each one needs to reflect the nature of the system in which it is held.

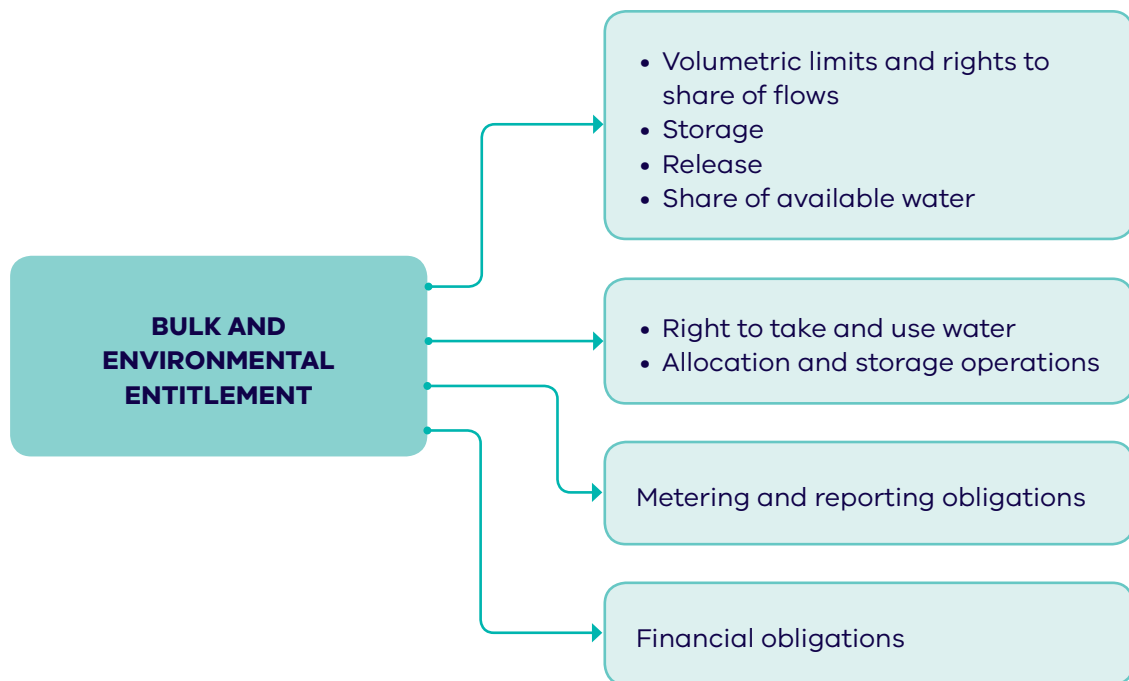


Figure 7-2: Simplified structure of bulk and environmental entitlements

Holders of bulk entitlements and environmental entitlements explained in this section have specific powers and responsibilities.

They:

- may take or order water to be delivered in accordance with their entitlement
- must comply with the conditions of their entitlements, which include obligations to release or provide for passing flows
- may apply to the Minister for an amendment to their bulk or environmental entitlement
- may be required to contribute to funding the operation of the supply system
- must undertake risk management
- may be required to carry out long-term planning to make sure there is sufficient supply to meet future demands

Environmental entitlements

The Minister for Water may, by instrument, allocate water under an environmental entitlement to the Victorian Environmental Water Holder. The VEWH is a corporate body established under Part 3AA of the Victorian Water Act.

The purposes of environmental entitlements are to:

- contribute to the environmental water reserve
- improve the environmental values and health of water ecosystems, including their biodiversity ecological functioning and water quality
- assist other uses that depend on good or improved environmental condition

See [Chapter 12](#) for more information.

As with a bulk entitlement, the Minister for Water must consider the matters set out in the Victorian Water Act in considering whether or not to allocate an environmental entitlement.



These include:

- any adverse effect that the allocation or use of water under the entitlement is likely to have on existing authorised uses of water in the water system
- the conservation policy of the government
- the maintenance of the environment water reserve in accordance with the environmental water reserve objective
- whether the proposed source of water is within a heritage river area or natural catchment area within the meaning of the *Heritage Rivers Act 1992*, and any restriction on the use in the area under that Act
- any relevant sustainable water strategy
- any other matter the Minister thinks fit to take into account

Environmental entitlements and bulk entitlements can be amended and traded. This process is explained in [Section 7.2.3](#).

7.2.2.2 Individual arrangements for access to water

Water shares

Unbundling was the process of separating water rights from land rights, when entitlements previously called water rights or take and use licences were converted into three separate rights, water shares, delivery shares in districts or extraction shares on waterways and water-use licence or water use registration. This was done for northern Victoria by a declaration of water systems on 1 July 2007 which resulted in existing water rights being converted into:

- a share of the available water in the water system: a water share
- authorisation to use water on land: a water-use licence for irrigation or water-use registration for uses other than irrigation
- authorisation to divert water: a works licence (issued under section 67 of the Victorian Water Act) to divert water directly from a waterway or a delivery share (provided as a delivery determination under section 222 of the Victorian Water Act) to divert water from a water corporation's irrigation district infrastructure

A water share is a legally recognised and ongoing entitlement to a share of the water available in a declared water system. Water shares have been issued in most of the regulated surface water systems in northern Victoria. The volume of water that may be taken in any year will depend; on the allocation in relation to a water share, and any carryover that applies.

Decisions about allocations are made by an Authority appointed by the Minister under the Victorian Water Act. This is Goulburn-Murray Water for the Murray, Goulburn, Loddon, Campaspe, Broken and Bullarook systems.

Decisions about allocations are based on a range of factors, including mainly the amount of water available in the system and by considering any future estimated inflows. This is discussed in more detail in [Section 7.2.2.5](#).

Water shares can be high-reliability or low-reliability. The reliability relates to the level of security and how allocations are made in relation to water shares. Allocations are made against high-reliability water shares before low-reliability water shares. The rules in relation to when allocations are made to the water shares are described in the respective system bulk entitlements.

Features of a water share include:

- the name or names of the holder
- the volume, for example 100 ML
- its water system, such as the Goulburn or Murray, and the zone for which the water share is issued if that system is divided into zones
- its class of reliability, for example high-reliability or low-reliability
- identification of the water corporation responsible for providing the services regarding the water share

In Victoria anyone can own a water share, but take and use of water under a water share is subject to any provisions under the Victorian Water Act. Provisions may limit where water may be used, the place from which water may be taken, or the times or rate at which water may be taken (as specified in a water use licence, water use registration, works licence or delivery share). Details of water shares are stored in the Victorian Water Register.

Delivery shares or extraction shares are required to provide access to water particularly during times of congestion. A delivery share is an entitlement to have water delivered to land in an irrigation area. It gives the holder access to a share of the available capacity in the channel or piped network that supplies water to their property.

A water-use licence or water-use registration is an entitlement to irrigate a specific parcel of land, water-use licences are for to apply irrigation water on land and water-use registration are for any other purpose. These licences are tied to the land and are automatically transferred to the new owner if the land is sold.

A works licence authorises the construction, alteration, operation, removal or decommissioning of any works on a waterway. These may include conditions relating to when works may be used and restrictions or conditions including to protect the environment and third parties.

Take and use licences

A take and use licence, also known as a section 51 licence, is an entitlement issued for a fixed term to take and use surface water or groundwater from a specified source: a waterway, catchment dam, spring, soak or aquifer. The maximum licence term is 15 years or 30 years for power generation companies. A take and use licence can be renewed.

In northern Victoria, take and use licences authorise access to water from undeclared surface water and groundwater aquifers. They are also used to access water in the undeclared Coliban Water regulated surface water system.

In Victoria's North and Murray water resource plan area, the Minister for Water has delegated licensing responsibilities to Goulburn-Murray Water, Lower Murray Water and Coliban Water. The relevant water corporation issues take and use licences unless it has a conflict of interest. If there is conflict of interest the Minister will make the decision about the licence application.

Most Victorian unregulated surface water systems, and groundwater management areas and water supply protection areas have a cap or a limit placed on the total volume of water that may be licensed for extraction within a given period (typically one year). This includes the taking of water for urban drinking water, irrigation and industrial uses.

When the relevant water corporation considers an application for the issue of a licence, it must consider a range of matters including those set out in section 40 of section 53 of the Victorian Water Act.



These include:

- the existing and projected availability of water in the area
- any applicable permissible consumptive volume
- any adverse effect that the allocation or use of water under the entitlement is likely to have on existing uses of water, or a waterway or aquifer
- maintenance of the environmental water reserve
- the need to protect the environment

Licences are issued and managed by water corporations in line with the Ministerial Policies for Managing Take and Use Licences (DEPI, 2014). These policies set out matters and actions the Minister asks delegates to consider or carry out. Policies have also been issued for protecting high-value ecosystems that depend on groundwater when water corporations are considering applications for take and use of groundwater (DELWP, 2015).

Each licence is subject to conditions. A standard set of conditions is included in all licences and additional customised conditions may also be included in a licence.

Take under a take and use licence is also subject to any other provisions of the Victorian Water Act. These may limit the place from which water can be taken and the times or rate at which it can be taken, as specified in a section 67 works licence. A works licence must be held if a person requires works to access water through infrastructure, like a pump on a waterway or bore.

The Minister may revoke a licence if, in the Minister's opinion, there has been a failure to comply with any of the licence conditions. However, the Minister must give three months' written notice and specify the reasons for doing this.

Take and use licences can be transferred (traded) permanently or temporarily. An application to transfer a take and use licence will be assessed against the same criteria as the issue of a licence. Consideration of an application include any potential effects on third parties like the environment, as well as any trading rules that may apply. See [Figure 7-7](#) for the considerations that apply to the transfer of a take and use licence. See also [Section 7.4](#) for discussion of groundwater trade under Basin Plan.

Information about take and use licences is recorded on the Victorian Water Register (see [Section 7.3.2](#)).

Registration licences

A registration licence authorises take and use from a dam, spring or soak. Registration licences were issued between 1 July 2002 and 30 June 2003 and recognised historical water use. A registration licence is perpetual and does not attract a licence fee. It is attached to land and can only be transferred on the sale of land. As noted, a registration licence cannot be traded, except with the sale of the land, but may be converted into a take and use licence if the holder wants to trade.

7.2.2.3 Other supply arrangements

Urban water supply

Individuals who are supplied by urban water corporations are not required to obtain an entitlement or to exercise a right under the Victorian Water Act to take water for use in their homes. Urban reticulated water supply is managed by water corporations. A water corporation with a water district must supply water to the owners of all serviced properties. The water to meet this obligation is sourced from the urban water corporation's bulk entitlement or water shares owned by water corporations.

Where a serviced property is supplied by a water corporation, permanent water saving rules or water restrictions which limit specified outdoor uses, such as garden watering, can be imposed during times of water shortage to reduce demand.

Supply by agreement

A water corporation may decide to enter into contractual arrangements known as a supply by agreement to supply water to customers where, for example, there are properties that are not designated as serviced properties¹. This is a contractual arrangement which may specify a range of matters including the volume of water, flow rates, quality, period of time and the purpose for which the water will be used. The water supplied under these supply by agreements is sourced from the water corporation's bulk entitlement or water share or take and use licences.

7.2.2.4 Above cap and system water

In addition to individual water entitlements, there is a large amount of other water in rivers, 'above cap' water and system water. Above cap water is the water that is left in the system which is in excess of the water which is authorised to be taken under the Victorian Water Act. System water is defined in bulk and environmental entitlements and may support reliability, water quality, or delivery of individual water entitlements, for example passing flows or defined losses. Both above cap and system water can have multiple benefits including supporting system reliability, environmental values and deliverability. How this water contributes to achieving environmental outcomes or objectives is outlined further in [Section 12.4.3](#).

Each system has system specific rules, defined in bulk entitlements, which reflect historic operations, the needs of users, interactions with other systems and the environment.

Above Cap

Above cap water is the water which is left over after passing flows have been met and all take under an entitlement or right has been extracted. In unregulated systems, this is most of the flow in the river that remains after water users have extracted water available under their entitlements or right. In regulated systems this is the flow in the river which is not allocated under entitlements and is not meeting a requirement downstream. This may occur when storages spill and there is not sufficient airspace in storages or consumptive demand downstream to make use of this water. Because of the connectivity of systems in northern Victoria, water has a high chance of being regulated either in Victorian tributaries or the River Murray. However, unless rain falls directly on the storage the water will have some period of not being regulated. Note that under the Risk Assessment (see [Appendix B](#)) risks to above cap water were assessed as "uncontrolled water". The risks to this water were assessed separately for environmental, consumptive, and other economic uses (see [Chapter 5](#) and [Appendix B](#) for more detail).

System water

System water is all the water that is described in the bulk entitlements which is not specifically for environmental or consumptive use. This water will likely have a specific purpose, for example water for passing flows, water to cover delivery losses in irrigation districts or water reserves for release to mitigate water quality impact from water quality events. Different systems prescribe different portions for the system water and will depend on the complexity of the system and the arrangements as described in the bulk entitlements. System water may go by other names as specific to the use of the water. In some instances this water might be specifically for the environment and is therefore planned environmental water under the Basin Plan (see [Section 12.4.2.2](#)). Risks to system water were assessed in the Risk Assessment (see [Appendix B](#)). The risks to this water were assessed separately for environmental, consumptive and other economic uses.

1. Serviced properties (section 144) and water districts (Part 6A, section 122GA) are declared under the Victorian Water Act



7.2.2.5 Specific water access arrangements under entitlements

Access arrangements are an important tool used by water managers to protect passing flows when conditions are dry. Restricting take in these times protects environmental values and section 8 and 8A rights. As section 8 rights include domestic use this type of use is protected as part of critical human needs in Victoria (see [Chapter 10](#) for more info).

Rosters, bans and restrictions

In undeclared regulated or unregulated water systems, conditions in some bulk entitlements preserve baseflows in rivers, and rosters, bans and restrictions are used to ration take and use licence holders' access to water in dry conditions. Bulk entitlements usually have a passing flow clause, which describes a base level of water that cannot be taken for consumptive use.

Take and use licences authorising access to surface water include conditions that enable restrictions and bans to protect the environment and support water sharing during periods of low flow. Restriction rules are developed and documented in statutory management plans in water supply protection areas or communicated in local management plans in other areas.

Seasonal determinations

Seasonal determinations are a method to manage variable water availability year to year and share available water between all entitlement holders, including water share holders, other bulk entitlement holders and environmental entitlement holders in accordance with rules defined in bulk and environmental entitlements. A seasonal determination determines the amount of water available for use in the water system for that season.

In northern Victoria, Goulburn-Murray Water is appointed as the Authority responsible for making seasonal determinations for the seven declared water systems.

Seasonal determinations are made at the start of each water year based on the total water in storage and a forecast of inflows during the year, minus an estimate of the total water required to operate that system over the year and water already committed, including carryover and water held in inter-valley transfer accounts. Seasonal determinations are revised regularly throughout the year and increases to allocations are made based on current operational data such as actual deliveries, losses and inflows, and revised forecasts for the remainder of the season.

Building system resilience – lessons from the Millennium Drought

The unprecedented dry conditions of the Millennium Drought, particularly during 2006-07, resulted in several years when there was not enough water to supply the full range of competing uses in the systems. It also exposed the potential that following consecutive dry years, there may not be enough water to operate the large regulated systems in northern Victoria and supply customers, even if they have carried over water for use.

As a result, many changes were introduced to build system resilience to dry conditions. These included changes to how water resource managers forecast inflows and allocate and use the system operating water, and more conservative reserve rules to provide greater certainty that water could be delivered early in the season. These reforms have continued to support the development of high-value irrigated agriculture in Victoria.

Carryover

Surface water carryover

Carryover was initially introduced in the Goulburn and Murray regulated systems in northern Victoria in 2007 as an emergency drought response measure. Carryover arrangements allow water not used in a water season to be taken and used into the next water season. The central principle behind carryover is that unused water may be carried over by individuals to the next year, but must not displace inflows that support new allocations. Carryover is designed to maximise the water available in the early part of the season and is available to holders of both high and low-reliability water shares and bulk and environmental water holders. It allows the holder more flexibility to hold, use or trade water when it's of the greatest value to their business, and to prepare for water shortages.

The Victorian Water Act enables the Minister for Water to make a declaration in relation to a water system, allowing for carryover in that system. A declaration provides that water not used in one water season may be taken and used, that is 'carried over', in the next water season subject to any rules or conditions determined by the Minister for Water.

The Minister has made rules about how users can carry over water so that carryover does not have a negative impact on other entitlement holders or the environmental water reserve. In the Goulburn, Murray and Campaspe systems when entitlement holders carry over water and store water allocation in excess of their full entitlement volume, this is recorded in a spillable water account from which deductions are made if spills occur in the system.

In the Loddon, Broken and Bullarook systems where the storages are smaller, carryover is limited to 50 percent of the entitlement volume for each water share.

In all systems five percent of the carryover volume is deducted to cover water that evaporates when it is stored in the dam through the new water season.

Carryover is not available on the Ovens system where dams are too small to support storage of water for carryover.

Groundwater carryover

The Minister has made declarations for the carryover of groundwater in some groundwater management areas. Groundwater carryover operates on the same principles as for surface water. The declaration enables the licence holder to carry over a fixed percentage of their unused licence volume to the following year.

In northern Victoria the percentages range from 20 to 30 percent, depending on the groundwater management area. There is no deduction for losses or evaporation for groundwater.

7.2.3 Protecting entitlement reliability

The volume and reliability of existing entitlements to surface water and groundwater may be eroded if additional entitlements are granted. The Victorian Water Act provides significant safeguards to protect the integrity of water shares, bulk and environmental entitlements and take and use licences.

These safeguards include:

- offences for unauthorised use of water
- formal statutory processes that must be followed to:
 - issue a new water share
 - issue a new or amend a bulk entitlement (see [Figure 7-4](#))



- issue a new or amend an environmental entitlement (see [Figure 7-5](#))
- issue a new take and use licence
- amend conditions of a take and use licence under a water supply protection area management plan
- a cap on the total amount of water that can be authorised for extraction in Victoria's North and Murray water resource plan area from a surface water system is limited by the sustainable diversion limits (SDLs) set by the Murray-Darling Basin Authority
- a cap on the total amount of groundwater that can be authorised for extraction in Goulburn-Murray water resource plan area is limited by the SDLs set by the Murray-Darling Basin Authority and where a groundwater system has been declared by the Minister by an Order published in the Government Gazette (section 22A) is limited by the permissible consumptive volumes which also cap the total volume of water available to issue under a take and use licence
- requirements for notification to be given to other entitlement holders when the Minister is considering an application to grant or amend a:
 - bulk entitlement (section 38 of the Victorian Water Act)
 - environmental entitlement (section 48D of the Victorian Water Act)
 - take and use licence (section 49 of the Victorian Water Act)
- considerations which the Minister must regard when considering an application to issue or amend an entitlement (for example, sections 33J, 53, 40 and 48F of the Victorian Water Act), including:
 - any adverse effect that the allocation or use of water under the entitlement is likely to have on existing authorised water users
 - the maintenance of the environmental water reserve
- provision for either House of Parliament to disallow a bulk entitlement

The Victorian Water Act requires an application to be made to the Minister for the issue or amendment of a bulk or environmental entitlement. Further, the Act outlines the consultation steps and matters to consider before an entitlement can be amended.

A bulk entitlement may be amended by order on application to the Minister made by the Authority holding a bulk entitlement or another Authority with the support of another Minister. Bulk entitlements are amended in the same manner as they are granted. The process to grant or amend a bulk entitlement is set out in Part 4, Division 1 of the Victorian Water Act. This process must be followed before a bulk entitlement can be created or an amendment can be made. The Act prevents the Minister from issuing a direction about how the Victorian Environmental Water Holder is to manage its environmental entitlements.

Applications for new, or major amendments to, bulk and environmental entitlements can take up to two years to be approved. The Act provides procedural safeguards to minimise the influence of vested interests and to address the technical challenges in explicitly and exclusively specifying rights to water resources that move through river drainage basins and groundwater systems.

A minor amendment may be made to a bulk entitlement by notice, using a streamlined process where the proposed amendment would:

- correct a mistake in the description of any element of the entitlement
- make a minor variation arising from practical operations
- vary or impose a new obligation on a resource manager or storage manager
- make any other amendment that does not impact on another person's entitlement to water and does not adversely affect the environmental water reserve

Bulk entitlements may be traded permanently (transferred under section 46D of the Victorian Water Act) and water held under a bulk entitlement can be temporarily traded (assignment of allocation under section 46 of the Victorian Water Act). Temporary trades require approval by the Minister for Water or the Minister's delegate and the Authority whose works will be used to deliver the water. Permanent trade of bulk entitlement must be approved by the Minister and this approval is not delegated.

As with bulk entitlements, environmental entitlements are ongoing and can be traded permanently (transferred under section 48OA of the Victorian Water Act) or water held under an environmental entitlement can be temporarily traded (assignment of allocation under section 48L of the Victorian Water Act). Temporary trade (assignment of allocation) of environmental entitlements needs approval by the Minister and the Authority whose works will be used to deliver the water.

Figure 7-4 shows the processes set out in the Victorian Water Act that must be followed to grant a new bulk water entitlement or make a major amendment to an existing one. The process is similar for environmental entitlements (see **Figure 7-5**).

7.2.3.1 Qualification of rights

In extreme events further described in **Chapter 10**, the Minister may qualify any water entitlement. This is an emergency measure which allows the Minister for Water to intervene by declaring a water shortage and qualifying rights and entitlements in a water system. This allows the Minister for Water to temporarily overrule some or all the water sharing arrangements in a system.

Section 33AAA of the Victorian Water Act allows the Minister to qualify rights temporarily following a declaration of a water shortage. This power has been used during severe droughts, for example to reduce passing flow obligations to make sure town water demands can be supplied under Stage 4 restrictions.

The Department of Land, Environment, Water and Planning (DELWP) has issued guidelines for exercising these powers and expects that qualification of rights will only be done in extraordinary and unforeseen circumstances (DELWP, 2016).

The Minister may also permanently qualify rights to water under section 33AAB of the Victorian Water Act. Permanent qualification of rights can be declared only on completion of a long-term water resource assessment. Assessments are to be reviewed every 15 years.

Process in the Victorian Water Act to amend a bulk water entitlement

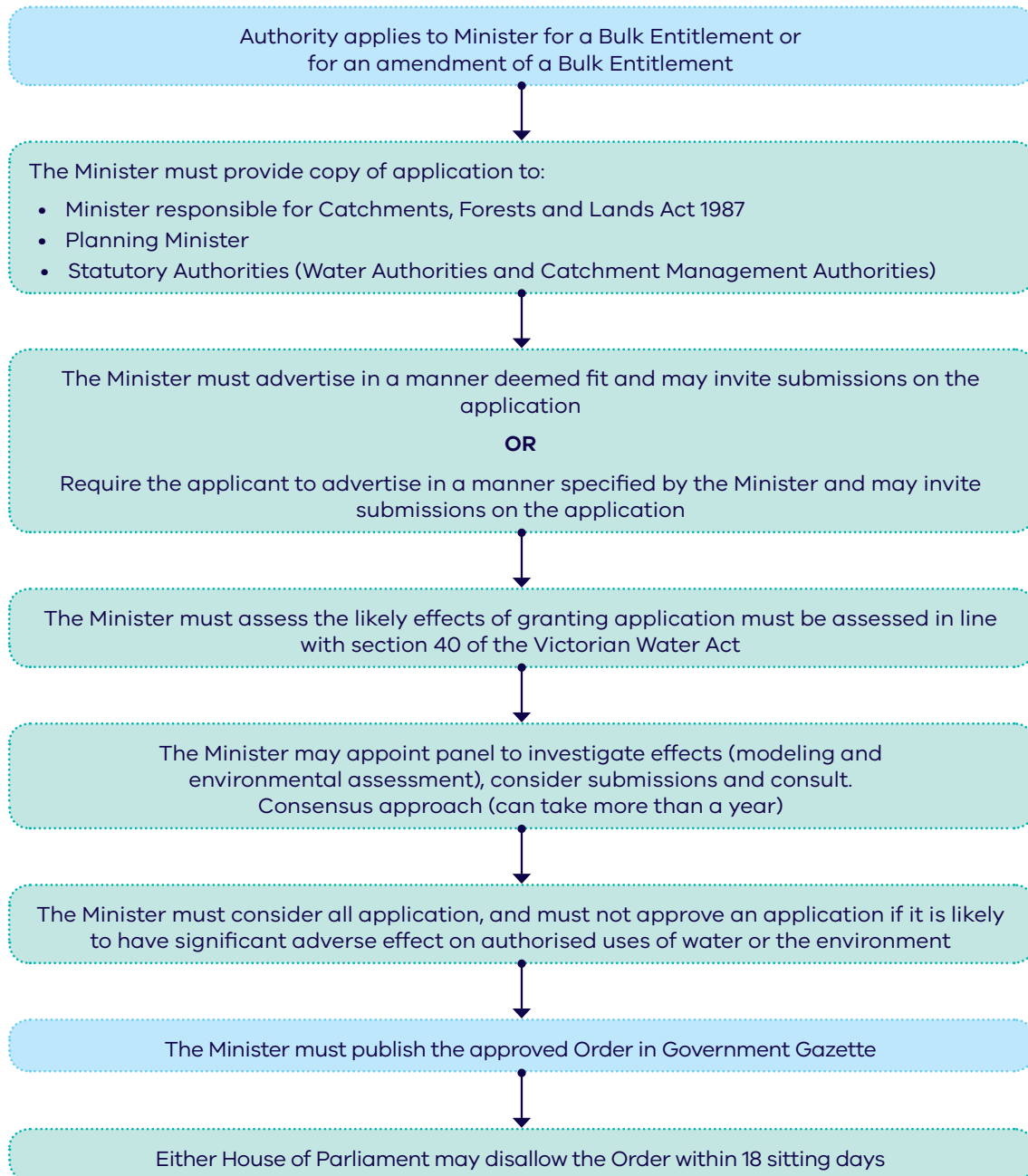


Figure 7-3: Process in the Victorian Water Act to amend a bulk water entitlement

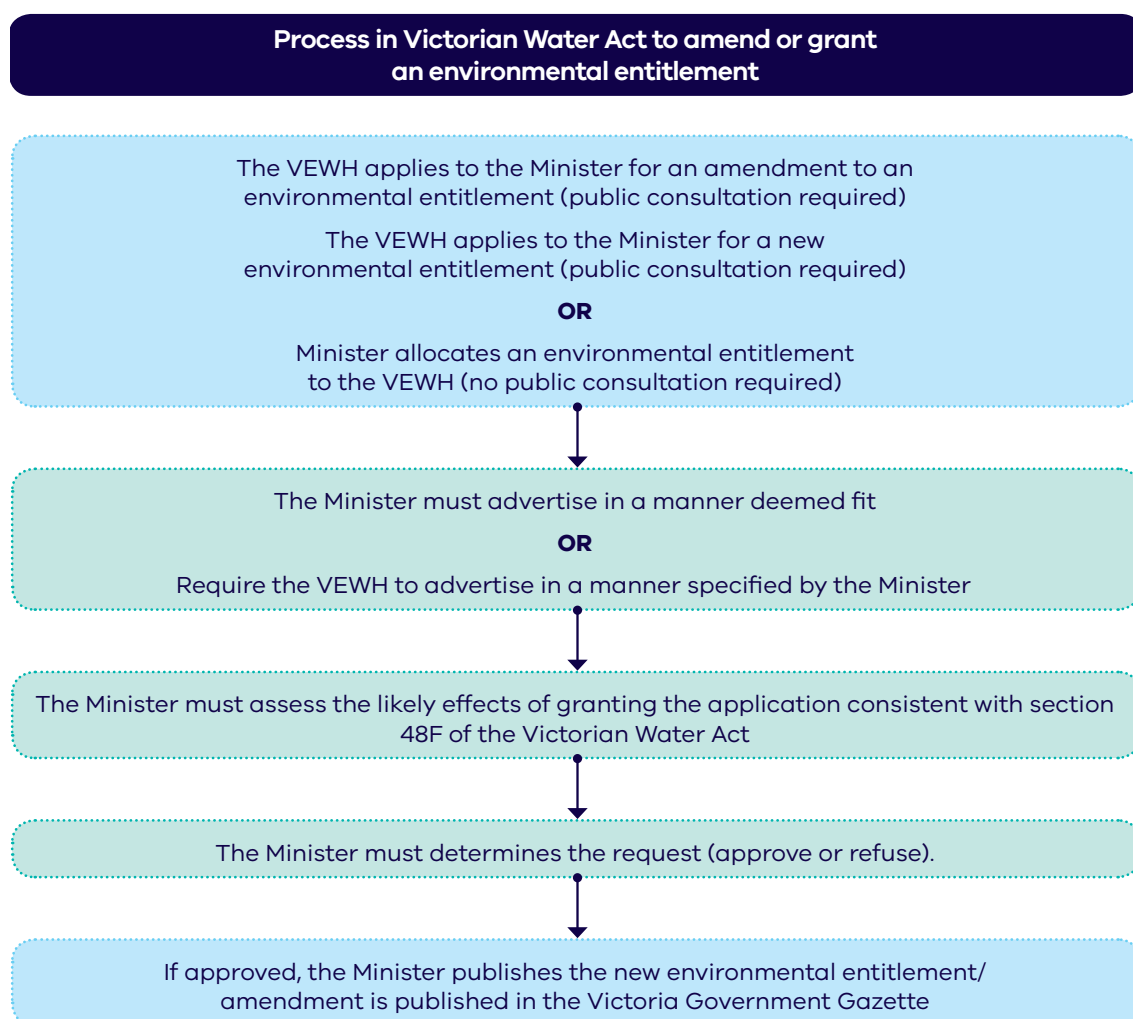


Figure 7-4: Statutory process requirements for new or major amendments to an environmental entitlements

7.3 Water markets and trade

Water markets provide an equitable and efficient way to access and share finite water resources. The Victorian water markets are based on a cap and trade system.

Water trading is the process of buying and selling water entitlements or transferring access to water held under entitlements (allocation). Water trade has long been used as a tool in Victoria to facilitate the efficient use of water resources. While unofficial trade was likely occurring as early as the 1940s, official temporary trades first occurred in 1987 and official permanent trades first occurred in 1991–92.

Trading zones are an important feature of water markets. They define areas within which water may be freely traded, traded sometimes and never traded.

Trading rules describe when and how entitlement and allocation can be traded between different trading zones. Trading rules seek to facilitate trade wherever possible whilst minimising the impact of the trade on other uses and the environment. The rules reflect the hydrologic links between the systems and the circumstances in which trades can happen. The rules differ depending upon the region. The Trading Rules for Declared Systems (DSE, 2007), made under the Victorian Water Act, came in to effect on 1 July 2007. Trade of take and use licences in unregulated systems is managed by the relevant rural water corporation in accordance with the ministerial Policies for Managing Take and Use Licences (DEPI, 2014) which set out some rules for

trade. The trade of groundwater licences is also subject to the Policies as described further in [Section 7.4.2](#).

More information about water trading in Victoria is provided on the Victorian Water Register website.

7.3.1 Market design and rules

Figure 7-5 shows the Victorian Government's approach to the design and operation of water markets. The Government balances oversight and consistency with an ability to design each water market to be the most suitable for its purpose and based on the context and characteristics of water resources and market participants.

The Victorian Government establishes market arrangements to apply to all participants who seek to buy and sell water. These participants can include individual entitlement holders, market brokers and intermediaries and organisational entitlement holders, such as water corporations, environmental water entitlement holders and private organisations. Roles and responsibilities in water markets in Victoria are described in [Table 7-2](#).

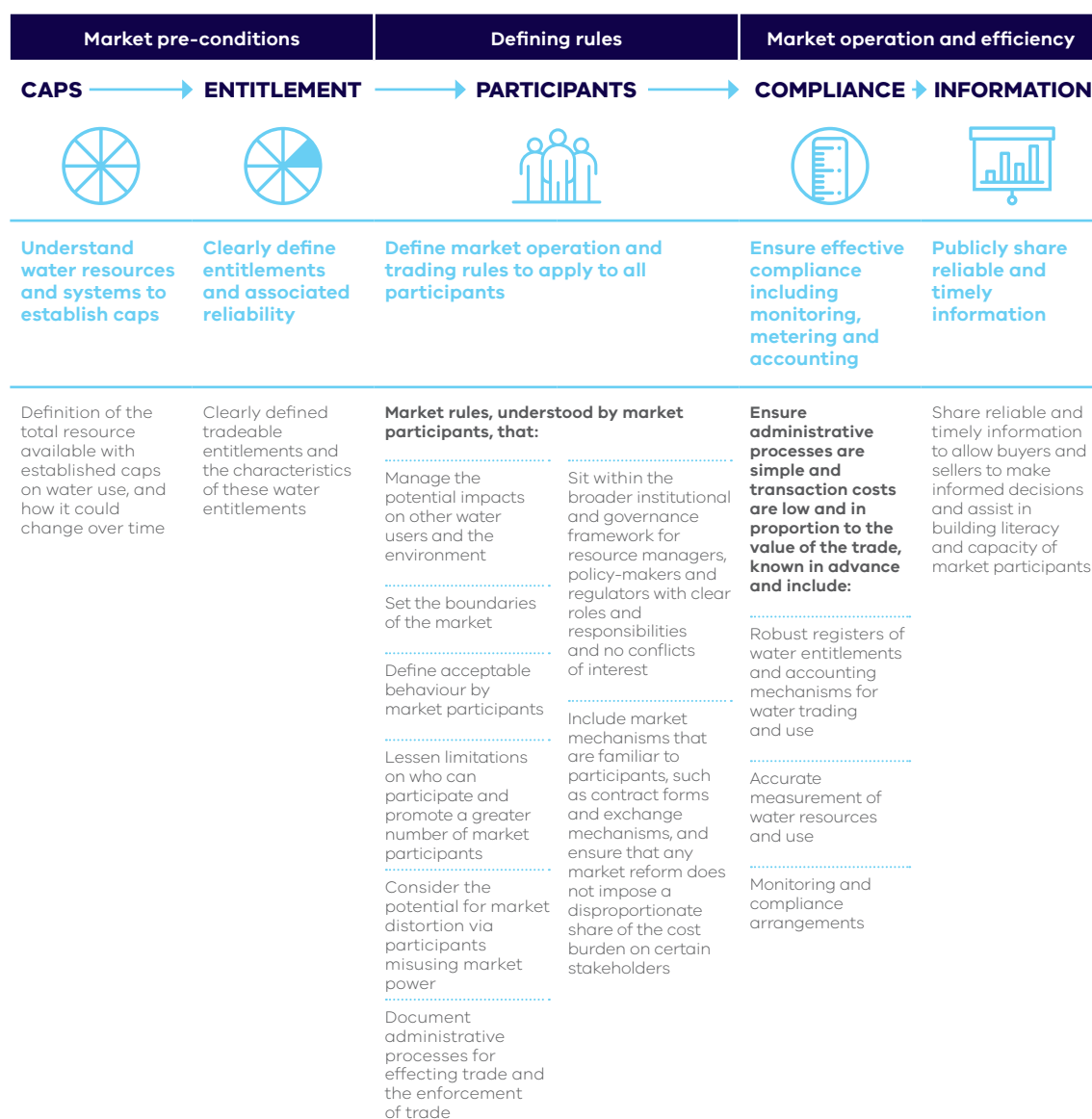


Figure 7-5: Elements of an effective water market

Table 7-2: Roles and responsibilities in water markets

Entity	Roles
Victorian Minister for Water	overall responsibility for elements of market design including compliance with all national and interstate regulations and rules to deal with any potential impacts on third parties or the environment
Murray-Darling Basin Authority	- ensure compliance with Murray-Darling Basin Plan - aim to remove artificial barriers to trade - prevent insider trading and discrimination on who can trade
Australian Competition and Consumer Commission	- fair trading provisions - consumer appeals for unfair trading
Productivity Commission	independent advice to the Federal Government regarding the Murray-Darling Basin Plan and progress towards achieving the objectives and outcomes of the National Water Initiative
Water corporations (where appropriate)	- responsible (delegated authority) for assessing applications for trade of water shares and take and use licences - compliance with regulations and rules - governing water market transactions - disclosure of true and accurate information - must comply with Murray-Darling Basin Plan trading rules - must comply with Water Resource Plans
Market intermediaries or brokers	- subject to consumer law that outlines protections for buyers and sellers - compliance with regulations and rules governing water market transactions - disclosure of true and accurate information
Buyers and sellers	- compliance with regulations and rules governing water market transactions - disclosure of true and accurate information - must not illegally take water above the volume or conditions specified on their entitlement
Victorian Environmental Water Holder	- must comply with Murray-Darling Basin Plan trading rules - compliance with regulations and rules governing water market transactions - disclosure of true and accurate information
Commonwealth Environmental Water Holder	- must comply with Murray-Darling Basin Plan trading rules - compliance with regulations and rules - disclosure of true and accurate information

7.3.2 The Victorian Water Register

The Victorian Water Register provides water users with essential information about water entitlements, seasonal determinations, trade and transfers. The Water Register is the authoritative record of water entitlements and facilitates the transactions that underpin Victoria's water markets.

All water entitlements in Victoria's North and Murray water resource plan areas are recorded on the Victorian Water Register, which provides the Government with the point of control for the state's water entitlement and allocation system. It is a public register of all water-related entitlements in Victoria and was designed and built to record water entitlements with integrity and provide crucial information for managing Victoria's water resources. Important attributes of the register are shown in [Figure 7-6](#).

The Water Register holds statewide surface water and groundwater entitlement records and information about ownership, transfers and, where relevant, allocations to bulk entitlements, environmental entitlements, water shares in declared systems, licences to take and use water and supply by agreements. It also records ownership and details about water-use licences, water-use registrations and works licences.

The Victorian Water Register also hold data related to volumes of water taken or diverted under an entitlement. For Basin Plan purposes this is actual take data. The data on the Victorian Water Register will inform actual take reporting to inform SDL reporting. See [Chapter 9](#) and [Appendix C](#) for more information. The methods for determining actual take and are outlined in [Table 6](#) (for surface water) and [Table 11](#) (for groundwater) in [Appendix C](#).



Figure 7-6: Key attributes of the Victorian Water Register

7.4 Water Markets and the Basin Plan

The Basin Plan seeks to encourage more efficient use of water through trade which allows water to move to areas of higher-value use. Although Basin State governments primarily manage water markets, the Basin Plan provides the framework in which states operate in. The MDBA prepared Basin Plan water trading rules, these rules address three broad aspects of market operations, reducing restrictions on trade, improving transparency and access to information and maintaining market integrity and confidence.

The Basin Plan sections 12.06-12.15 outline the bounds around the expectation that all water resources are able to be traded free of certain restriction. This includes expectations that trade should not be restricted based on the right, the class of person, the purpose for which the water is being used, where the water is being used, whether the water will be carried over, whether the system is over-allocated, the level of use of the water and whether trade would be made conditional on water delivery rights.

The Murray-Darling Basin has a number of water markets not all are as mature and developed as the regulated surface water market in the southern connected basin. Differences occur in water markets due to the type of entitlements, the users, the connectivity to other systems, and the maturity of the markets.

In Basin Plan there are additional rules relating to surface water (see [Section 7.4.1](#)) and groundwater (see [Section 7.4.2](#)).

7.4.1 Surface water trade requirements for Basin Plan

Water trading of surface water in Victoria's North and Murray water resource plan area is covered in Chapter 12 of the Basin Plan, which sets out the Basin Plan surface water trading rules that came into effect in Victoria on 1 July 2014. The Basin Plan does not require general surface water trading arrangements to be included in water resource plans.

In accordance with section 12.19 of the Basin Plan, Victoria has provided evidence to the MDBA regarding restrictions on trade in surface water systems which are necessary and in accordance with section 12.18 of the Basin Plan.

7.4.2 Groundwater trade requirements for Basin Plan

Chapter 12 of the Basin Plan prohibits groundwater trade unless certain conditions are met. These conditions are set out in sections 12.24, 12.25 and 12.26 of the Basin Plan. These conditions are:

- sufficient hydraulic connectivity between the two locations (sections 12.24(a), 12.25(a) and 12.26(a) of the Basin Plan)
- resource condition limits in the SDL resource unit specified in any water resource plan will not be exceeded as a result of the plan (sections 12.24(b), 12.25(b) and 12.26(b) of the Basin Plan)
- the entitlements traded have substantially similar characteristics of timing, reliability and volume, or measures are in place to ensure the entitlement traded will maintain its characteristics of timing, reliability and volume (sections 12.24(c), 12.25(d) and 12.26(d) of the Basin Plan)
- measures are in place to account for trade (sections 12.25(c) and 12.26(c) of the Basin Plan)
- measures are in place to address the impact, as a result of trade, on water availability in relation to a water access right held by a third party (sections 12.24(d), 12.25(e) and 12.26(e) of the Basin Plan)

The requirements under section 12.24-12.26 are also supplemented by the requirements in sections 12.06-12.15 of Basin Plan discussed in [Section 7.4](#). Victoria's North and Murray Water

Resource Plan identifies the circumstances in which groundwater trade may be permitted in the Goulburn-Murray water resource plan area to meet the above conditions.

Part 8 of Chapter 10 of the Basin Plan requires water resource plans to sets out the circumstances in which trade is permitted between two locations within an SDL resource unit, between SDL resource units or between groundwater and surface water SDL resource units.

There is a range of factors that impacts on whether a trade can occur between two locations, and because of this Victoria does not propose to establish trading zones within the Goulburn-Murray water resource plan area under Victoria's North and Murray Water Resource Plan.

Table 7-3 below identifies where trade *may* occur. However, each application to trade is subject to an assessment which includes consideration of a site-specific hydrogeological resource assessments relevant to the trade and the consideration of the matters listed in response to sections 10.37, 10.38 and 10.39 of Basin Plan where relevant. These matters are outlined below and form part of Victoria's North and Murray Water Resource Plan.

Table 7-3: Groundwater trading for Basin Plan Implementation

SDL resource unit	Goulburn-Murray: Sedimentary Plain	Goulburn-Murray: Highlands	Goulburn-Murray: deep	Goulburn-Murray: Shepparton Irrigation Region
Goulburn-Murray: Sedimentary Plain	✓	✓	X	X
Goulburn-Murray: Highlands	✓	✓	X	X
Goulburn-Murray: deep	X	X	✓	X
Goulburn-Murray: Shepparton Irrigation Region	X	X	X	✓

7.4.2.1 Assessing groundwater trade

In northern Victoria groundwater entitlements are issued as take and use licences, also referred to as section 51 licences (see [Section 7.2.2.2](#)). Take and use licences may be traded permanently or temporarily. Trades must comply with the Victorian Water Act and rules in the ministerial Policies for Managing Take and Use Licences (DEPI, 2014) and any management plan that applies in the area. Victoria's trading rules and entitlement framework dictates where groundwater trade can occur, in northern Victoria trading also occurs in line with the requirements of Chapter 12 of the Basin Plan.

Chapter 12 of the Basin Plan contains requirements relating to the trade of water within the Murray-Darling Basin. In addition to prescribing the conditions that must be satisfied before permitted groundwater trade (discussed below), Chapter 12 of the Basin Plan also requires trade to be free of certain restrictions. The Victorian Water Act meets the requirements of sections 12.06 to 12.15 of the Basin Plan. Although section 40(1)(l) of the Victorian Water Act does require consideration of purpose of use of water and the potential impacts the proposed use may have on water resources and third parties, this does not result in a restriction on trade in contravention of section 12.08 of the Basin Plan. There is no discrimination based on individual water access right holder or a specific industry of commercial users in Victoria.



In northern Victoria, Goulburn–Murray Water and Lower Murray Water are delegated by the Minister for Water to issue licences for bore construction and licensing of groundwater under the Victorian Water Act.

The management of groundwater resources aligns with the Victorian groundwater management framework, groundwater basins and groundwater catchments are shown in [Figure 2-3](#).

The Victorian Water Act sets out a number of key considerations that must be taken into account when assessing an application for the transfer (trade) of a take and use licence. Included in this assessment is:

- Considerations relating to section 53 of the Victorian Water Act for the issue or transfer of a take and use licence which ensure the person to whom the water is being transferred has authorisation to take that water from the system
- Considerations relating to section 62 of the Victorian Water Act to transfer the licence from one party to another
- Considerations relating to section 67 of the Victorian Water Act relating to the construction, alteration or operation of a bore where the conditions relating to an existing bore may need to be amended or the person to whom the water is being transferred requires a new bore
- Considerations under section 74 of the Victorian Water Act for the transfer of a works licence where the trade of water also relates to the transfer of ownership of a bore

In determining whether a transfer (or trade) of a groundwater take and use licence can occur the hydrogeological setting must be assessed before the a transfer can proceed. Regardless of whether the ability to trade has already been established between two locations via a previously approved trade, a hydrogeological assessment will always be undertaken in respect of each individual trade (either based on previous or new technical analysis). One component of this assessment is whether there is sufficient hydraulic connectivity between the two locations to support the transfer or trade. Hydrogeological assessments are discussed in more detail below at [Section 7.4.2.2](#).

In addition to assessing the hydrogeological context in which the proposed trade is going to take, a water corporation will also consider the following matters:

- availability of water in the system – consistent with section 40(1)(b) of the Victorian Water Act
- impact of the extraction and the use of the bore on neighbouring features including the impact on waterways where there is groundwater/surface water connectivity or impacts on groundwater dependent ecosystems (including priority environmental assets and priority ecosystem functions)
- the need to protect the environment including, the maintenance of the environmental water reserve which includes held and planned environmental water (see [Chapter 12](#) for discussion on environmental watering)
- management of the aquifer
- any statutory management plans in place
- the impact of the proposed water use on other existing users in the system

[Figure 7-7](#) identifies how the considerations prescribed under the Victorian Water Act relating to the transfer (trade) of a take and use licence (groundwater) aligns with Basin Plan requirements.

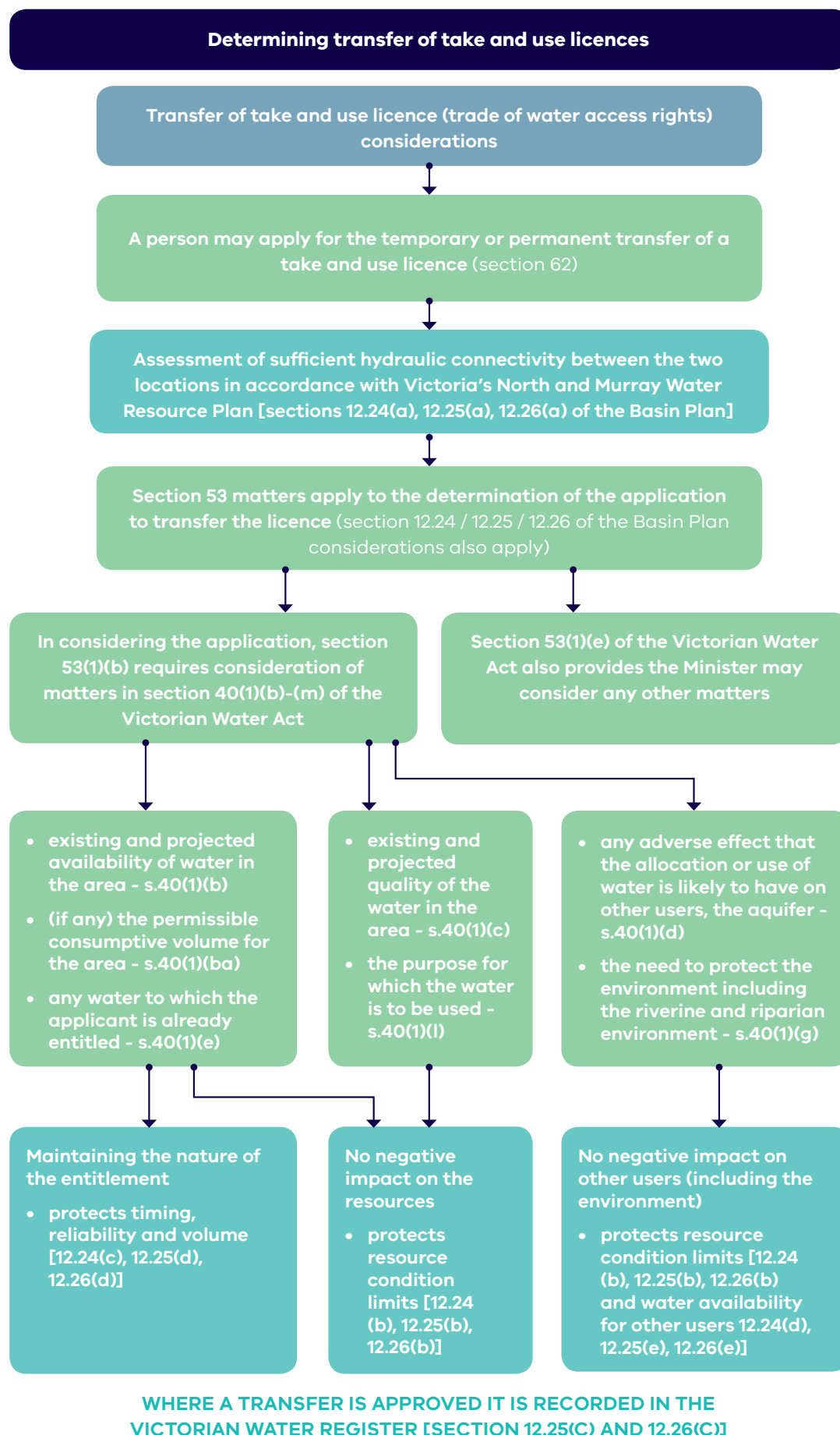


Figure 7-7: Determining the transfer of a take and use licence



The matters required by Basin Plan to be considered when determining whether a trade of groundwater should be approved are:

- sufficient hydraulic connectivity (see [Section 7.4.2.2](#))
- resource condition limits (see [Section 7.4.2.3](#))
- accounting for trade (see [Section 7.4.2.4](#))
- maintaining characteristics of what is traded (see [Section 7.4.2.5](#))
- managing impacts on third parties (see [Section 7.4.2.6](#))

These matters are required to be met for trades within a groundwater SDL resource unit, between two groundwater SDL resource units and trades between a groundwater SDL resource unit and a surface water SDL resource unit.

7.4.2.2 Sufficient hydraulic connectivity in Victoria's North and Murray water resource plan

Basin Plan requires sufficient hydraulic connectivity to be demonstrated prior to the approval of a transfer of a take and use licence for groundwater. Sufficient hydraulic connectivity is considered to exist in a groundwater system through which groundwater may flow, which has discrete boundaries and which has areas of groundwater recharge and discharge. It may include a single aquifer, a group of connected aquifers, or groundwater and surface water elements in conjunction, that are connected by a groundwater flow path.

For the purpose of Basin Plan, a water resource plan must identify the locations between which there is sufficient hydraulic connectivity or the method by which sufficient hydraulic connectivity will be identified. In Victoria, before determining whether the trade of groundwater resources should be permitted, an extensive assessment is undertaken which includes among other things, an assessment of sufficient hydraulic connectivity. However, the existence of sufficient hydraulic connectivity is not the only factor in determining whether a person can trade between the two identified locations.

Details about factors related to impacts of taking groundwater (ie more specific than the matters spelt in sections 53 and 40 of the Victorian Water Act) include:

- impacts on other uses, including the environment, from drawdown and potential loss of access
- loss of connection with surface water systems (eg loss of baseflow)
- potential subsidence and acid sulphate soils

In addition to sufficient hydraulic connectivity, the Victorian framework requires a number of other requirements to be met before a trade can be approved. Victoria does not propose to establish trading zones within the Goulburn-Murray water resource plan area under Victoria's North and Murray Water Resource Plan because they do not currently exist and the work has not been done to set them up.

Understanding groundwater availability, movement and connectivity is complex. Below is a summary of the current understanding of connectivity within the plan area.

All groundwater units present in Victoria's North and Murray water resource plan area are hydraulically connected to adjacent groundwater units. The groundwater systems operate within the single overall Goulburn-Murray groundwater basin, and as such they have been managed as connected systems. The high level of connectivity has been investigated over many years and has guided management plan development and the sustainable management of the resource over the long term.

Victoria considers sufficient hydraulic connectivity in terms of the Goulburn-Murray region on the following basis:

- groundwater resources are hydraulically connected, across catchments within the Goulburn-Murray: Sedimentary Plain SDL resource unit
- groundwater resources are hydraulically connected between adjoining groundwater catchment areas in the Goulburn-Murray: Highlands SDL resource unit
- groundwater resources are hydraulically connected, between the Goulburn-Murray: Sedimentary Plain and the Goulburn-Murray: Highlands SDL resource units within groundwater catchments
- groundwater resources are hydraulically connected within the Goulburn-Murray: Shepparton Irrigation Area SDL resource unit

The above assessment of connectivity identifies where trade may generally occur but each individual trade is subject to site specific hydrogeological resource assessments undertaken by the licensing authority. In circumstances where sufficient hydraulic connectivity is not established an application for a transfer (trade) of a take and use licence may be refused.

7.4.2.3 Resource condition limits

In all groundwater management units, a permissible consumptive volume (PCV) has been declared that sets a cap on the total volume of water that may be licensed. The exception is the Upper Ovens River Water Supply Protection Area Water Management Plan where there is conjunctive management of groundwater and surface water. PCVs are declared by the Minister for Water through an Order published in the Government Gazette under section 22A of the Victoria Water Act. Where a water supply protection area is declared the statutory management plan may identify limits on extraction for that declared area where no PCV is in place.

Licences may not be issued or transferred if the permissible consumptive volume or limit under a statutory management plan will be exceeded as a result of the issue of the licence or the transfer of the licence.

Where the transfer of a take and use licence would cause the resource condition limit (cap on entitlement take) to be exceeded the applicant would be advised that the trade cannot occur. This may result in a negotiation to bring the volume down to a level which is below the resource condition limit, this advice would be given by the water corporation processing the trade.

This circumstance will only arise where trade is occurring between groundwater management units which have individual resource condition limits separate from the overall SDL for the relevant SDL resource unit in the Goulburn-Murray water resource plan area.

7.4.2.4 Accounting for trade

Basin Plan requires that all trades be accounted for. In Victoria all water share, bulk entitlement, environmental entitlement and licence transfers are recorded on the Victorian Water Register. This includes all approved groundwater trades. See [Section 7.3.2](#) above for more detail on the Victorian Water Register.

7.4.2.5 Maintaining characteristics of the what is traded

The Victorian Water Act provides for a groundwater trade (whether temporary or permanent) to be made by a transfer of the licence. Basin Plan requires that either:

- water access rights (entitlements) with substantially the same characteristics exist in both locations (sections 12.24(c)(i), 12.25(d)(i) or 12.26(d)(i) of the Basin Plan), or
- maintain the characteristics of the water access right (entitlement) through the trade (sections 12.24(c)(ii), 12.25(d)(ii) or 12.26(d)(ii) of the Basin Plan).



Take and use licences authorise the take and use of groundwater across Victoria. Take and use licences for the authorisation of groundwater take have substantially the same characteristics across Victoria. Therefore Victoria is able to satisfy the requirement under sections 12.24(c)(i), 12.25(d)(i) or 12.26(d)(i) of the Basin Plan without the need to maintain characteristics through a trade (transfer) of a take and use licence.

As a result of take and use licences having substantially the same characteristics across Victoria, the Victorian Water Act inherently also provides for traded licences to maintain their essential characteristics such as volume, term and conditions (noting that groundwater licences do not have the characteristic of high or low reliability).

It is understood that for the purposes of Basin Plan, changes from all-year licence to winter-fill will constitute a change to the timing characteristics of a water access right. This typically does not occur, except in the unique circumstance under the Upper Ovens River Water Supply Protection Area Water Management Plan which only permits trade to an upstream water user (noting that groundwater and surface water are treated as the same under this Plan) who can take under winter-fill licence. This is because water is not available under the resource condition limit under an all-year authorisation to take upstream without impacting on reliability of water for other users or without increasing the risk of adverse impacts on the environment. The upstream trading rule, which results in a winter-fill licence, ensures that there are no undesirable upstream impacts on summer flows that may affect the reliability of water users upstream. It also improves the reliability for water users downstream during the summer months and it reduces adverse environmental impacts upstream, where summer flows are likely to be less than at the downstream location. However, these measures effectively change the characteristics of the entitlement as it is converted from a full year licence to a winter-fill licence as a result of the trade.

Trade in line with the Upper Ovens River Water Supply Protection Area Water Management Plan is relevant to sections 10.37 and 10.39 of the Basin Plan as it relates to trade of groundwater to surface water and vice versa (see [Section 7.4.2.10](#)). In response to section 10.37 and 10.39 of the Basin Plan, it has been identified that to meet the circumstances of 12.24(c) and 12.26(d) all permanent trade in the Upper Ovens River Water Supply Protection Area licences cannot be converted as a result of a trade. Practically speaking, this will mean that a person's take and use licence must be converted to a winter-fill licence before being permanently transferred to an upstream user. This requires an administrative change in how the trading rules under the statutory management plan are given effect.

7.4.2.6 Managing impacts on third parties

When assessing a trade the authorising authority also considers any impact of the proposed trade would have to other users in the system and the environment. The impact is considered at the following scales:

- neighbour
- local
- regional

If an application does not meet the requirements as a medium or high risk, or cannot prove that it meets the requirements, then the application will be refused. However before the water corporation formally refuses the application first they would speak to the applicant to determine whether the applicant wishes to do further resource assessments at their own cost to provide justification for the trade, or if the applicant wishes to alter the proposal so as not mitigate the impact of the trade.

Neighbour

The neighbouring scale assessment considers drawdown impacts to neighbouring features typically within one to two kilometres of the pumping bore. See [Figure 7-9](#).

Impacts are determined using a groundwater interference assessment tool developed by Goulburn-Murray Water with support from DELWP to model drawdown at neighbouring features like bores (third party holders of a water access right) and groundwater dependent ecosystems (including priority environmental assets and priority ecosystem functions) and stream depletion (surface water impacts). The assessment applies a risk-based approach that includes a probabilistic analysis to improve certainty in the analysis.

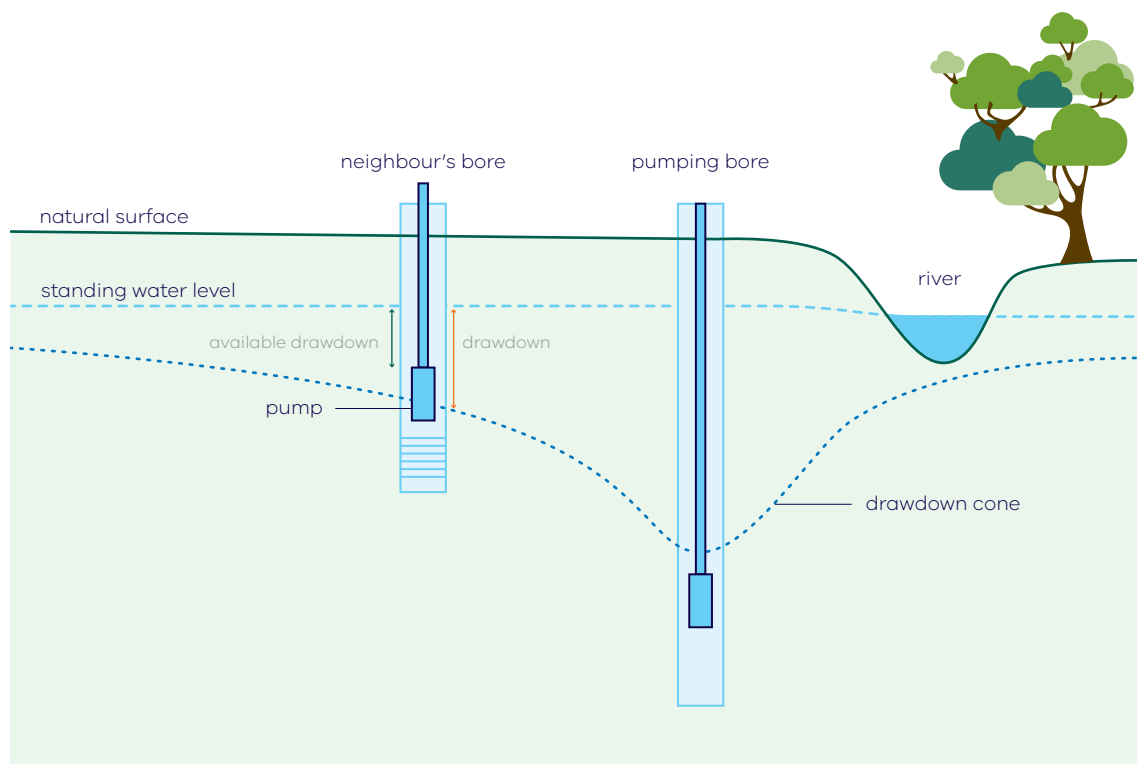


Figure 7-8: Impacts of groundwater pumping on neighbouring features

Local scale

Local scale assessment considers impacts of cumulative pumping at the management zone or 'hot spot' scale from a few km² to 10km² (see [Figure 7-10](#)).

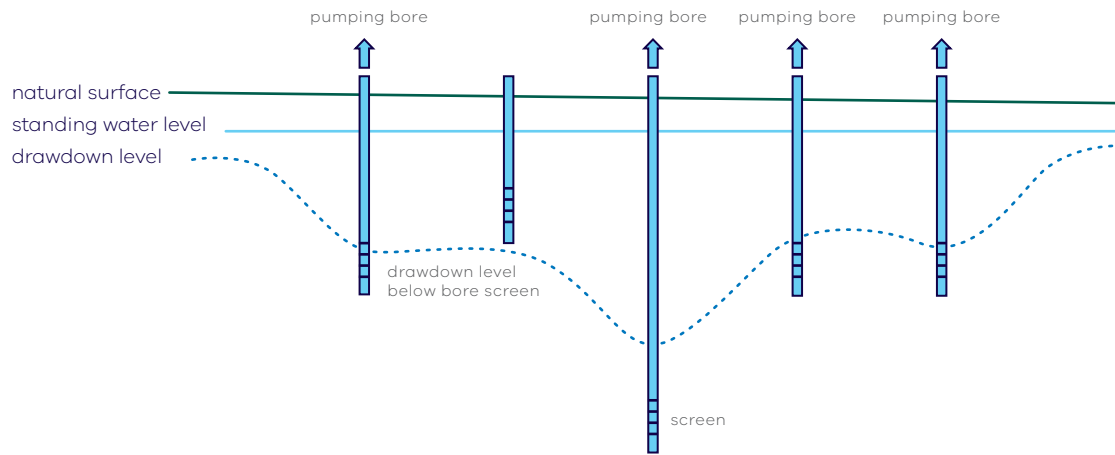
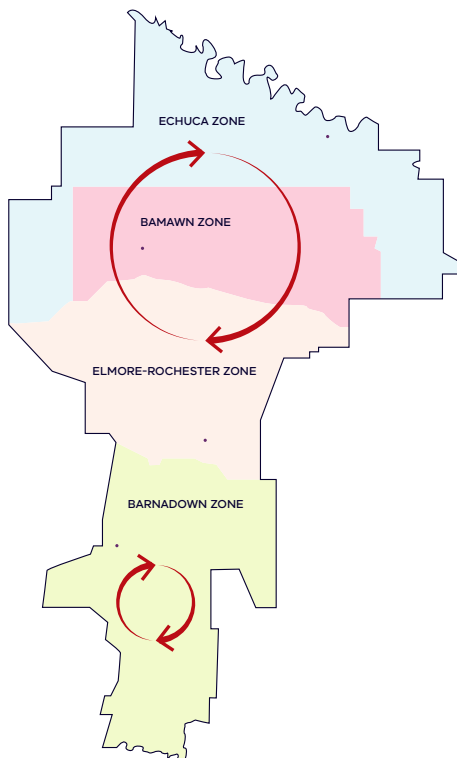


Figure 7-9: Cumulative impacts of groundwater pumping from multiple bores

Impacts are considered in a resource management plan through a limit on licence volume within a management zone, or a rule on the density of licence volume within a defined area around a licenced bore to manage groundwater drawdown levels. For example, in the Lower Campaspe Valley water supply protection area, groundwater licence volume is limited within management zones, and through rules on the density of licence volume (see [Figure 7-10](#)).

Management zones

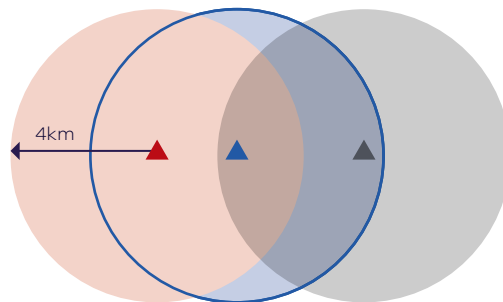
MANAGEMENT ZONE VOLUME LIMITS:
 Echuca Zone: 9.6 GL/yr
 Bamawm Zone: 29.0 GL/yr
 Elmore-Rochester Zone: 18.3 GL/yr
 Barnadown Zone: 8.3 GL/yr



Density limit on licence volume

Licence volume is limited to 7,500 ML/yr within a 4 km radius of a licence holder's bore.

Each triangle in the figure below represents a bore licenced to extract 3,000 ML/yr.



The blue triangle has 9,000 ML/yr within a 4 km radius and therefore cannot permanently trade any additional water to the licence.

The red and grey triangles only have 6,000 ML/yr within a 4 km radius of their bores, so they may trade in up to 1,500 ML/yr permanently.

Figure 7-10: Trading rules in the Lower Campaspe valley limit licence volume and density of licence volume

Regional scale

Regional scale assessment considers the impact on sustainability of the resource at a catchment or basin scale from 10 km² to 100 km².

Impacts are considered in resource management plans through a cap on total licensed volume called through the permissible consumptive volume (described above). An application to trade cannot be approved if it would cause the PCV to be exceeded (see [Section 7.4.2.3](#)).

Conversion Rate in the Upper Ovens River WSPA

In the Upper Ovens River Water Supply Protection Area (Ovens WSPA) surface water and groundwater from Zone 1 are managed conjunctively.

The first measure or rule applied to trades in this area is a 20 percent reduction imposed on downstream transfers (trades) from an all year licence. The effect of this 20 percent loss factor is that as part of the permanent or temporary downstream transfer of a licence to take water from unregulated water systems (including groundwater under this Water Management Plan), the Minister (or delegate) may impose a condition in the Upper Ovens River Water Supply Protection Area Water Management Plan area that the buyer is only entitled to receive less than 80 percent of the licence volume transferred by the seller.

The reduction in licence volume from the seller to the downstream buyer is implemented to account for evaporation, seepage and other losses which would occur in the system between the seller's upstream extraction point and the buyer's downstream extraction point.

Without this deduction the buyer would be taking a greater net volume of water out of the system than the seller. Meaning the effect of the rule is to maintain the relative volume of the water access right (licence) between upstream and downstream users given the difference between availability. Without this rule the buyer would have a negative impact on the overall resource availability for all entitlement holders including potential adverse impacts on the environment. This is a general rule to manage potential impacts on water availability for all licence holders and is in line with section of 12.18(b) of the Basin Plan.

The rule is applied uniformly under the Water Management Plan in the Ovens WSPA because the impact of taking water from the surface water system or the groundwater system is essentially the same, even though there may be time lag effects in relation to groundwater extractions. Therefore, the rule applies to groundwater to groundwater trades and groundwater to surface water trades. The application of this rule ensures that levels of take remain within the resource condition limit across the management area.

For the purposes of Basin Plan this is consistent with the application of a conversion rate as described in sections 10.37(2) and 10.39(2) of the Basin Plan (see [Section 7.4.2.10](#)).

7.4.2.7 Basin Plan considerations before approving groundwater trade

Before a groundwater trade can be approved the Basin Plan requires specific circumstances to be met, how these relate to the Victorian Water Act is describe in [Figure 7-11](#), and further explained in [Section 7.4.2.8](#) to [Section 7.4.2.10](#).

CONSIDERATIONS BEFORE APPROVING GROUNDWATER TRADE

BASIN PLAN	WATER RESOURCE PLAN	VICTORIAN WATER ACT
sufficient hydraulic connectivity 12.24(a), 12.25(a), 12.26(a) BP	sufficient hydraulic connectivity must be demonstrated in: - a hydrogeological resource assessment for 10.38 BP and 10.38 BP - a statutory management plan approved under s.32A of the Victorian Water Act for 10.39 BP	for each trade hydrogeological resource assessment considers: - topography - aquifers / aquitards - groundwater levels (current, long term, seasonal and aquifer interactions) - groundwater flow - neighbouring environmental features (waterways and groundwater dependent ecosystems) - groundwater quality - impacts of proposed pumping this assessment may be supported by any hydrogeological investigation undertaken by proponent to support application
Resource Condition Limit 12.24(b), 12.25(b), 12.26(b) BP	relevant permissible consumptive volume declared under section 22A of the Victorian Water Act must not be exceeded	matters to be taken into account include: - existing and projected availability of water (section 40(1)(b)) - the relevant permissible consumptive volume declared under section 22A of the Victorian Water Act (section 40(1)(ba))
must account for trade 12.25(c), 12.26(c) BP	trade is recorded on the Victorian Water Register	all trades must be recorded on the Victorian Water Register
maintain characteristics of the water access right 12.24(c), 12.25(d), 12.26(d) BP	the volume to be traded must be specified, noting that in Victoria measures are in place to ensure that the water access right to be traded will maintain its characteristics of timing, reliability and volume	The Victorian Water Act provides for a groundwater trade (whether temporary or permanent) to be made by a transfer of the licence. It requires traded licences to maintain their essential characteristics such as volume, term and conditions (noting that groundwater licences do not have the characteristic of high or low reliability).
measures to address impact on water availability to third party water access right holders 12.24(d), 12.25(e), 12.26(e) BP	where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water measures are in place to address any adverse effect	matters to be taken into account include: - impacts on other users (including the environment and waterways) (section 40(1)(d)(i)) - the needs of other potential applicants (section 40(1)(m))

Figure 7-11: Basin Plan considerations before approving groundwater trade

7.4.2.8 Trade within a groundwater SDL resource unit

To meet the requirements of section 10.37 of the Basin Plan, Victoria's North and Murray Water Resource Plan must identify the circumstances in which trade is permitted to ensure that the conditions of section 12.24 of the Basin Plan are met.

Groundwater trade may take place between two locations within an SDL resource unit in the Goulburn-Murray water resource plan area as long as:

- there is sufficient hydraulic connectivity between the two locations
- it does not cause the sum of total entitlement volume to exceed the permissible consumptive volume in the groundwater management unit or exceed any cap that applies to the management zone where it exists
- it does not cause unacceptable groundwater interference or water quality impacts to environmental or consumptive users in the local area

The SDL resource units within the Goulburn-Murray water resource plan area shown in [Table 7-3](#). How the conditions under section 12.24 of the Basin Plan are met under Victoria's framework is outlined above in [Section 7.4.2.2](#) to [Section 7.4.2.6](#). The specific circumstances in which trade may be permitted under Victoria's North and Murray WRP within a groundwater SDL resource unit is outlined in the accredited text provided below.

It is considered that trade between two locations within a single SDL resource unit within the Goulburn-Murray water resource plan area would be supported on the basis of sufficient hydraulic connectivity. Each SDL resource unit has been established based on hydrogeological and terrain similarities. However, as identified above, each trade is subject to a site specific hydrogeological resource assessment that will determine whether that particular trade can occur. This assessment will demonstrate whether there is sufficient hydraulic connectivity between the two locations.

In some instances, where a statutory management plan has been approved for a water supply protection area the assessment of connectivity will be outlined in that plan.

Trade is permitted within the Goulburn-Murray: Highlands SDL resource unit, the Goulburn-Murray: Sedimentary Plain SDL resource unit, the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit and Goulburn-Murray: deep SDL resource unit as described in [Table 7-3](#) and in [Section 7.4.2.2](#) and [Section 7.4.2.3](#) subject to meeting the requirements of the accredited text in response to section 10.37 of the Basin Plan (see below) and the requirements under the Victorian Water Act.

Trade is permitted for the Goulburn-Murray: Shepparton Irrigation Region SDL resource unit. Within this SDL resource unit trade is permitted. However, if someone wants to increase their groundwater licensed volume they can apply for a new entitlement volume, rather than trading because the resource is not yet fully allocated. Increased groundwater use is encouraged to manage rising groundwater tables which are causing salinity issues and because the permissible consumptive volume for this area has not been reached.

The circumstances prescribed in Victoria's North and Murray Water Resource Plan satisfy the requirements under section 10.37 of the Basin Plan are outlined in the accredited text below.

Basin Plan s10.37(1)

1. Trade between two locations within a single SDL resource unit in the Goulburn-Murray water resource plan area is permitted in the following circumstances:
 - a. if the two locations are within the same geology as defined by the SDL groundwater unit where sufficient hydraulic connectivity is demonstrated by the relevant hydrogeological resource assessment or statutory management plan approved under section 32A of the *Water Act 1989* (Vic) as appropriate; and



- b. if the relevant permissible consumptive volume declared under section 22A of the *Water Act 1989* (Vic) is not exceeded; and
 - c. except for in the Upper Ovens River Water Supply Protection Area, for the transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and
 - d. in the Upper Ovens River Water Supply Protection Area, for the permanent transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and
 - e. where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water and measures are in place to address any adverse effect.
2. **Figure 7-7** of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer (trade) of a take and use licence under the *Water Act 1989* (Vic) and demonstrates how the conditions set out in section 12.24 of the Basin Plan align with the Victorian framework. Reference to the *Water Act 1989* (Vic) in **Figure 7-7** of Victoria's North and Murray Comprehensive Report does not form part of the response and is included for reference only.
3. References to sections of the *Water Act 1989* (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only.

Note 1: Section 12.27 of the Basin Plan clarifies that the requirements of Chapter 12 of the Plan, including trade within a groundwater SDL unit (section 12.24 of the Basin Plan), trade between groundwater SDL units (section 12.25 of the Basin Plan), and trade between groundwater and surface water (section 12.26 of the Basin Plan) are not intended to prevent a restriction being imposed on a trade of a water access right under State water management law because a person has committed an offence or failed to pay fees or charges. State water management law includes the *Water Act 1989* (Vic) and regulations and other instruments made under that Act.

Note 2: permissible consumptive volumes declared under section 22A of the *Water Act 1989* (Vic) have the effect of setting a resource condition limit for the resource to which the declaration applies.

Note 3: See response to section 10.18 (3) which applies a rule under paragraph (1) of that response relating to the consideration of risks to high value groundwater dependent ecosystems relating to the transfer of a take and use licence. This rule applies the *Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems* (Minister for Water, 2015). See the discussion in response to Part 4 in Column 5 of Victoria's North and Murray Index Table for more information on the application of this policy and the rule.

Note 4: The effect of the circumstance identified in paragraph (d) is that in the Upper Ovens River Water Supply Protection Area (WSPA), where groundwater is permanently traded upstream, a downstream full year licence cannot be traded and converted to a winter-fill licence upstream. The 'upstream trading rule' in the Upper Ovens River WSPA Water Management Plan, however, only permits trade of a downstream full year licence to an upstream water user if the licence is converted into a water-fill licence. Accordingly, for upstream trade of full year licences to continue, the licence will need to be converted to a winter-fill licence prior to being traded to comply. Goulburn-Murray

Water will need to identify a process for managing this type of trade prior to approving a trade in the Upper Ovens River Water Supply Protection Area to ensure decisions are consistent with Victoria's North and Murray Water Resource Plan and Chapter 12 of the Basin Plan.

<<end of accredited text for s10.37(1) of the Basin Plan>>

7.4.2.9 Trade between two groundwater SDL resource units

To meet the requirements of section 10.38 of the Basin Plan, Victoria's North and Murray Water Resource Plan must identify the circumstances in which trade is permitted to ensure that the conditions of section 12.25 of the Basin Plan are met. The circumstances must relate to trade between two groundwater SDL resource units within the Goulburn-Murray water resource plan area (see [Table 7-3](#)). How the conditions under section 12.25 of the Basin Plan are met under Victoria's framework is outlined above in [Section 7.4.2.2](#) to [Section 7.4.2.6](#).

Current research indicates that there is potential for trade between the Goulburn-Murray: Sedimentary Plain SDL resource unit and the Goulburn-Murray: Highlands SDL resource unit as they are hydraulically connected at the upgradient Goulburn-Murray: Highlands SDL resource unit at their common boundaries. For example, the fractured rock aquifers in the Goulburn-Murray: Highlands SDL resource unit are hydrogeologically connected to the Sedimentary Plain aquifers present at the boundary with the Highlands and continue where the Sedimentary Plain aquifers overlie the fractured rock in the Goulburn-Murray: Sedimentary Plain SDL resource unit.

Due to the connectivity between these two SDL resource units, trade between the Goulburn-Murray: Sedimentary Plain SDL resource unit and the Goulburn-Murray: Highlands SDL resource unit may occur, if sufficient hydraulic connectivity is proved. This may occur during the development of a statutory management plan also it must be assessed through the relevant hydrogeological resource assessment for each individual trade.

Groundwater trade occurs between the Goulburn-Murray: Sedimentary Plain SDL resource unit and the Goulburn-Murray: Highlands SDL resource unit according to rules established in groundwater management plans. In 2017-18 there were 31 permanent transfers between these two SDL resource units amounting to almost 2,400 ML .

Trade does not occur:

- into or out of the Goulburn-Murray: deep SDL resource unit does, given the poor hydraulic connectivity between this unit and the overlying aquifer layers
- Goulburn-Murray: Shepparton Irrigation Region SDL resource unit as the objective of the Shepparton Irrigation Region groundwater management area plan is to encourage groundwater extraction to provide salinity and shallow watertable control

The circumstances prescribed in Victoria's North and Murray Water Resource Plan that satisfy the requirements under section 10.38 of the Basin Plan are outlined in the accredited text below.

Basin Plan s10.38(1)

1. Trade between two groundwater SDL resource units within Victoria's North and Murray water resource plan area is permitted in the following circumstances:
 - a. the two locations are within the Goulburn-Murray: Sedimentary Plain SDL resource unit and the Goulburn-Murray: Highlands SDL resource unit and sufficient hydraulic connectivity between the two locations has been demonstrated by the relevant hydrogeological resource assessment or statutory management plan approved under section 32A of the *Water Act 1989* (Vic) where appropriate; and



- b. if the relevant permissible consumptive volume declared under section 22A of the *Water Act 1989* (Vic) is not exceeded; and
 - c. if the volume to be traded is specified, noting that in Victoria measures are in place to ensure that the water access right to be traded will maintain its characteristics of timing, reliability and volume; and
 - d. where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water and measures are in place to address any adverse effect.
2. Where trade occurs in the above circumstances it will be recorded on the Victorian Water Register.
3. **Figure 7-7** of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer (trade) of a take and use licence under the Water Act and demonstrates how the conditions set out in section 12.25 of the Basin Plan align with the Victorian framework. Reference to the *Water Act 1989* (Vic) in **Figure 7-7** of Victoria's North and Murray Comprehensive Report does not form part of the response and is included for reference only.
4. References to sections of the *Water Act 1989* (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only.

Note 1: Section 12.27 of the Basin Plan clarifies that the requirements of Chapter 12 of the Plan, including trade within a groundwater SDL unit (section 12.24 of the Basin Plan), trade between groundwater SDL units (section 12.25 of the Basin Plan), and trade between groundwater and surface water (section 12.26 of the Basin Plan) are not intended to prevent a restriction being imposed on a trade of a water access right under State water management law because a person has committed an offence or failed to pay fees or charges. State water management law includes the *Water Act 1989* (Vic) and regulations and other instruments made under that Act.

Note 2: Permissible consumptive volumes declared under section 22A of the *Water Act 1989* (Vic) have the effect of setting a resource condition limit for the resource to which the declaration applies.

Note 3: See response to section 10.18 (3) of the Basin Plan which applies a rule under paragraph (1) of that response relating to the consideration of risks to high value groundwater dependent ecosystems relating to the transfer of a take and use licence. This rule applies the Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems (Minister for Water, 2015). See the discussion in response to Part 4 in Column 5 of Victoria's North and Murray Index Table for more information on the application of this policy and the rule.

Trade is not permitted into or out of the Goulburn-Murray: Shepparton Irrigation Region or Goulburn-Murray: deep SDL resource units in the Goulburn-Murray water resource plan area.

<<end of accredited text for s10.38(1) of the Basin Plan>>

7.4.2.10 Trade between surface water and groundwater SDL resource units

To meet the requirements of section 10.39 of the Basin Plan, Victoria's North and Murray Water Resource Plan must identify the circumstances in which trade is permitted to ensure that the conditions of section 12.26 of the Basin Plan are met. The circumstances must relate to trade

between surface water and groundwater in Victoria's North and Murray water resource plan area. How the conditions under section 12.26 of the Basin Plan are met under Victoria's framework is outlined above in [Section 7.4.2.2](#) to [Section 7.4.2.6](#).

Trade between surface water and groundwater areas is permitted by the Victorian Water Act, subject to the Act, the policies, including Policies for Managing Take and Use Licences (DEPI, 2014), and any rules in a statutory management plan that apply to the area. This policy supports trade within unregulated surface water and groundwater systems:

Clause 27A Trade within unregulated surface water and groundwater systems

- 1. In developing or amending a local management plan, there may be particular circumstances where rural water corporations may develop system-specific trading rules and*
- 2. Where any system-specific water trading rules are developed for inclusion in a local management plan, the executive director responsible for water entitlements in the Department must be consulted before the local management plan is implemented.*

Trade between surface water and groundwater is permitted where there is a high degree of connection recognised for between the two resources. As at April 2019 in the Goulburn-Murray water resource plan area, Goulburn-Murray Water has published 17 groundwater management area and water supply protection area plans, but only the Upper Ovens River water supply protection area Water Management plan (GMW, 2012) has been developed as a combined surface water and groundwater plan which allows trade between surface water and groundwater systems. Under the Upper Ovens River Water Supply Protection Area Water Management Plan groundwater and surface water is conjunctively managed. This means all surface water and groundwater in Zone 1 is treated as the same.

Groundwater in the river alluvium in this area is in the Goulburn-Murray: Sedimentary Plain SDL resource unit, and extensive dredging upstream of Myrtleford has resulted in a highly permeable aquifer that is highly connected to the Ovens River. The groundwater and river systems are closely connected and the area has a long history of impacts to the watertable from surface water extraction and stream depletion through excessive pumping of groundwater close to the river.

Because of this, groundwater discharge to the river is significant for maintaining base flow during periods of low rainfall, and trading rules for groundwater extraction from the alluvial material are the same as for surface water in the adjacent stream. The water supply protection area has two groundwater management zones. Zone 1 covers the extent of the highly permeable river alluvium and associated hillslope colluvium. Zone 2 comprising the less conductive fractured bedrock that has a relatively poorer hydraulic connection to the stream systems.

The licence transfer (trade) rules adopted are consistent with surface water licence transfers these are:

- an application to transfer upstream may be approved with winter-take conditions
- a licence to transfer downstream may be approved with a 20 percent reduction in the licence volume (to be applied as a conversion rate under sections 10.37(2) and 10.39(2) of the Basin Plan). See discussion at [Section 7.4.2.5](#) and [Section 7.4.2.6](#) for an outline of these rules.

There has not been any trade between surface water and groundwater outside of the Upper Ovens River water supply protection area. It is reasonable to expect that in the future there may be other opportunities for trade between surface water and groundwater, but further work needs to be done to understand the opportunities.

The circumstances in Victoria's North and Murray Water Resource Plan that satisfy the requirement under section 10.39 of the Basin Plan are outline in the accredited text below.

**Basin Plans
s10.39(1)**

1. Trade between a groundwater SDL resource unit and a surface water SDL resource unit within Victoria's North and Murray water resource plan area is permitted in the following circumstances:
 - a. the trade occurs in areas considered to have sufficient hydraulic connectivity as recognised in a statutory management plan approved under section 32A of the *Water Act 1989* (Vic); and
 - b. if the relevant permissible consumptive volume declared under section 22A of the *Water Act 1989* (Vic) is not exceeded; and
 - c. except for in the Upper Ovens River Water Supply Protection Area, for the transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and
 - d. in the Upper Ovens River Water Supply Protection Area, for the permanent transfer of a take and use licence, the characteristics of the take and use licence to be traded relating to timing, reliability and volume will be maintained; and
 - e. where regard has been had to any adverse effect that the trade is likely to have on existing authorised users of water and measures are in place to address any adverse effect.
2. Where trade occurs in the above circumstances it will be recorded on the Victorian Water Register.
3. **Figure 7-7** of Victoria's North and Murray Comprehensive Report depicts the process for determination of a transfer (trade) of a take and use licence under the *Water Act 1989* (Vic) and demonstrates how the conditions set out in section 12.26 of the Basin Plan align with the Victorian framework. Reference to the *Water Act 1989* (Vic) in **Figure 7-7** of Victoria's North and Murray Comprehensive Report does not form part of the response and is included for reference only.
4. References to sections of the *Water Act 1989* (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only.

Note 1: Section 12.27 of the Basin Plan clarifies that the requirements of Chapter 12 of the Plan, including trade within a groundwater SDL unit (section 12.24 of the Basin Plan), trade between groundwater SDL units (section 12.25 of the Basin Plan), and trade between groundwater and surface water (section 12.26 of the Basin Plan) are not intended to prevent a restriction being imposed on a trade of a water access right under State water management law because a person has committed an offence or failed to pay fees or charges. State water management law includes the *Water Act 1989* (Vic) and regulations and other instruments made under that Act.

Note 2: Permissible consumptive volumes declared under section 22A of the *Water Act 1989* (Vic) have the effect of setting a resource condition limit for the resource to which the declaration applies.

Note 3: See response to section 10.18 (3) which applies a rule under paragraph (1) of that response relating to the consideration of risks to high value groundwater dependent ecosystems relating to the transfer of a take and use licence. This rule applies the *Ministerial Guidelines for groundwater licensing and the protection of high value groundwater dependent ecosystems* (Minister for Water, 2015). See the discussion in response to Part 4 in Column 5 of Victoria's North and Murray Index Table for more information on the application of this policy and the rule.

Note 4: The effect of the circumstance identified in paragraph (d) is that in the Upper Ovens River Water Supply Protection Area (WSPA), where groundwater is permanently traded upstream, a downstream full year licence cannot be traded and converted to a winter-fill licence upstream. The 'upstream trading rule' in the Upper Ovens River WSPA Water Management Plan, however, only permits trade of a downstream full year licence to an upstream water user if the licence is converted into a water-fill licence. Accordingly, for upstream trade of full year licences to continue, the licence will need to be converted to a winter-fill licence prior to being traded to comply. Goulburn-Murray Water will need to identify a process for managing this type of trade prior to approving a trade in the Upper Ovens River Water Supply Protection Area to ensure decisions are consistent with Victoria's North and Murray Water Resource Plan and Chapter 12 of the Basin Plan.

<<end of accredited text for s10.39(1) of the Basin Plan>>

In response to section 10.39(2) the way in which a conversion rate will be determined is set out in the following accredited text.

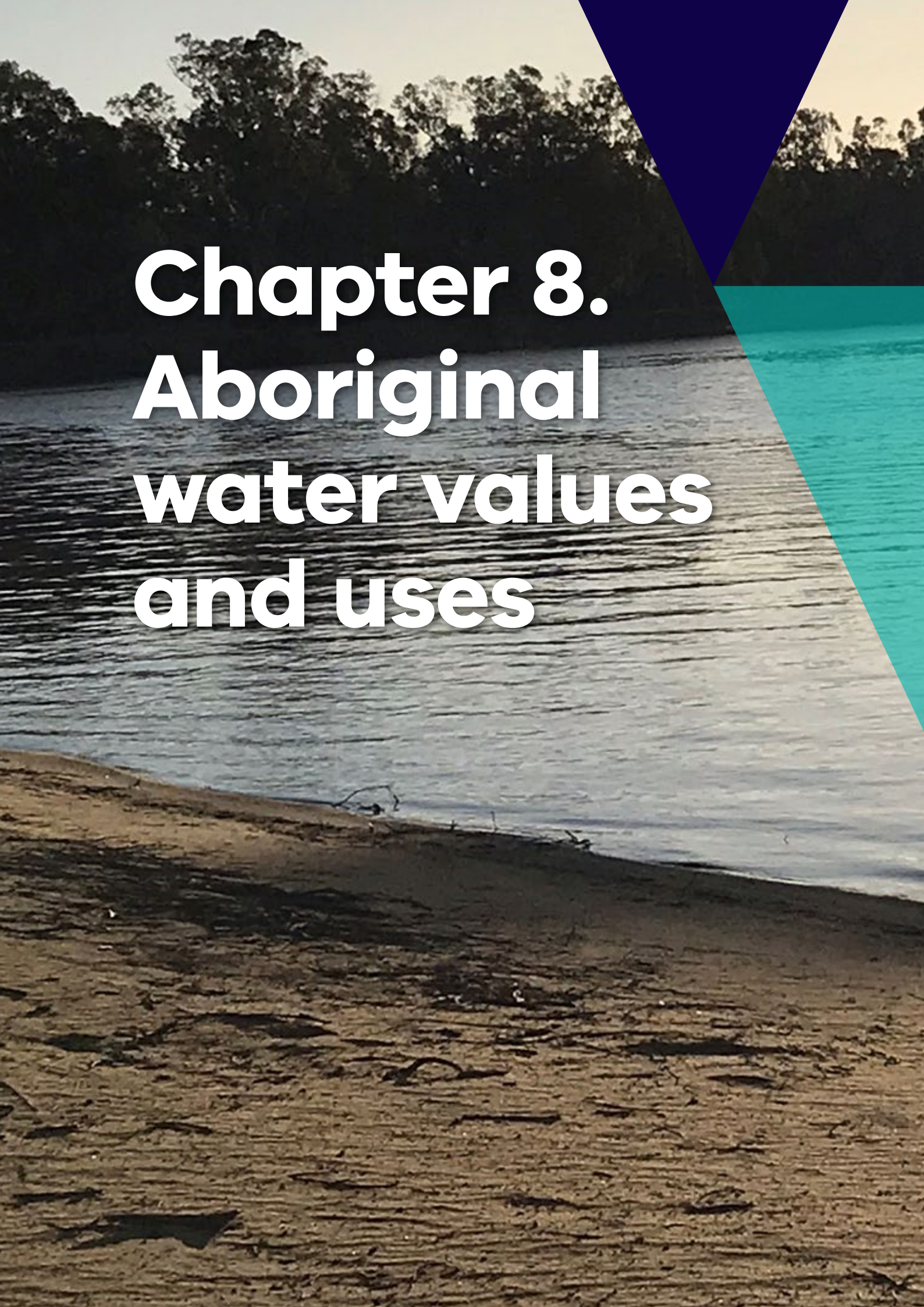
**Basin Plan
s10.39(2)**

1. In Victoria's North and Murray water resource plan area a 20 per cent conversion rate applies if specified in the relevant statutory management plan approved under section 32A of the *Water Act 1989* (Vic) for a water supply protection area declared under section 27 of the *Water Act 1989* (Vic).
2. References to sections of the *Water Act* do not have the effect of importing the sections referenced into the accredited material but are included for reference only.

<<end of accredited text for s10.39(2) of the Basin Plan>>

Under Basin Plan this loss factor meets the characteristics of a "conversion rate" for the purposes of section 10.39(2) of the Basin Plan. The way in which a conversion rate will be determined from time to time and made generally available is outlined (as required under section 10.39(2)(b) of the Basin Plan) is outlined in the accredited text of Column 3 of Victoria's North and Murray Index Table in response to section 10.39(2) of the Basin Plan.





Chapter 8. Aboriginal water values and uses



8. Aboriginal water values and uses

This Chapter presents views of Traditional Owner groups within the Northern Victoria and Murray water resource plan area. It highlights their objectives and outcomes for water resource management with consideration of Aboriginal values and uses of water. This Chapter meets requirements under Part 14 of Chapter 10 of the Basin Plan.

8.1 Murray-Darling Basin Plan requirements for Aboriginal values and uses of water

The Murray-Darling Basin Plan requires Basin states to identify objectives and outcomes of water, based on Aboriginal values and uses of water, and have regard to the views of Traditional Owners on matters identified by the Basin Plan.

Victoria engaged with Traditional Owner groups in the Water Resource Plan for the northern Victoria area to:

- outline the purpose, scope and opportunity for providing water to meet Traditional Owner water objectives and outcomes through the Murray-Darling Basin Plan
- define the role of the water resource plans in the Basin, including but not limited to the requirements of the Basin Plan (Chapter 10, Part 14)
- provide the timeline for the development and accreditation of the Northern Victoria Water Resource Plan
- determine each Traditional Owner groups' preferred means of engagement and involvement in the development of the Northern Victoria Water Resource Plan
- continue to liaise and collaborate with Traditional Owner groups to integrate specific concerns and opportunities regarding the water planning and management framework.
- identify Aboriginal water objectives for each Traditional Owner group, and desired outcomes.

The Water Resource Plan for the Northern Victoria water resource plan area, the Victorian Murray water resource plan area and the Goulburn-Murray water resource plan area is formally titled Victoria's North and Murray Water Resource Plan for the purposes of accreditation. When engaging with Traditional Owners this plan has been referred to as the Northern Victoria Water Resource Plan and called this in **Chapter 8** of the Comprehensive Report.

Where accredited text is included, reference will be made to the formal title being Victoria's North and Murray Water Resource Plan.

This part outlines:

- Traditional Owners in the area for the Northern Victoria Water Resource Plan
- Traditional Owner objectives and outcomes for water approaches to addressing risks to

Aboriginal water-related values and uses

- approaches to addressing risks to Aboriginal water-related values and uses
- how regard was given to Aboriginal water values and uses in the development and implementation of Victoria's Aboriginal Water Policy
- opportunities to strengthen protection of Aboriginal values and uses through existing arrangements and agreements.

This part includes contributions prepared by each of the Nation groups in the area for the Northern Victoria Water Resource Plan, that identify the objectives and outcomes of water, and Traditional Owner views for each Nation. Victoria's approach to meeting Part 14 of Chapter 10 of the Basin Plan has been to incorporate the views of Traditional Owners through their contributions to the Water Resource Plan. This part includes accredited text that responds to Basin Plan requirements under Part 14 of Chapter 10 of the Basin Plan.

8.2 Basin Plan requirements

Section 10.52 of the Basin Plan requires the Northern Victoria Water Resource Plan to identify the following:

- *the objectives of Indigenous people in relation to managing the water resources of the water resource plan area; and*
- *the outcomes for the management of the water resources of the water resource plan area that are desired by Indigenous people*

The Basin Plan also requires regard to be had to the views of relevant Indigenous organisations on:

- their values and uses of water when developing water resource plans
- a further range of matters listed in section 10.53:
 - a. Native Title rights, Native Title claims and Indigenous Land Use Agreements provided for by the Native Title Act 1993 in relation to the water resources of the water resource plan area
 - b. registered Aboriginal heritage relating to the water resources of the water resource plan area
 - c. inclusion of Indigenous representation in the preparation and implementation of the plan
 - d. Indigenous social, cultural, spiritual and customary objectives, and strategies for achieving these objectives
 - e. encouragement of active and informed participation of Indigenous peoples
 - f. risks to Indigenous values and Indigenous uses arising from the use and management of the water resources of the water resource plan area.

A water resource plan must have regard to the views of Aboriginal communities about cultural flows under section 10.54 and provide at least the same level of protection of Indigenous values and uses as existed before the Basin Plan under section 10.55.

8.3 Traditional Owners in the area of the Northern Victoria Water Resource Plan

Caring for Country is the essence of Aboriginal social, spiritual, economic and physical wellbeing, and the basis of cultural lore. Cultural connections to Country do not follow the boundaries of the area for the Northern Victoria Water Resource Plan, or indeed state boundaries, and are not represented in how water is managed in the region.

The Northern Victoria Water Resource Plan includes the two surface water areas (Northern Victoria and Victorian Murray) and one groundwater area (Goulburn-Murray). For detail on the source of water for these plan areas, refer to [Chapter 2](#). The identification of surface water areas for the purposes of developing water resource plans do not reflect Aboriginal connection to Country.

8.3.1 Working with Traditional Owners

Local Traditional Owner knowledge and expertise is needed to progress the realisation of Aboriginal water objectives and outcomes in Victoria's water policy development and management framework.

"It is our human right – the rights of the Indigenous people of Australia. To be involved in water, have the right of access to water, and be participating players in the decisions made regarding water. "

Brendan Kennedy, Tati Tati Nation, July 19, 2017

It is expected that incorporating Traditional Owner objectives into Victorian water planning and management will enhance community benefit through improved understanding and management of local waterways.

Victoria is required by the Basin Plan to engage with Traditional Owners in the development of water resource plans to ensure that the objectives and outcomes of Traditional Owners for water resource management of Basin resources are formally identified. To support Basin states in undertaking this engagement Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and the Murray-Darling Basin Authority have published advice on the Nations relevant to each water resource plan area. This list is based on representation on MLDRIN's delegation and does not necessarily reflect those Nations who have been formally recognised under the *Native Title Act 1993* (Cth), the *Traditional Owner Settlement Act 2010* (Vic) and the *Aboriginal Heritage Act 2006* (Vic).

DELWP engaged with Traditional Owners who are formally recognised under legislative frameworks as well as with Traditional Owner Nations without this formal recognition. DELWP welcomes the contributions of all Nations identified by MLDRIN as holding an interest in water resource planning, noting it is unable to recognise Nations' statements of boundaries where these are not supported by formal agreements with the Victorian Government.

Traditional Owner groups currently engaged through the Northern Victoria Water Resource Plan include (in alphabetical order):

- Barapa Barapa (see [Section 8.3.2](#))
- Dhudhuroa, Waywurru and Yaitmathang (see [Section 8.3.3](#))
- Dja Dja Wurrung (see [Section 8.3.4](#))
- First Peoples of the Millewa-Mallee (Nations of Nyeri Nyeri, Ngintait and Latji Latji) (see [Section 8.3.5](#))
- Tati Tati Wadi Wadi (see [Section 8.3.6](#))
- Taungurung (see [Section 8.3.7](#))
- Wadi Wadi (see [Section 8.3.8](#))
- Wamba Wamba (see [Chapter 8.3.9](#))
- Weki Weki (see [Chapter 8.3.10](#))
- Yorta Yorta (see [Chapter 8.3.11](#))

Bangerang have identified an interest in engaging in the water resource plan process. DELWP has started engaging with Bangerang representatives to further understand their views on water and water resource management in Victoria. Refer to [Appendix D](#) for further details regarding the consultation to date.

Some Nations identified within the Northern Victoria Water Resource Plan have Country or areas of significant cultural interest within the Water Resource Plan for Northern Victoria, and the Wimmera-Mallee Water Resource Plan:

- The First Peoples of the Millewa-Mallee Registered Aboriginal Party boundary falls in both the Northern Victoria Water Resource Plan, and the Wimmera-Mallee Water Resource Plan
- Dja Dja Wurrung Country as recognised under its Traditional Owner Settlement Agreement straddles both the Northern Victoria Water Resource Plan, and the Wimmera-Mallee Water Resource Plan
- Wamba Wemba, Barapa Barapa, Tati Tati, Weki Weki and Wadi Wadi Nations have identified objectives and outcomes and expressed interest in water on Country in both Victorian water resource plans.

A staged engagement and consultation approach has been used to identify objectives and outcomes with Traditional Owners in the Victorian share of the Murray-Darling Basin. This approach considers and respects the preparedness, prioritisation and resourcing of each individual Traditional Owner group to best participate in the preparation of Victoria's water resource plans.

Engagement through the Northern Victoria Water Resource Plan was undertaken with individual Traditional Owner groups to outline the Basin Plan requirements for Victoria's water resource plans. Engagement included joint discussion of timelines, consideration and response to how best to develop objectives and desired outcomes of each group.

Means of engagement included workshops, meetings, Nation meetings, community gatherings and information sharing on Country in response to the preferences of each Traditional Owner group.

8.3.1.1 Traditional Owner contributions to the Northern Victoria Water Resource Plan: identifying objectives and outcomes and Aboriginal values and uses

Contributions to the Northern Victoria Water Resource Plan were prepared and submitted for or by each of the Traditional Owner groups within the plan area, or by a group of Nations, to meet the requirements stipulated in the Basin Plan. The contributions included below are those that have been approved by representatives of the Nation for inclusion in the Comprehensive Report.

The contributions included below meet the requirements of Part 14 of Chapter 10 of the Basin Plan as they detail values, uses, objectives and outcomes for water for each Nation. The contributions have been approved by representatives of each Traditional Owner groups for inclusion in the Water Resource Plan.

It is intended that the information contained in these contributions can assist in achieving objectives and outcomes beyond the scope of the water resource plans.

The following section presents the contributions from members of each Traditional Owner group. The content of each contribution represents the views of the contributors. They may not reflect the views of all Traditional Owners who identify as a particular group and it is acknowledged that Aboriginal values and interests are diverse and can vary widely between clan and family groups. Additionally, they do not necessarily represent the views of the Victorian Government. This document is not an instrument to add to the discussion of Country or to give validity to potential claims for recognition or disputes with other Nations.

8.3.2 Barapa Barapa

The Barapa Barapa objectives and outcomes were workshopped in January 2018. The contribution was discussed at a Nation meeting, and signed off at a Steering Committee meeting in January 2019.

8.3.2.1 Description:

"To the Barapa people, the land is our oxygen. We feel the presence of our old people being there. We have a spiritual connection to everything; the animals, the land and the water. We are the custodians of the land for future generations. When you visit our Country, you share this responsibility with us. Barapa Barapa are the river custodians, one of many Nations who are the Traditional Owners of Murray River Country"

**'Barapa Barapa Cultural Watering Framework', pub.
North Central CMA, 2017**

Barapa Barapa has a strong association with the Murray River, and its tributaries, including around the area of Gunbower Forest in Victoria, with areas of significance including Reedy Lagoon, Guttrum and Black Swamp. Interests in water extend both geographically and through connection to water sources, to both the Northern Victoria and the Wimmera-Mallee water resource plans.

Barapa Barapa Country continues across the border to New South Wales, to Deniliquin, with several rivers feeding into the Murray being places of interest.

8.3.2.2 Current or pending agreements

The Barapa Barapa peoples are in the preliminary stages of their native title negotiation, along with the Wamba Wamba Nation. Negotiation may include progressing to a settlement agreement under the *Traditional Owner Settlement Act 2010 (Vic)*.

Registered Aboriginal Party (RAP) (Cultural Heritage)

Barapa Barapa does not currently have RAP status, however, the group is undertaking the required preliminary work to apply to be recognised as a RAP for their Country as part of Native Title negotiations.

Barapa Barapa has spoken about the need for Native Title to include water rights. It is also concerned regarding the requirements for RAP status – for instance proof of occupancy, and the access barriers that preclude that.

8.3.2.3 Existing reference /scoping materials²

Through the Barapa Barapa Water for Country Steering Committee there are several existing reference documents relating to water. The Barapa Barapa Cultural Watering Framework is the result of a four year project on the Lower Gunbower Forest, that helped determine cultural values and associated watering objectives at a series of sites. Victoria's water resource plans

² Traditional Owner groups may not wish to share these: this can also denote that they exist and Government should be aware of it and respect existing materials.



helped fund the project for several months, as there was a strong alignment with the requirements of the Murray-Darling Basin Plan.

In 2017, Victoria's water resource plans funded an Aboriginal Waterway Assessment with Barapa Barapa.

Traditional Owner groups may not wish to share these: this can also denote that they exist and Government should be aware of it and respect existing materials.

Barapa Barapa Water for Country Steering Committee with North Central CMA have produced a series of publications and youtube videos: <http://www.nccma.vic.gov.au/media-events/videos/barapa-water-country>

8.3.2.4 Barapa Wamba Water for Country Project

The current project builds on the Barapa Barapa Water for Country project, which commenced in 2014 to identify and map traditional values and sites of cultural significance in the Gunbower Forest. The second phase of the project focused on flow objectives and how these will deliver cultural outcomes in the Gunbower Forest. In 2018-19 the project has been extended to gain understanding of the cultural values and aspirations of wetlands on Barapa Barapa and Wamba Wemba Country.

8.3.2.5 Preferred means of engagement

Barapa Barapa has stressed that any engagement regarding Country needs to have Barapa Barapa people involved from the outset.

The Barapa Wamba Water for Country Steering Committee is the "water arm" of the working group. The committee receives support from a water officer based in the North Central CMA: <http://www.nccma.vic.gov.au>.

Barapa Barapa MLDRIN delegates can be found at <http://www.mldrin.org.au/membership/nations>, and can be an initial form of contact.

While Native Title discussions are underway, the Barapa Wamba Working Group is a key stakeholder and needs to be engaged, as instructed by the full group, to act in the best interests of Barapa Barapa and Wamba Wemba people. The Working Group receives executive support from the First Nations Legal and Research Services.



Figure 8-1: Uncle Ron Galway doing a Welcome to Country, Barapa Barapa Water for Country project, Treetops Scout Camp, Gunbower

8.3.2.6 Barapa Barapa and *Water Resource Plans*

For several months, Victoria's water resource plan team have been talking with Barapa Barapa through MLDRIN delegates, the Water for Country Steering Committee, and the Barapa Wamba Working Group about water – including their objectives, desired outcomes, values and uses, thoughts on water entitlements, and how Barapa Barapa representatives want to work with Government.

Victoria's Water Resource Plans provided funding support for delivering the Water for Country framework (2017) and associated meetings on Country, and held both a community gathering (June 2018) and a Nation meeting (November 2018) to discuss Barapa Barapa's contribution to Victoria's water resource plans. Barapa Barapa is also represented on the Northern Victoria Water Resource Plan Technical Advisory Group, and has hosted an Advisory Group meeting on Country at Gunbower to help other members better understand their aspirations for water and what success may look like.

Barapa Barapa has also met DELWP on Country several times to further understanding of water on Country, how current practices can impact on cultural outcomes, and how these changes to the natural landscape in turn have a negative effect on native flora and fauna, and ultimately, erode the ability of Barapa Barapa to connect with the environment in a way that is respectful of both their cultural past, and of current day objectives.

Barapa Barapa people are strong advocates for water returning to Country, and for Country returning to healthy Country. Members of Barapa Barapa have also raised concern in regards to compliance from water users, and that permitted water extraction is still too high. In addition the heavily regulated waterways on Barapa Barapa Country have stopped water from overbank flooding reaching sites of cultural significance - including important story-telling sites many of which now have no water. Barapa Barapa believes water would be better managed if what it supported agriculturally was more sensitive to the landscape, and less thirsty. Lack of flows are



impacting badly on protected native animals – and the way that flows are managed. For instance, regulated flows have destroyed fish populations that have not adapted to the changes in either timing, volume or temperature.

There is an ongoing challenge with salinity and soil health along the Murray and its tributaries, particularly in the past 50 years – Barapa Barapa reports that many lakes and billabongs that were fresh, now have salty water. Other water quality concerns have been raised – and a potential indicator in that deformed fish are being found in the Murray River. The management of public land that adjoins waterways is also a concern, including when land is leased to farms for grazing cattle, which causes degradation of the river bank, and impacts on water quality.

Barapa Barapa also believes Traditional Owners should be involved in, and remunerated for, measuring water quality by using cultural indicators.

Barapa Barapa have been supported by the North Central CMA through a water officer employed, including to provide secretariat support. There is a clear preference for Barapa Barapa to also have a water officer for its Nation to help with work on the ground to get water back on Country, including re-establishing wetlands. For the position to make real inroads, Barapa Barapa suggest funding be for a significant time period, and appropriate funding and resources for the continuation of the Steering Committee, and for cadetships for people starting out, and to facilitate them commencing then moving into a long-term role to support youth. It is also important for there to be women and men, for cultural reasons. Barapa Barapa stressed it wants its people to be employed to work, monitor and manage water on Country – that it is seeking occupational opportunities.

Rights to information, images and culture shared by Barapa Barapa remain the property of Barapa Barapa people.

8.3.2.7 Objectives and outcomes

The following are the objectives and associated outcomes for Barapa Barapa as determined through their work on the Water for Country Framework, meetings with Victoria’s water resource plans over a 12 month period, an open community gathering, and a Nation meeting. Barapa Barapa reserves the right to reflect on and change these as required.

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Table 8-1: Barapa Barapa objectives and outcomes

Objectives	Outcomes
Achieving cultural outcomes	
Barapa Barapa wants to be able to care for waterways and wetlands and participate in the decision-making processes that influence the sustainable use of water.	Water management is undertaken in a way that is integral to Barapa Barapa cultural identity.
That water management and water delivery supports the cultural practices for Barapa Barapa women, as advised by women on the Steering Committee, at gatherings, and through Government consultation.	Barapa Barapa women are able to practice their cultural birthing practices throughout the Nation where women are having birthing in special areas. That women have a say in watering regimes to meet their needs.

Objectives	Outcomes
Barapa Barapa and Government work together to improve water quality so billabongs, lakes and wetlands that have become saline are restored to their freshwater status.	Culturally significant water bodies are returned to their freshwater status. Native flora and fauna return or thrive at important sites
Barapa Barapa to participate in culturally informed watering through supported, active participation in the management of environmental water to ensure the consideration of traditional knowledge and delivery of shared benefits.	Shared benefits of environmental water are accommodated, activated and achieved.
Barapa Barapa has an equal say at the table in how to manage rivers and waterways.	Decisions on water management, planning and policy are informed and influenced by Barapa Barapa as an equal partner.
Water is returned to culturally significant sites, as advised by Barapa Barapa.	Habitat on culturally significant sites is restored. Native animals and plants return or thrive.
Water management enables the restoration of traditional harvest activities to enable sharing of cultural knowledge and stories	Water management supports native flora and fauna.
Rights to water	
Recognition and integration of Barapa Barapa custodians' rights, needs, priorities and values in water management. Including increased engagement and participation of Barapa Barapa custodians in natural resource management through internal and external relationship building.	Barapa Barapa are recognised as the custodians on Country.
Working with water	
Resourcing us to participate in water policy, strategy and plans on Barapa Barapa Country.	Barapa Barapa achieves improvements in : • economic participation (skills development / jobs) • governance and leadership • health, cultural and social wellbeing
Barapa Barapa is able to access employment opportunities in natural resource management, and is remunerated for its participation in Government.	Barapa Barapa people are employed at water authorities, CMAs, Parks Victoria, Fisheries and there is a Barapa Barapa Water Officer for the Nation.
Government supports training programs for the Barapa Barapa community to explore and implement business opportunities with each other and other communities.	Barapa Barapa is supported by Government, corporations and philanthropical societies to run its own water-based businesses.
Government supports a teaching program for the Barapa Barapa community to share knowledge with each other and other communities.	Barapa Barapa knowledge is shared and recognised, to provide better outcomes for waterways, native flora and native fauna.

Objectives	Outcomes
Government adheres to Barapa Barapa's requirements in regards to participation, including engagement timelines	Barapa Barapa cultural perspectives are sought at the beginning of projects, and responded to in water management on Country. Government acknowledges and accommodates Barapa Barapa requirements, including: • plain English and no acronyms • achievable timeframes • self determination • cultural awareness • equal participation
Cultural monitoring	
Barapa Barapa wants to work with Government to support its own cultural values monitoring program.	A cultural values monitoring program on water is developed, funded and implemented to measure cultural outcomes on waterways.
Barapa Barapa seeks resourcing to undertake ecological surveys for water life - for example crays, freshwater mussels, fish, bugs, turtles, rakali and other important species - for water quality, and monitor cultural hot spots annually.	Species are monitored annually by Barapa Barapa.
Barapa Barapa is resourced to undertake surveys for cultural heritage, to indicate areas of high productivity in the past, as priority watering sites.	Determining priority watering sites for the environment is influenced by areas of cultural importance.
Economic benefits	
Barapa Barapa has access to water entitlements to enable it to make watering decisions autonomously.	Cultural watering entitlement is held by Barapa Barapa.
Yabby and fish farming is introduced by Barapa Barapa at sites and Government works with Barapa Barapa to maintain appropriate water standards to support yabbies and fish at an economic scale.	Water quality and protection is brought to, and maintained at, a standard to support yabby and fish cultivation. Barapa Barapa is able to harvest yabbies and fish for cultural and economic outcomes.

8.3.2.8 Values and uses

Barapa Barapa has mapped the requirements of culturally important flora and fauna, and their water dependencies (see below), and included this in its 'Water for Country' framework.

In discussions with Barapa Barapa, the Nation has repeatedly outlined the interdependencies between Country, culture and water:

"Cultural Heritage cannot survive without water"

Uncle Neville Whyman, November 2018.

Having water reach important sites, water of a quality that supports life, and to be available at times that support cultural values is imperative for flora and fauna, and in turn, vital for activities such as hunting, harvesting native plants for medicine and food, and fishing and yabbying.

Different people specialised in making tools for Barapa Barapa, and there was a big trading route. For Barapa Barapa to make their specialised tools, cultural implements and canoes, there needs to be water in certain places, at certain times, to enable plant and species to thrive in a way that supported the Nation.



Figure 8-2: History in the making: scar tree created at Reedy Lagoon, Gunbower Island, at the 2018 Bark Canoe Event

8.3.2.9 Flow dependent cultural assets

Table 8-2: Barapa Barapa flow dependent cultural assets

Asset category	Includes	Water dependence	Aim
Plants	Old man weed	Needs seasonal flooding/drying regime - damp soils	Abundant healthy old man weed populations through wetting/drying
	River red gums (piyal)	Periodic flooding that reaches out onto floodplain in winter-spring	Healthy trees with little dieback and new annual growth
	Cumbungi (Gumbung)	Needs seasonal flooding/ drying regime	Some good healthy stands fringing wetlands (leaving open water), burn in winter
	River flax lily	Needs functioning floodplains, mimicking natural conditions	Increase numbers and plants reproducing
	Water ribbons	Clean water, spring flooding	Abundant populations in spring in wetlands and creek.
	Nardoo (talem talem)	Needs seasonal flooding/ drying regime	Abundant healthy populations
	Moonah	TBC	Healthy plants recruiting
	River mint (kapel-kup)	Needs seasonal flooding / drying regime - damp soils	Abundant healthy populations
	Water pepper	Seasonal flooding and a drying regime	Some healthy populations
	Native lettuce	Needs seasonal flooding / drying regime	Abundant healthy populations at the end of spring

Asset category	Includes	Water dependence	Aim
Animals	Fish (yawir) large bodied native	Connectivity and stable flow during breeding (November) - irrigation causing unseasonal variability Traditional ecological knowledge used to inform flow requirements to support species.	Abundant Murray cod and yellow belly in creek. Trout and cod present. Catfish (buk) in permanent wetlands. Carp numbers reduced
	Turtles (toonimum)	Permanent refuges and protection during nesting seasons Traditional ecological knowledge used to inform flow requirements to support species	Increase breeding and survival
	Goanna (tyuling)	Water quality/saline/ water levels and bird breeding supported for food source	Maintain
	Grey Kangaroo (kurre)	Water quality/saline/ water levels	Maintain
	Bardi and Wittchetty grubs	Well watered, healthy forest, and a spring rain	Maintain and protect
	Freshwater mussels	Permanent refuges. Shallow areas. Periodic flooding in wetlands, right flow rate.	Mussels present and breeding
	Crayfish and yabbies	Permanent refuges Traditional ecological knowledge used to inform flow requirements to support species.	Increase breeding and survival
	Water birds - Ducks, Swans (Kunawar), Magpie, Geese	Permanent refuges and protection during breeding (Spring - Summer)	Increase breeding and survival
	Emu (Kawir)	TBD	Support breeding
	Water rats	Permanent refuges and protection during breeding	Increase breeding and survival

Asset category	Includes	Water dependence	Aim
Water	Reedy Lagoon Black Swamp	Permanent refuges with some drying phases	Areas of permanent clean open water
	Gunbower Creek	Right seasonality - lowest in summer, highest in spring	Natural seasonal flows of clean water, some deep holes
	Reedbed Swamp - Guttrum/ Benwell Forests	Periodic flooding (winter - spring)	Restore periodic flooding
People - tangible cultural heritage	Scarred trees (coolamons, shields, shelter, canoes and women's areas)	Periodic flooding	Sites surveyed and recorded. Maintain tree health - no loss of trees
	Culturally significant trees (ring trees, burial trees, boundary trees)	Periodic flooding	Sites surveyed and recorded. Maintain tree health - no loss of trees
	Earth mounds (villages and cooking sites)	Rarely inundated	Sites surveyed and recorded. Record and preserve
	Middens	Rarely inundated	Sites surveyed and recorded - avoid bank erosion
Intangible cultural heritage	Women's sites	TBD	Sites surveyed and recorded. Sites visited and cared for by Barapa Barapa Traditional custodians. No damage by visitors.
	Men's sites	TBD	Sites surveyed and recorded. Sites visited and cared for by Barapa Barapa Traditional custodians. No damage by visitors
	Cultural knowledge	TBD	Participatory water management with cultural knowledge included

8.3.2.10 Flow objectives with indicators

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Table 8-3: Barapa Barapa flow objectives with indicators

Name	Objective	Indicator	Measure
Kulayatang (wet)	Maintain permanent water refuges	Open water in Black Swamp and Reedy Lagoon in summer	Presence of remnant pools of sufficient quality water in summer. No further invasion of ruby red gums or giant rush
		Healthy water	Water test kit - salinity and dissolved oxygen levels suitable for plants and animals. Groundwater bore levels appropriate – TBD
		Water enters fish ponds associated with mounds	Presence of water in fish ponds (cultural sites) during flood



Name	Objective	Indicator	Measure
Cultural Plants	Promote and maintain healthy cultural plants at culturally significant sites (Reedy Lagoon, Black Swamp. Reed Bed Swamp - Guttrum Forest)	Old man weed - lots of green in summer	Cultural harvest, plant surveys, seed collection and photo points at designated sites
		River red gums - tree health scores and photo points to observe canopy for new growth annually and water gets to flood mark on trees periodically (inside Reedy Lagoon)	
		Cumbungi (Gumbung) - weaves without breaking, looks fresh and tastes good	
		River flax lily - new plants flowering	
		Water ribbons - abundant in spring	
		Nardoo - plants are present and healthy after flood and look right (not tall and leggy)	
		Moonah - plants flowering and recruiting	
		River mint - plants look healthy and are producing seed	
		Water pepper - plants present and producing seed	
		Native lettuce - enough plants to harvest	

Name	Objective	Indicator	Measure
Yumurriki (Dreaming)	Barapa people sharing culture and caring for Country	Cultural and monitoring activities on Country	Number of people and hours on Country People feel good on Country (video/questionnaire)
	Protect and preserve culturally significant sites through appropriate flow regimes	No new erosion or exposure of cultural sites Dead scarred trees remain standing Live scar trees are healthy	Photo points at inflow and outfall points Circumference measure/ photo points of dead scarred trees Tree health scores of live scarred trees
Yawir (fish)	Promote healthy and abundant native fish communities	Murray cod and yellow belly are breeding	Fish survey show range of ages including young of year (less than 1 year)
		Trout cod and catfish	Fish surveys show presence
Tya (soil/land)	Prime wetlands by prewetting soils in autumn	Aquatic plants respond to watering events	Plant surveys and photo prints
Kunawar (Black Swan)	Promote healthy water bird populations	Water birds breeding	Spring-summer surveys for eggs

8.3.2.11 Cultural flows

Barapa Barapa seeks water entitlement so it can make its own decisions about water on Country, and to provide economic outcomes for Barapa Barapa people. Barapa Barapa also seeks cultural outcomes through shared benefits from water held by others, such as through working with Government on how water held as entitlement by the environment is used.

8.3.3 Dhudhuroa, Waywurru and Yaitmathang

The Aboriginal Water Officers working under the Dhudhuroa Waywurru Nations Aboriginal Corporation have been developing a contribution on behalf of the Dhudhuroa, Waywurru and Yaitmathang Traditional Owner Groups. The Chair and other Board members of the Corporation provided review and guidance for the contribution. The content of the Dhudhuroa Waywurru Nations Aboriginal Corporation contribution was not finalised and approved in time for inclusion in this Chapter of the Water Resource Plan. DELWP will continue to work with Dhudhuroa, Waywurru and Yaitmathang Traditional Owner Groups on furthering recognition of their objectives and outcomes for water resource management in Victoria.

While the Dhudhuroa, Waywurru and Yaitmathang contribution could not be included in this Chapter of the Water Resource Plan, DELWP continued to work with the Corporation to finalise their contribution. Please refer to [Appendix F](#) for the final contribution and [Appendix D](#) for further details of the consultation.

8.3.4 Dja Dja Wurrung

The Dja Dja Wurrung contribution was developed and signed off by the Dja Dja Wurrung Kapa Gatjin water advisory group, with support from the Dja Dja Wurrung Water Officer, in accordance with the agreement between Dja Dja Wurrung Aboriginal Clans Corporation Chief Executive Officer and MLDRIN delegate, Rodney Carter, and DELWP.

“Dja Dja Wurrung Country is a cultural landscape that is more than just tangible objects; imprinted in it are the dreaming stories, law, totemic relationships, songs, ceremonies and ancestral spirits, which give it life and significant value to Dja Dja Wurrung People.”

Dja Dja Wurrung Recognition Statement

8.3.4.1 Description

The following is the work prepared, agreed and submitted by Dja Dja Wurrung, in a process agreed between the corporation and Victorian Government, to enable Dja Dja Wurrung to prepare its response to Victoria’s water resource plans, supported by Government when requested. The format is determined by the requirements of the Basin Plan, approached in a manner that meets the needs of the Dja Dja Wurrung Aboriginal Clans Corporation, and the people it represents.

Dja Dja Wurrung people, Country and agreements (TOSA)

On the 28 March 2013, after 18 months of negotiations between the State and Dja Dja Wurrung People, the Government of Victoria and the Dja Dja Wurrung Clans Aboriginal Corporation (DDWCAC) entered into a Native Title ‘**Recognition and Settlement Agreement**’. The Agreement formally recognising Dja Dja Wurrung people as the Traditional Owners of their Country and acknowledges the history of disbursement and dispossession that has affected the Dja Dja Wurrung People since settlement. Victoria’s northern water resource plan area covers a large part of central Victoria and consists of approximately two thirds of Dja Dja Wurrung Country. Dja Dja Wurrung Country, legally recognised by the ‘Dja Dja Wurrung Recognition and Settlement Agreement’, extends from the upper catchments of the Bulutjang (Loddon River) and Koliban (Coliban River) to Mount Franklin and the towns of Creswick and Daylesford in the southeast to the Yerrin (Campaspe River) Kyneton, Redesdale and Rochester in the east, Lake Boort in the north, Lake Buloke, Donald in the northwest, to the Avon Richardson River, Navarre Hill and Mount Avoca marking the south west boundary.

The basins within Dja Dja Wurrung Country represented by the Northern Victoria Water Resource Plan include the Bulutjang (Loddon River) basin and part of the Yerrin (Campaspe River) basin. The waters of Yerrin (the Campaspe River) and its main tributary Koliban River (Coliban) are highly significant areas to the Dja Dja Wurrung people as well as the main storages within the Loddon System, such as Cairn Curran and Laanecoorie reservoir. Dja Dja Wurrung Country also encompasses the Bendigo and Clunes goldfields as well as the Loddon and Avoca River watersheds. The Northern Victoria water resource plan area scope includes an abundance of wetlands and rivers that are currently of interest to Dja Dja Wurrung, such as Boort Lake, Bullock Creek, Tang Tang Swamp and the Bendigo Creek, and their confluences.

Dja Dja Wurrung Enterprises

Dja Dja Wurrung Enterprises Pty Ltd, trading as 'Djandak', is the commercial arm of the Dja Dja Wurrung Clans Aboriginal Corporation. It is owned wholly by the Dja Dja Wurrung Clans Aboriginal Corporation and is a Supply Nation Certified Business operating since 2012.

Djandak primarily acts as a representative of the Dja Dja Wurrung group regarding natural resource management works. It is also the home of the Dja Dja Wurrung Water Unit and Kapa Gatjin (To Know Water) Advisory Group.

Djandak has a team of cultural and natural heritage experts and project staff who work on a wide range of natural and cultural resource management projects from practical on-ground works through to traditional ecological knowledge gathering and cultural education activities. Their services include natural resource management and conservation works, landscaping projects, environmental policy, strategy development and cultural services.

Djandak's purpose is motivated and guided by the aspirations detailed in Dhelkunya Dja, the Dja Dja Wurrung Country Plan.

"Hundreds of years ago, our Country was mostly covered in open forests and woodlands, providing us with the plants and animals that we used for food, medicine, shelter and customary practices. Today, though our Country is vastly changed, it still holds many important values. We feel a moral responsibility to care for our Country as it binds us to the past, present and future."

Dhelkunya Dja Country Plan

The Kapa Gatjin (To Know Water) Advisory Group is the water-focused subdivision of the 'Dhelkunya Dja Land Management Board'. Its purpose within Djandak is to support and advise the Kapa Gatjin Water Unit on the execution of the 'Rivers and Waterways' chapter of the Dja Dja Wurrung 'Dhelkunya Dja Country Plan'. The Kapa Gatjin Advisory Group is representative of the wider Dja Dja Wurrung community in water-related matters and is to be involved in all decision making and consultation within Victoria's water resource plans.

The function of the Kapa Gatjin Advisory Group is to:

- build on our creation storylines and connection to Djandak (Country) with our mob
- to support and advise the Kapa Gatjin Water Unit in developing and delivering the Country Plan aspirations for rivers and waterways
- work with the Registered Aboriginal Party (RAP) to identify and care for cultural sites near Dja Dja Wurrung waterways
- promote cultural education between Dja Dja Wurrung Traditional Owners and Land and Gatjin (water) users and the broader community
- compile our cultural knowledge in order to produce resources to share knowledge with our community
- promote and build on partnerships with relevant stakeholders to collaborate on joint projects
- revive and conduct our cultural ceremonies associated with water
- assist with developing and progressing projects from Aboriginal Waterways Assessment (AWA) reports

- promote Dja Dja Wurrung self-determination through capacity and rapport building to ensure a legitimate and distinguished role in decision making and management of our waterways.

8.3.4.2 Agreements that influence water policy, partnerships, rights

Through their membership with the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and the Federation of Victoria Traditional Owners Corporation (FVTOC), Dja Dja Wurrung actively participate in representing the rights of Traditional Owner groups in water policy and governance in Victoria and the Murray-Darling Basin. Dja Dja Wurrung has also conducted an Aboriginal Waterways Assessment in May 2017 along the Coliban River and Upper Coliban Catchment Area alongside MLDRIN and North Central Catchment Management Authority (NCCMA), both of whom provided invaluable support to the project.

“The North Central Catchment Management Authority will ensure that the corporation is provided with the opportunity to be actively engaged in regional natural resource management strategic planning processes for which it is accountable in the Agreement area.

NCCMA will partner with Dja Dja Wurrung to develop joint project funding proposals to undertake natural resource management-related projects in partnership where suitable fund sources can be identified.”

Dja Dja Wurrung and North Central Catchment Management Authority Partnership Statement

The Dja Dja Wurrung Recognition Settlement Agreement (RSA) includes ‘Natural Resource Management Participation Strategies’, under which the State of Victoria has committed to provide the Dja Dja Wurrung people (through DDWCAC) with the opportunity to ‘actively participate in the development and review of natural resource management policies and strategic plans, and regional management and action plans’ within the Agreement area, in order to further Dja Dja Wurrung people’s rights and interests in water.

Schedule 16 – Natural Resources Management Participation Strategies of the Dja Dja Wurrung Settlement Agreement includes partnership arrangements between Dja Dja Wurrung and North Central CMA, which commits both parties to further developing a mutually beneficial relationship that will allow the organisations to work proactively together to build capacity, capability and sustainability. The Memorandum of Understanding (MoU) aims to define and further the relationship between the two organisations to deliver on North Central CMA commitments regarding the Dja Dja Wurrung RSA and to deliver outcomes that go beyond compliance with the RSA.

The RSA also includes a draft authorisation order, which authorises the take and use of water from a waterway or bore to meet any personal, domestic or non-commercial communal needs of Dja Dja Wurrung people. This order authorises the taking and use of water from a waterway or bore only where the Dja Dja Wurrung member has access to a waterway or bore in the circumstances set out in section 8(1) of the Victorian Water Act.

A ‘Traditional Owner Land Management Agreement’ is held between the state and Dja Dja Wurrung people and sets out principles to guide Joint Management of six parks that make up the Dja Dja Wurrung appointed land held under Aboriginal title by the Dja Dja Wurrung Clans



Aboriginal Corporation. Parks include: Hepburn Regional Park, Paddys Ranges State Park, Kooyoorra State Park, Wehla Conservation Reserve, Greater Bendigo National Park and Kara Kara National Park.

Dja Dja Wurrung have also secured freehold titles to three significant sites – Mt Barker (Yapenya), Carisbrook and Franklinford (Lalgambrook) in addition to the six parks jointly managed with the State.

The Dhelkunya Dja Land Management Board works in partnership with the Government to develop and implement joint management plans for these sites that consider all nine assets of the Dhelkunya Dja Country Plan; the Jaara people, cultural practises and customs, cultural heritage, flora and fauna/bushtucker and medicine, rivers and waterways, land and climate, self-determination of Dja Dja Wurrung people, Traditional Owner economy under Dja Dja Wurrung Enterprises and joint management.

8.3.4.3 Preferred means of engagement

Dja Dja Wurrung has managed their own consultation processes to engage Dja Dja Wurrung people in the development of the Northern Victoria Water Resource Plan, with support and involvement where required from the water resource plan team at DELWP.

Dja Dja Wurrung Enterprises were funded through the inaugural Aboriginal water grants program to employ a Water Policy Officer and the Kapa Gatjin (To Know Water) Advisory Group. As a result, Dja Dja Wurrung are in a position where we are able to coordinate consultation independently with Dja Dja Wurrung people, provided appropriate resourcing is made available for consultation activities. Dja Dja Wurrung therefore requests that the Kapa Gatjin Water Policy Officer is to remain first point of contact for all matters relating to the Water Resource Plan, which will then be communicated to the Kapa Gatjin 'To Know Water' Advisory Group for further consideration and endorsement.

This is the preference of Dja Dja Wurrung as it reflects the group's rights to be engaged as an equal partner with the State and its agencies in land and water planning and management.

8.3.4.4 Water resource plan response

During consultation it has become clear that there is an ongoing process of peel back of values and uses of water occurring which will continue to inform Victoria's water resource plans in the coming years. To ensure that this process and the learnings of this process can be captured by Victoria's water resource plans it is proposed that Dja Dja Wurrung be supported by DELWP in the annual review and updating of a Country Plan specific to water in the water resource plan area. This Country Plan will build on the rivers and waterways goal of Dhelkunya Dja and provide guidance as to Dja Dja Wurrung Water Policy, values and uses of water and objectives and desired outcomes for management which will greatly enhance the process and support Dja Dja Wurrung in providing ongoing engagement and input into the water resource plan implementation.

Due to the constant evolution of water management over time, we feel it would be practical for Dja Dja Wurrung to produce a dynamic and flexible document that will, as previously mentioned, refine and review the rivers and waterways chapter of the Dhelkunya Dja Country Plan to provide more detailed and meaningful input that can better sustain Victoria's water resource plans over their 10 year term. The document will create a firm basis for further planning and development regarding Dja Dja Wurrung values, uses, objectives and outcomes in water, and will allow us to take a progressive and all-inclusive approach in describing and implementing our cultural values into the Water Resource Plan.

We propose that the Dhelkunya Dja Country Plan is referenced within Victoria's water resource plans to allow it to remain a 'live' scheduled document that will remain under Dja Dja Wurrung's

control and discretion, allowing for continuous capture and review of Dja Dja Wurrung water policy over time. This will permit us to be ongoing, flexible and proactive with our objectives/outcomes & values/uses without restricting our ideals or compromising how we wish to communicate our priorities and objectives for managing water on Country within Victoria's water resource plans.

We also ask it is acknowledged that it is not possible to include all of Dja Dja Wurrung's cultural water aspirations, uses, values, and places of cultural importance into one perspective, as our values are diverse and complex and can widely differ between family and clan groups. Dja Dja Wurrung request that the naming or identification of specific wetlands in the Water Resource Plan does not compromise the importance of those not listed, and that any cultural values provided in this response do not fully define the interests and beliefs of Dja Dja Wurrung people, which are multifaceted and cannot be defined through a single standpoint or response.

It is also requested that the Dja Dja Wurrung Intellectual Property and Research Policy (IP) protocols are respected and followed. The IP protocols outline measures intended to ensure that the cultural and intellectual property of Dja Dja Wurrung Traditional Owners is protected and respected. This reflects the rights and protections of Aboriginal Cultural Heritage as presented in the 'Aboriginal Heritage Act 2006', and the 'United Nations Declaration on the Rights of Indigenous Peoples'.

The IP policy necessitates that cultural heritage and cultural knowledge are morally and legally the responsibility of their respective Traditional Owners, and that any cultural knowledge provided by Dja Dja Wurrung in this response is therefore the intellectual property of the Dja Dja Wurrung community. The collection and further use of cultural knowledge provided requires free, prior and informed consent of the Dja Dja Wurrung people, whom hold the right to keep confidential any information concerning their cultural practises, traditions and beliefs.

We feel confident that through this proposed process, we can make a significant ongoing contribution to Victoria's water management and entitlement planning, policy and implementation by working in partnership with DELWP to progress our shared objectives of greater Traditional Owner involvement in water management, while simultaneously supporting self-determination and independence for Dja Dja Wurrung people in regard to water governance.

8.3.4.5 Objectives

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Table 8-4: Dja Dja Wurrung objectives

Objectives
Dja Dja Wurrung people see their land and its waterways as central to their cultural identity and aspirations for community and economic development. As stated in the Dhelkunya Dja Country Plan, the Dja Dja Wurrung people wish to: • Ensure all of our waterways are healthy, with the right water in the right place at the right time to meet the needs of the environment, Jaara people and the broader community • Have a recognised and legitimate role in water governance, with genuine consultation in policy development and a recognised role in decision-making about our waterways • Secure adequate and equitable water rights that meet our social, cultural, spiritual, economic and environmental needs • Share our creation stories to teach people how water works in the landscape • Ensure that Dja Dja Wurrung cultural and spiritual values for Gatjin are respected, acknowledged and celebrated. • Government to work support Dja Dja Wurrung to continue to develop and unpack the rivers and waterways goal of the Dhelkunya Dja Country Plan to inform Dja Dja Wurrung values and uses for water • Dja Dja Wurrung to be provided resourcing to develop more Seasonal Watering Plans for Country and to gain resourcing to develop more Environmental Watering Plans for Country • Dja Dja Wurrung seeks the opportunity to access water and achieve visions without Government involvement • Make water accessible for all Dja Dja Wurrung people • Acquire (tradeable) water entitlements (purchase, seek donations from private donors, access surplus water entitlements created through efficiency mechanisms under the Murray-Darling Basin Plan (MDBP)) or purchase property with water entitlements attached • Work with Water Corporations to influence their delivery of urban or irrigation water. Use to enhance environmental flows to deliver on cultural objectives • Use Section 8A rights under TOSA to access water • Dja Dja Wurrung to become manager of environmental water • Participation with CMAs and Water Corporations to collaborate to develop and implement plans for the protection and rehabilitation of our waterways • Work with CMA, VEWH and CEWH and other relevant Government bodies so the release of environmental water, when available, can be timed with cultural outcomes and community events • Know how much water is going in/out of Country. Take stance on water consumers and research how much major consumers use. Develop relationships with other water users • Investigate water used on Country for financial/commercial gain. Investigate profits and GST to be shared with Dja Dja Wurrung. Add Dja Dja Wurrung logo to products sold for commercial gain (ie bottled water) • Identify framework to decide which sites need cultural water, and how to identify them, i.e. perform case studies on possible sites, environmental watering plans, aboriginal waterway assessments • Government to ensure Dja Dja Wurrung is invited to elect representatives onto advisory and working groups of stakeholders and partners • Expand our knowledge of water markets and trading to develop guidelines and policies for buying/selling water • Be enabled to follow up on identified sites and their water rights: Mt Franklin, Mt Barker, Carisbrook

Objectives

- Advocate for Indigenous Land Corporation (ILC) to participate in water as well as land
- Develop new partnerships and review existing ones. Place measures (ie. partnership evaluation tools) to make partnerships realistic/accountable
- Build cultural competency with partners, ie through cultural awareness workshops
- Dja Dja Wurrung to have more involvement in agriculture, farming, green/recycled water and be involved in Government decision making and planning
- Consult other mobs to compare positions, share insights. Follow precedents that may have worked for them, learn from mistakes that may not have worked. Possibilities to trade water between mobs, creation of new Aboriginal water market
- Make cultural activities more accessible on wetland sites
- Create opportunities to involve the Dja Dja Wurrung community in the development and care of sites by training Jaara in water related matters ie. monitoring
- Develop our economic independence through education and training to build our capacity
- Manage sites to support cultural activity and healing of Country
- Negotiate to develop a framework for access and management of all natural resources i.e. cultural burning
- Government to facilitate for land and water to be managed simultaneously to secure a cultural and holistic approach in water management
- Secure both land and water rights to sites and wetlands
- Increase community involvement at sites; interpretative and educational signage/audio, spiritual/healing places, vegetation (cultural, medicinal), wildlife, tourism opportunities (cultural walks, school programs, tourist attractions)
- Government to resource better weed removal and weed control of sites and for the introduction of native and/or endangered fauna back onto Country i.e. quolls, dingoes, emus, native fish and the removal of aggressive and invasive species that negatively affect the ability of indigenous species to survive
- Revegetate wetlands to allow for food and fibre resources, and native, ecologically and culturally important plants
- Build capacity through employing, procuring and training Dja Dja Wurrung peoples in water management and planning. Increase employment, training and economic development for Dja Dja Wurrung people through water-related projects
- Conduct ongoing monitoring and maintenance of sites and waterways, preferably by Dja Dja Wurrung people
- Employment and training of Dja Dja Wurrung people to undertake cultural monitoring and interpretation
- Restore Cultural Flows and recreate Jaara traditional ecological knowledge to inform management practises that heal Country
- Management of impacts that degrade the natural character/health of sites or alter the natural flow of a waterway. i.e. bridges, fenced areas, rubbish, farming activity (grazing, cropping, runoff), land use upstream
- For Dja Dja Wurrung to be resourced to partner with the City of Greater Bendigo in order to be actively and equitably involved in the restoration of Bendigo Creek.
- For Dja Dja Wurrung to partner with Parks Victoria to actively and equitably be involved in the management and restoration of the Lake Boort complex and surrounding wetlands.

8.3.4.6 Outcomes

Basin Plan
s10.52(1)(b)

Table 8-5: Dja Dja Wurrung outcomes

Outcomes

To empower, improve and promote the physical, social, emotional, cultural, spiritual and ecological wellbeing of Country including Gatjin, waterways, individuals, the Dja Dja Wurrung community and wider society. To achieve this, we expect the State to directly engage with the Djandak (through their Water Policy Officer) in relation to water management, delivery and resourcing that supports the maturation of a Dja Dja Wurrung Water Unit through the initial following processes:

- resourcing, including funding for Dja Dja Wurrung
- to continue to develop and unpack the rivers and waterways goal of the Dhelkunya Dja Country Plan ensuring we continue to communicate the importance of Dja Dja Wurrung values and uses for water for the successful implementation of Victoria's North and Murray Water Resource Plan
- for Kapa Gatjin Advisory Group to provide review and feedback on the Water Resource Plan and associated processes on an ongoing basis
- to develop and implement a transition plan within 12 months of accreditation of Victoria's North and Murray Water Resource Plan to empower Dja Dja Wurrung to achieve self-determination of gatjin on Country, including delivery of Seasonal Water Proposals and Environmental Water Plans
- to develop Seasonal Watering Proposals for Country
- to develop Environmental Water Plans, integrating cultural knowledge and western science, initially for all waterways and wetlands with recognised Dja Dja Wurrung names
- to maintain an Aboriginal Water Policy Officer position, to implement, develop and inform policy positions, processes and procedures with the support of the State
- to deliver Aboriginal Water Assessments (on a seasonal basis) to inform all the above (at least 6 per year)
- As per schedule 16.4 of the Dja Dja Wurrung Recognition and Settlement Agreement
- Meet with relevant State Government investors covered by this plan to develop funding proposals to support the above as well as relevant Dja Dja Wurrung values and uses for water in delivery of this Water Resource Plan (ie VIF, VEWH, etc)
- Bendigo Creek is managed to deliver on Dja Dja Wurrung Country Plan aspirations including self determination, joint management, healing Upside Down Country and rivers and waterways.

8.3.4.7 Values and uses

The following table shows the association between objectives, outcomes, and values and uses:³

Basin Plan
s10.52(1)

Table 8-6: The association between objectives, outcomes, and values and uses

Objective	Outcome	Values and Uses
Continue to develop and unpack the <i>rivers and waterways</i> goal of the <i>Dhelkunya Dja Country Plan</i> to inform Dja Dja Wurrung values and uses for water	- Self-determination - Build on Dja Dja Wurrung water policy - Can be used to inform Dja Dja Wurrung values and uses for water - Better equipped to care for Country	- Social - Economic - Cultural - Environmental - Educational
Gain resourcing to develop more Seasonal Watering Plans for Country Gain resourcing to develop more Environmental Watering Plans for Country	- Better equipped to care for Country - Can be used to inform management practises - Will assist in directly achieving Country Plan aspirations - Capacity building	- Social - Economic - Aboriginal environmental - Environmental
Opportunity to access water and achieve visions without Government involvement	- Self-determination, self-sufficiency - Capacity building	- Social - Economic
Make water accessible for all Dja Dja Wurrung people	- Water access for all Dja Dja Wurrung people 'Closing the gap'	- Social - Economic
Acquire (tradeable) water entitlements (purchase, seek donations from private donors, access surplus water entitlements created through efficiency mechanisms under MDBP) or purchase property with water entitlements attached	- Use to deliver cultural flows - Investment; sell allocations in dry years - Donate or sell at low cost to Dja Dja Wurrung community members working land - Deliver environmental water to wetlands on private lands - Use for agricultural production - Deliver Aboriginal environmental water to on site wetlands	- Aboriginal environmental - Cultural - Economic - Social
Work with water corps to influence their delivery of urban or irrigation water. Use to enhance environmental flows to deliver on cultural objectives	- Use to enhance environmental flows to deliver on cultural objectives - Partnership	- Aboriginal environmental - Cultural

³ Table for accreditation

Objective	Outcome	Values and Uses
Use Section 8A rights under Traditional Owner Settlement Agreement to access water	- Cultural flows - Water for cultural purposes	- Aboriginal environmental - Cultural - Economic - Social
Become manager of environmental water Participation with CMAs and Water Corporations to collaborate to develop and implement plans for the protection and rehabilitation of our waterways	- Take on management responsibilities that CMAs perform in delivering environmental water - Self determination - Establish a recognised and legitimate role in water management/planning - Development partnerships	- Aboriginal environmental - Social - Economic - Cultural - Environmental
Work with CMA, VEWB and CEWH and other relevant Government bodies so the release of environmental water, when available, can be timed with cultural outcomes and community events	- Influence delivery of environmental water to best suit our cultural needs - Self-determination - Healing of Country and culture - Development of partnerships	- Aboriginal environmental - Social - Environmental - Cultural
Know how much water is going in/ out of Country. Take stance on water consumers and research how much major consumers use. Develop relationships with other water users	- Better able to monitor water on Country - Capacity building - Know how much water is going in and out of Country - Better equipped to take a stance on water consumers and their use of water	- Economic - Aboriginal environmental - Educational
Investigate water used on Country for financial/ commercial gain. Suggestions that their profits and GST should be shared with Dja Dja Wurrung. Potentially add Dja Dja Wurrung logo to products sold for commercial gain (ie bottled water)	- Economic and business benefit - Closing the gap - Capacity building	- Economic - Social - Educational
Identify framework to decide which sites need cultural water, and how to identify them. ie) perform case studies on possible sites, EWPs, AWAs	- Framework will allow us to have a consistent approach to watering - Able to manage cultural water more effectively and efficiently - Information gathered can be used to inform future management practises and decisions - Capacity building	- Social - Aboriginal Environmental - Cultural - Educational

Objective	Outcome	Values and Uses
Elect representatives onto technical advisory groups of stakeholders and partners	- Recognised and legitimate role in water management - Capacity building - Building partnerships	- Social - Educational
Contact a water broker to expand our knowledge of water markets and trading to develop guidelines and policies for buying/selling water. Contact MILDRN for suggestions on how to use it to our advantage.	- Capacity building - Will allow us to develop guidelines and policies for buying and selling water - Make it easier to purchase water entitlements	- Social - Economic - Educational
Follow up on identified sites and their water rights: Mt Franklin, Mt Barker, Carisbrook. Argue ILC for water as well as land.	- Learn how we can access water rights as well as land rights - Potentially gain access to water - Opportunity to manage water and land rights simultaneously (in these areas)	- Cultural - Environmental - Social
Develop new partnerships and review existing ones. Place measures (ie. Partnership evaluation tools) to make partnerships realistic/accountable.	- Realistic and legitimate partnerships - Governance - Make partnerships transparent and accountable - Be seen as an equal partner rather than a stakeholder or contributor	Social
Build cultural competency with partners i.e. through cultural awareness workshops.	- Secure and respectful partnerships - Equity and respect - Reconciliation - Raising awareness	- Social - Cultural - Educational
More involvement in agriculture, farming, green/recycled water.	- Environmentally friendly ways to access and use water - Potential economic opportunities	- Environmental - Economic



Objective	Outcome	Values and Uses
It would be valuable to eventually consult other mobs to compare positions, share insights. Follow precedents that may have worked for them, learn from mistakes that may not have worked. Possibilities to trade water between mobs, creation of new Aboriginal water market.	- Keeping cultural water cultural - Sharing insights will reduce mistakes and misinformation. Learning from others mistakes - Creation of Aboriginal water forum - Self-determination - The creation of an Aboriginal water market may further improve relationships between mobs, allowing us to mutually work together towards a single united goal – to heal Country	- Social - Cultural - Educational - Economic
Possibility to plan and make cultural activities more accessible on wetland sites.	- Increased accessibility to sites - Able to use wetlands freely for cultural activities	- Cultural - Social
Create opportunities to involve the Dja Dja Wurrung community in the development and care of sites by training Dja Dja Wurrung people in water related matters i.e. monitoring. Develop our economic independence through education and training to build our capacity.	- Capacity building and training - Involving mob in caring for their Country - The more people trained in water, the larger the voice we have. - Better able to care for our Country - Develop self-determination through economic ventures with water i.e. tourism)	- Social - Cultural - Economic - Aboriginal environmental - Environmental - Educational
Manage sites to support cultural activity and healing of Country. Negotiate to develop a framework for access and management of all natural resources i.e. cultural burning. Find a way to allow for land and water to be managed simultaneously to secure a cultural and holistic approach in water management. Secure both land and water rights to sites and wetlands.	- Consistent management framework for natural resources that respects cultural knowledge and standards - More control over all our natural resources and the benefits of managing them - Combining land, water, fire, cultural, societal and economical values to manage and care for Country in a traditional way - Managing land and water rights as one entity will allow for a holistic approach in healing Country	- Social - Cultural - Aboriginal environmental

Objective	Outcome	Values and Uses
Community involvement at sites; interpretative and educational signage/audio, spiritual/healing places, vegetation (cultural, medicinal), wildlife, tourism opportunities (cultural walks, school programs, tourist attractions).	- Community involvement - Educates general public - Share stories and culture - Tourism opportunities - Revegetation will allow for resources such as medicinal plants, grasses for weaving etc	- Educational - Social - Cultural - Economic
Weed removal and weed control of sites. Introducing native and/or endangered fauna back onto Country. i.e. quolls, dingoes, emus, native fish. Animal and pest (including fish) control of sites. Removal of aggressive and invasive species that negatively affect the ability of indigenous species to survive. Revegetating wetlands to allow for food and fibre resources, and native, ecologically and culturally important plants.	- Revegetation will allow for resources such as medicinal plants, grasses for weaving etc - Using Traditional Ecological Knowledge to restore Country and native flora/fauna - Animal, pest and weed control will manage any nuisance plants or pests that may have adverse effects on the environment and other fauna - Promotes traditional practises by allowing Country to provide us with cultural materials our ancestors used	- Social - Cultural - Environmental - Aboriginal environmental
Build capacity through employing, procuring and training Dja Dja Wurrung peoples in water management and planning. Increase employment, training and economic development for Dja Dja Wurrung people through water-related projects.	- Capacity building and training - Self-determination - Increase in employment and economic development - Involve Dja Dja Wurrung people in the management of their Country and waterways	- Educational - Cultural - Economic - Aboriginal-environmental - Social
Ongoing monitoring and maintenance of sites and waterways, preferably by Dja Dja Wurrung people. Employment and training of Dja Dja Wurrung people to undertake cultural monitoring and interpretation.	Consistent maintenance of sites and waterways will improve their health while providing employment and capacity-building opportunities for Dja Dja Wurrung people.	
Restore Cultural Flows and recreate Djaara Traditional ecological knowledge to inform management practises that heal country.	- Restoration of cultural flows - Better able to care for Country - Sharing of stories and knowledge - Healing of Country through traditional methods	- Cultural - Environmental - Aboriginal-environmental - Social



Objective	Outcome	Values and Uses
Management of impacts that degrade the natural character/ health of sites or alter the natural flow of a waterway. ie) bridges, fenced areas, rubbish, farming activity (grazing, cropping, runoff), land use upstream.	• Minimising impacts such as upstream land use will allow for the natural flows of waterways to be preserved • Assist in returning Country to its natural state, while reducing man-made disruption of natural • flows that undermine both cultural and ecological values • Management of litter, farmer runoff, rubbish, vandalism etc will allow for improved site health and water quality	• Environmental • Cultural • Aboriginal environmental

Values and uses case study no. 1

The Aboriginal Waterways Assessment (AWA) is a tool for Aboriginal communities to consistently measure and prioritise river/wetland health so that they are better placed to negotiate for their Country's water needs. The tool is used to capture and record information about the cultural values, uses, and health of waterways and wetlands to assist Aboriginal people to be more meaningfully involved in water planning processes on their Country.

Out on Country, the assessment teams share information, hold in-depth discussions, observe and closely inspect sites and build on collective data to complete each site survey form with a focus on various aspects of the waterway and its condition. The team hear presentations from key speakers about the site's condition, history and significance, and record scores and relevant information about cultural values and waterway health.



While conducting their AWA's, Dja Dja Wurrung participants documented feeling a strong sense of connection, healing and spiritual sustenance from their Country and ancestral spirits. The number of the Cultural Heritage sites visited during the AWA's are supportive of this, and evidence a legacy of occupation that shows the important connection between Jaara (Dja Dja Wurrung people) and gatjin(water). Cultural heritage indicators and sites show how and where Jaara have used the waterways in the past, while the AWA tool helps us to record traditional ecological knowledge to continue to inform the management of our waterways today.





Culturally important information	Environmentally important information
Food and fibre knowledge	History of the site
Water flows and regimes that support cultural practices and customs	Water quality and quantity
Traditionally ecological and botanical knowledge used to care for Country	Revegetation needs
Presence of plants and animals used traditionally for food, medicine, shelter and tools	Ecologically important plants and vegetation communities
Oral cultural knowledge about the area	Presence and diversity of fish species
Presence and diversity of native flora and fauna	Presence and diversity of native flora and fauna
Cultural tradition activities such as hunting, fishing and ceremony	Geological and archaeological values
Dreaming stories and storylines	Soil and water health
Intangible heritage (sites and stories) associated with water and water places	Identification of risks and threats to be managed
Tangible cultural heritage sites	Landscape types

“We feel a moral responsibility to care for our Country as it binds us to the past, present and future.”

Dhelkunya Dja Country Plan

The cultural and environmental data gathered from the AWA's assists Dja Dja Wurrung in identifying key cultural and environmental values specific to each area. This provides a clear basis for informed management objectives to be developed that will support these values and ensure their progress, to help further advance Dja Dja Wurrung priorities for managing our rivers and waterways. It also provides opportunities for Dja Dja Wurrung to identify how a Traditional Owner group can guide effective use of water allocation, and to assist in the decision making and planning over a range of projects and water policy.

“Water is number 1. Without it trees, birdlife species and vegetation suffer greatly.”

Dja Dja Wurrung participant during an Aboriginal Waterway Assessment at Tang Tang Swamp

Values and uses case study no. 2

The lakes and wetlands of the Boort wetlands are of extremely high cultural significance to Dja Dja Wurrung people. The greater Lake Boort contains the highest concentration of scarred trees in Victoria. Lake Lyndger was an important meeting ground, with groups of cooking mounds along the southern shoreline indicating that people met there in large groups. Kinypanial Creek is an intermittent creek along which numerous scarred trees and other significant cultural sites such as mounds, camp sites and artefact scatters have been recorded.

The Boort AWA results have been used to contribute to a management plan for the Boort wetland complex, which is currently a focus of management activity for Dja Dja Wurrung. It has also been used to inform water planning and delivery of environmental water to the site alongside the North Central CMA.



Tang Tang Swamp was identified by Dja Dja Wurrung AWA team as a highly important place within a wider catchment that is culturally significant to the Dja Dja Wurrung people. It features River Red Gums, significant marker 'ring trees', scar trees, basket weaving grasses and many other interesting cultural features. The Swamp is managed as a Wildlife Reserve is registered on the National Directory of Important Wetlands due to brolga nesting and many other visiting migratory waterbirds. It also contains ecologically important plants and vegetation communities such as Southern Cane Grass, aquatic plants and patches of rare native grassland.

Community perspectives and insights captured in the Tang Tang Swamp Aboriginal Waterways Assessment report will be used to further assist Dja Dja Wurrung people to make decisions about how they would like the Swamp to be managed, and help land and water managers to have greater insight into the cultural values of Tang Tang Swamp.



Today, Dja Dja Wurrung Traditional Owners are actively engaged in recording and preserving these sites. This work includes conducting cultural heritage surveys and salvaging artefacts effected by land use activities.

The Coliban River is an important part of the broader Dja Dja Wurrung cultural landscape. Scar trees, burial sites, artefacts, stone quarries and other cultural heritage sites have been recorded along the waterway.

Large stone tool scatters and significant Tachylite quarry sites can be found along the main channel and adjacent to storages in the Upper Coliban, demonstrating continuous use of the land and resources along the waterway for many thousands of years.

The Upper Coliban AWA has continued to inform a variety of projects, such as the South West Loddon Pipeline project delivered by GWM Water and the Integrated Catchment Management Plan that is being developed for the waterway.



As the AWA provides a consistent method to identify cultural values, assess cultural health of waterways and prioritise water management and regulation it can assist the decision making and planning processes of a range of projects. This is being demonstrated where the AWA's provide the research to inform policy development and infrastructure investment to provide water management in support of cultural values and assets.

8.3.4.8 Cultural flows

Despite parts of the Country being recognised and returned to their Traditional Owners, there is still a strong disadvantage in the liberties of Indigenous people in Australia, as they do not have the same access to water rights as they do land rights. This is due to the introduction of the National Water Initiative (NWI), which saw the creation of property rights to water and tradeable water entitlements as necessary to address environmental damage and poor water management practises at the time. This was exacerbated through land and water rights being separated, this was put into effect in 2005 when the Victorian Water Act was amended to "unbundle" water for land title. Prior to this legislation, water and land rights were one entity and were allocated to people as they need it, at minimal or no cost to users. The uncoupling of water and land rights caused unintended consequences for Aboriginal groups, who, without access points or funds required to buy into water, cannot benefit from market-driven legislation.

There are instances, such as in Dja Dja Wurrung's case, of gaining access to land, but being excluded in enjoying rights to water on that same land. Dja Dja Wurrung people's relationship with water is holistic; combining land, water, culture, society and economy - relying equally on rivers, groundwater, wetlands and their Country to access cultural values, regardless of tangibility. Consequently, water and land rights are considered to be interwoven with each other, and it is Dja Dja Wurrung peoples belief that they should be managed as so.

Therefore, it is in Dja Dja Wurrung's best interests and long-term objectives to gain access and ownership to both water and land rights on our Country, and to enjoy and manage these rights simultaneously to support our ongoing cultural and spiritual connection to our Country and waterways.

8.3.5 First Peoples of the Millewa-Mallee: Nations of Nyeri Nyeri, Ngintait and Latji Latji

Objectives, outcomes and values and uses for water were workshopped, and signed off at separate Nation meetings for Latji Latji, Ngintait and Nyeri Nyeri. The final contribution was signed off by the First Peoples of the Millewa-Mallee Board, the membership of which includes a Latji Latji MLDRIN delegate, Ngintait MLDRIN delegate and a Nyeri Nyeri MLDRIN delegate.

8.3.5.1 Description

"We, the First Peoples of the Millewa-Mallee are people of the river and the scrub and desert area to the south and west of it. We are descendent from families whose ancestors are part of this Country; ancestors who cared for it, sang to it, danced on it and kept it strong and fat. The ancestors taught their descendants through each generation about their responsibility to care for their Country, despite the decimation caused by colonisation.

Even when we were taken away, we still belonged. Country is family."

The First Peoples of the Millewa-Mallee have lodged a native title claim under the *Native Title Act 1993* (Cth) over an area in the north west of Victoria, that runs south of the Murray River to the Mallee Highway and west from the Calder Highway to the South Australian border, including the Murray-Sunset National Park. First Peoples of the Millewa-Mallee are also working through the process towards settlement with the State of Victoria under the *Traditional Owner Settlement Act 2010* (Vic) (the Settlement Act) in relation to the same area.

First People of the Millewa-Mallee Aboriginal Corporation (FPMMAC) is the representative corporation formed by First Peoples of the Millewa-Mallee for the purposes of their Settlement Act processes. FPMMAC has recently been appointed as a registered Aboriginal party under the *Aboriginal Heritage Act 2006* (Vic) for the northern part of the First Peoples of the Millewa-Mallee claim area. In addition, FPMMAC currently has an application for registered Aboriginal party status before the Victorian Aboriginal Heritage Council in relation to the southern part of the First Peoples of the Millewa-Mallee claim area.

Eligibility to be part of First Peoples of the Millewa-Mallee is not based on language groups or Nations. First Peoples of the Millewa-Mallee is comprised of family groups, descended from apical ancestors connected to the area of the First Peoples of the Millewa-Mallee claim.

Individuals within First Peoples of the Millewa-Mallee identify as Latji Latji, Nyeri Nyeri and Ngintait, but these identifications are not the basis on which these individuals group together as First Peoples of the Millewa-Mallee.

The First Peoples of the Millewa-Mallee are connected to all surface and groundwater within their claim area, and in addition have significant interest and have indicated traditional cultural

history in areas beyond their claim area, which for Victoria includes Hattah-Kulkyne National Park, Robinvale and the Lake Tyrell area.

First Peoples of the Millewa-Mallee Country embraces many sites of cultural significance, including ceremonial grounds, cultural heritage such as earth oven remains, scar trees, birthing trees, shell middens, song lines, ancestral resting places, story places, and sorry places of grievous historical trauma. Cultural sites and places in traditional First Peoples of the Millewa-Mallee Country are a direct link between contemporary First Peoples of the Millewa-Mallee people and their ancestors who created and cared for those places.

8.3.5.2 Current or pending agreements

In October 2015, the First Peoples of the Millewa-Mallee filed a native title determination application under the Commonwealth *Native Title Act 1993* in the Federal Court of Australia. The application was accepted for registration in May 2016 and is currently being case managed by the Federal Court of Australia.

The First Peoples of the Millewa-Mallee first lodged a Part A Threshold Statement under the Settlement Act with the Department of Justice and Regulation of the State of Victoria in May 2016. This was revised in November 2016 and further supplementary material was provided in May 2017. The First Peoples of the Millewa-Mallee lodged a Part B Threshold Statement with the Department of Justice and Regulation in January 2018.

FPMAC has recently been appointed as a Registered Aboriginal Party (RAP) under the *Aboriginal Heritage Act 2006* (Vic) for the northern part of the First Peoples of the Millewa-Mallee claim area. In addition, FPMAC currently has an application for RAP status before the Victorian Aboriginal Heritage Council in relation to the southern part of the First Peoples of the Millewa-Mallee claim area.

The First Peoples of the Millewa-Mallee's proposed settlement area, native title claim area, and RAP area is geographically included in both the Northern Victoria and the Wimmera-Mallee water resource plans.

8.3.5.3 Existing reference /scoping materials

The First Peoples of the Millewa-Mallee are currently preparing their Country and Water Plan.

The Victorian Government funded through water resource plans an Aboriginal Waterway Assessment for the Ngintait Nation, conducted in 2018. The Ngintait Nation maintains intellectual property rights over the Aboriginal Waterway Assessment, but will refer to it as they determine appropriate when working with Government regarding water on Country.



Figure 8-3: Ngintait Nation Aboriginal Waterway Assessment 2018

Credit: DELWP

8.3.5.4 Preferred means of engagement

The First Peoples of the Millewa-Mallee have informed the Victorian Government through the Water Resource Plan consultation that their preferred means of engagement with Government agencies and Government delivery partners is through the FPMMAC Board (the Board).

The Board is comprised of representatives of each of the identified family groups within First Peoples of the Millewa-Mallee (as required by its Rule Book), meets regularly throughout the year and is committed to ensure that the “right people speak for Country.”

The Board considers requests for collaboration, participation or consultation, and determines how best to structure First Peoples of the Millewa-Mallee’s involvement.

First Peoples of the Millewa-Mallee and/or Ngintait, Latji Latji, Nyeri Nyeri representatives who are consulting with Government must have the appropriate permission before sharing knowledge. Through ensuring Traditional Owner representatives to speak on behalf of Nations are approved, individuals consulting with Government are protected from criticism. The approach also provides a record of information provided to Government and when and how that information is able to be cited.

The majority of engagement on the Victorian Government water resource plans has been with First Peoples of the Millewa-Mallee as a whole and the Board. Due to the Victorian Government’s consultation requirements, and following discussion with MLDRIN delegates for the individual Nations, separate Nation-level meetings were held with those who identify as Latji Latji, Ngintait and Nyeri Nyeri in November 2018.

Choosing the First Peoples of the Millewa-Mallee Board as the first point of consultation adds to the recognition expressed in consultation:

“We work as a collective. We’re strong when we stick together.”

Approved at consecutive Nation meetings for the First Peoples of the Millewa-Mallee, November 2018

Engagement requirements

As at November 2018, as First Peoples of the Millewa-Mallee have a registered native title claim, engagement within the First Peoples of the Millewa-Mallee claim area should be conducted by contacting the First Peoples of the Millewa-Mallee legal representative, First Nations Legal & Research Services on 03 9321 5300. In addition, it is expected any matters concerning Country, including water and works on Country undertaken in regard to water management, policy, planning or proposals, be referred to the First Peoples of the Millewa-Mallee in the first instance, via First Nations Legal & Research Services, with due consideration of the requirements of the *Native Title Act 1993* and objectives relating to engagement contained in this water resource plan, most specifically:

- involving First Peoples of the Millewa-Mallee from the outset
- enabling FPMMAC and the right Traditional Owners to be involved as decision makers.

“We want the Government to understand how we see the water. We have to be a part of the conversation everyone else is having about the river.”

Approved at consecutive Nation meetings for the First Peoples of the Millewa-Mallee, November 2018

As part of the First Peoples of the Millewa-Mallee Country and water planning process, the Department of Environment, Land, Water and Planning provided funding towards a film documenting a community gathering to talk about water and Country. Powerfully communicated in the film was the message:

“You Government departments that sit behind us, we are all part of this. We can each and every one of us contribute. We don’t stand behind anymore. We walk and work together.”

Approved at consecutive Nation meetings for the First Peoples of the Millewa-Mallee, November 2018

This message was reiterated and strengthened throughout the engagement process between the First Peoples of the Millewa-Mallee and the Victorian Government.

In May 2018 First Peoples of Millewa-Mallee held a community gathering at Lake Cullulleraine. This gathering was part of First Peoples of the Millewa-Mallee’s process to develop a Country and Water Plan and talk about their contribution to Victoria’s water resource plans and was supported by the Victorian Government water resource plans in a funding agreement. The gathering saw members from First Peoples of the Millewa-Mallee meet and talk about water,

hear how water management had changed with current water regulation, and re-connect over why water was important to them, as Traditional Owners.



Figure 8-4: Water for the future: Lake Cullulleraine community gathering for the First Peoples of the Millewa-Mallee

Credit: DELWP

“Being together like the Lake Cullulleraine weekend gives us energy being together. We’ve been disconnected..... but together we understand our place on Country and as family.”

Approved at consecutive Nation meetings for the First Peoples of the Millewa-Mallee, November 2018

8.3.5.5 Water resource plan response

The Victorian Government has taken a source-based approach to its water resource plans and identified that First Peoples of the Millewa-Mallee had interests in groundwater contained within the Wimmera-Mallee Water Resource Plan. This approach also identified the majority of interests of this Traditional Owner group in relation to surface water – rivers, creeks, wetlands, lakes – related to water being sourced from the Murray River. Engagement with the First Peoples of the Millewa-Mallee therefore increased in 2018.

This approach, while being logical from a State Government perspective, has at times been challenging and counter-intuitive for Traditional Owner groups, whose boundaries do not replicate those of State Governments, nor boundaries devised within State Governments, such as those of Water Corporations, Catchment Management Authorities, or public land managers.

Water on Country is connected, and State Government boundaries have been expressed by the First Peoples of the Millewa-Mallee as an artificial concept over a landscape and culture that spans thousands upon thousands of years.

It has been agreed with the FPMMAC Board and through consultations, that the contribution from the First Peoples of the Millewa-Mallee for the Northern Victoria and the Wimmera-Mallee water resource plans be consistent.

On January 19th 2018, the DELWP met with the FPMMAC Board to workshop preliminary objectives for water resource plans, specifically at that time, the Wimmera-Mallee Water Resource Plan, and agree on an engagement approach for the Northern Victoria Water Resource Plan.

At that meeting and at subsequent meetings, the FPMMAC Board endorsed the Department and the Federation of Victorian Traditional Owner Corporations to provide support to the First Peoples of the Millewa-Mallee to produce outcomes for both a First Peoples of the Millewa-Mallee Country and Water Plan and considered contributions, based on inclusive consultation, to the Victorian Government's water resource plans. The collaborative program is further documented in the [Appendix D](#) Consultation Report.

In discussions with the First Peoples of the Millewa-Mallee and at the culmination, through several meetings, the First Peoples of the Millewa-Mallee concluded that as a collective they sought to have a much bigger impact on water decisions, with a priority aim of getting water to Country that either hasn't received water due to changed water management regimes and competing priorities, or has more need than is being catered for to restore or maintain cultural outcomes.

The end goal of the First Peoples of the Millewa-Mallee is a process for input which fosters self-determination. Along the way to this goal, First Peoples of the Millewa-Mallee view having an equal say as a necessity. The First Peoples of the Millewa-Mallee's goal is that there is training for young Aboriginal people in caring for Country, whether in schools, with delivery partners, in negotiation skills and management, through training in plant identification and knowledge of water catchments or through certificates in cultural heritage with strong emphasis on culture related to water.

Similarly, in relation to representation at a leadership level, the First Peoples of Millewa-Mallee seek more representation on Government Boards that make decisions in relation to Country and water.

"There's a lack of communication with us from Government. People are walking all over us, and our Country."

**Statement agreed at Nation meetings
November 2018**

The Victorian Government through its water resource plans being developed in response to the Murray-Darling Basin Plan began discussions with the First Peoples of the Millewa-Mallee in 2017, initially in relation to the Wimmera-Mallee Water Resource Plan, and the Murrayville groundwater aquifer.

8.3.5.6 Objectives and outcomes

Basin Plans 10.52(1)

Table 8-7: Objectives and outcomes for First Peoples of the Millewa-Mallee

Objectives	Outcomes
Restock native fish species in waterways and bodies nominated by the First Peoples of the Millewa-Mallee, including BUT NOT LIMITED TO the Billabong at Berribee Homestead, where the fish will be able to mature and breed without unacceptable risk from predators or unfavourable water management regimes.	First Peoples of the Millewa-Mallee are empowered to make choices regarding locations and timing of fish releases based on sites that have cultural or historical importance, and areas that mirror fish movements and hunting in the past.
	First Peoples of the Millewa-Mallee can spend time looking after Country, fishing, yarning and sharing traditional ecological knowledge.
All Traditional Owners to be able to physically access waterways of cultural significance, and not be impeded by changed land conditions resulting from water and land management, unclear or restrictive access conditions through rules or regulations, or lack of recognition of the needs of Elders and people with more limited access opportunities.	Access to waterways and water bodies of significance are improved for the First Peoples of the Millewa-Mallee through facility upgrades, rights and improved engagement and responsive management to understand and remove limitations.
Access to waterways for other water users, including anglers, boaters, swimmers, joggers, four-wheel drivers and trail bike riders be better controlled to keep people from encroaching on culturally significant sites.	Access to water for both cultural and recreational opportunities is more sustainably managed, protecting Country from erosion and degradation.
	Access to water for recreators is achieved in a culturally appropriate way, protecting culturally significant sites from damage caused by foot and vehicle traffic.
	Access to water for cultural purposes, including fishing, swimming and canoeing, is available to physically impaired Traditional Owners.
Traditional Owner involvement in environmental watering decisions be ongoing and include decisions on site selection, quantities and timing.	Cultural outcomes are identified and catered for when managing water for the environment to achieve shared benefits based on traditional ecological knowledge and cultural values.
Restore songlines as discussed while on Country, and restore them so Traditional Owners can spend time on Country in a place of high cultural significance.	The song lines are restored with access to fresh water via the naturally formed waterholes and Traditional Owners are enabled to make decisions regarding the songlines, including in relation to economic opportunities through tourism and cultural activities.

Objectives	Outcomes
Representatives from First Peoples of the Millewa-Mallee sit on water boards, including the Catchment Management Authorities, and Lower Murray Water, and Government supports First Peoples of the Millewa-Mallee to be confident, know the rules and requirements, and know how best to share knowledge.	First Peoples of the Millewa-Mallee are at the forefront of decision making and evaluation, of socio-cultural-economic factors and informing and influencing decision makers of how to plan, manage and accommodate cultural outcomes.
The First Peoples of the Millewa-Mallee takes a lead role in monitoring and evaluation.	The First Peoples of the Millewa-Mallee are respected, listened to, and resourced to monitor, evaluate and participate in research on Country to determine from a cultural perspective how water management and planning decisions are impacting positively or negatively on Country in regards to water quality, flora and fauna protection and regeneration health in particular in relation to culturally significant species, and the protection of culturally significant sites.
The Victorian Government resources the First Peoples of the Millewa-Mallee to: employ an Aboriginal Water Officer to act as a liaison between the First Peoples of the Millewa-Mallee and Government and other bodies as agreed by the FPMAC Board.	Ongoing monitoring and evaluation of cultural outcomes is used to inform decisions regarding when and where to water sites of cultural significance, including but not limited to Lake Walla Walla, Kings Billabong, Brickworks Lagoon, Wallpolla Creek and Lyndsay Island. The First Peoples of the Millewa-Mallee are funded to make their own decisions about when and how it is best to evaluate the health of Country.
Fund and support monitoring and evaluation of changes to Country that occur following different watering regimes, decisions and climatic conditions.	The health of waterways and water bodies on the Country of the First Peoples of the Millewa-Mallee is improved, providing habitat for fish, birds and an environment that fosters native plant species important to cultural practices.
Funding for the First Peoples of the Millewa-Mallee to conduct Aboriginal Waterway Assessments at times determined by the Nation groups as the best way to gauge measures from a cultural perspective, including based on a seasonal calendar as determined by the First Peoples of the Millewa-Mallee based on their observations and cultural knowledge.	Self determination to monitor and evaluate river and wetland health from a cultural perspective.

Case study: Involvement in managing groundwater

The Murrayville Aquifer is within the Wimmera-Mallee Water Resource Plan area, and is of significant interest to the First Peoples of the Millewa-Mallee. The Murrayville groundwater management area occupies 1,578 km² centred on the town of Murrayville, between the Murray Sunset National Park and the Big Desert. It supports some irrigation, including potatoes, cereals and olives, and provides some town water use and domestic and stock water supply.

In 2017, Grampians Wimmera Mallee Water (GWM Water) released a new Groundwater Management Plan for Murrayville, after consultation with the Murrayville Groundwater Advisory Committee. This plan provides a management strategy for the aquifer to ensure it is protected and used sustainably. A representative from the First People of the Millewa-Mallee presented to the Murrayville Groundwater Advisory Committee to provide a better understanding about Traditional Owners' interest in the aquifer, including accessing water for customary practices and commercial interests, and working with the authorities to protect the aquifer. These interests were captured broadly in the plan, through a statement for the future:

"The Local Management Plan (LMP) recognises and acknowledges that the Traditional Owners have a deep connection to their lands and water. The LMP identifies the need to develop a greater understanding of the cultural objectives and values relating to groundwater in the Murrayville area during the implementation of the LMP."

**Murrayville Groundwater Local Management Plan Grampians
Wimmera Mallee Water, 2017**

As a result of gatherings on Country through funding afforded through the Country and Water Plan, and the Victorian water resource plans, the First Peoples of the Millewa-Mallee are now seeking ongoing active discussion with land and water managers to communicate their understanding of the groundwater resource and its significance to Traditional Owners in the past, and into the future.

8.3.5.7 Values and uses

Conversations with the First Peoples of the Millewa-Mallee regarding values and uses have been generous and insightful, but there is a shared concern that documenting these discussions overtly in a Government plan may have an adverse effect on active and continuing involvement of First Peoples of the Millewa-Mallee in policy and planning.

Therefore, Victoria's water resource plans for the First Peoples of Millewa-Mallee will refer to values and uses at a higher level, with the view that each and every conversation and decision relating to or impacting on cultural values and uses will involve First Peoples of Millewa-Mallee.

Values and uses include:

- it's important that water comes to the places we hunt and gather, not just to places others value, such as farms and irrigation
- we need to have our gatherings, our corroborees and our ceremonies

- if you've got no water, you can't regenerate land
- we need to be able to look after Country, preserve Country, water those trees, manage erosion, restock waterways with native fish – native fish look after the waterways
- as late as in the 1950s we still travelled by canoes, trapped, fished, traded with the farmers up and down the river, met friends, and met family.

8.3.5.8 Cultural flows

The First Peoples of the Millewa-Mallee are patently aware that water entitlements provide empowerment to make decisions outside the negotiation of managing and responding to multiple water users.

In addition to achieving cultural outcomes for Country, through water entitlement not bound to shared outcomes or benefactors, the First Peoples of Millewa-Mallee seek water entitlement to build their presence in using water for social, economical, environmental and cultural outcomes. Three case studies to illustrate the relationships and the standard expected by FPMM for engagement on watering decisions include:

- Kings Billabong
- Lake Walla Walla
- Brickworks Lagoon



Figure 8-5: Cowanna and Brickworks billabongs are nationally significant wetlands at Merbein Common

Credit Lisa Hocking (DELWP)

8.3.6 Tati Tati Wadi Wadi

Tati Tati Nation meeting participants self-determined they would like to be known as the Tati Tati Wadi Wadi for the purposes of Victoria's water resource plans. This is consistent with the Tati Tati Wadi Wadi Aboriginal Waterway Assessment prepared in 2017 with MLDRIN.

A July meeting at Robinvale in 2018 concluded the people present wished to be identified as Tati Tati Wadi Wadi. In November 2018, the MLDRIN full gathering formally appointed delegates for the Wadi Wadi Nation, that were not part of the Tati Tati Wadi Wadi consultation. These delegates had, from September 2018 led consultation for their Nation (see the Wadi Wadi contribution at [Section 8.3.8](#)).

Tati Tati Wadi Wadi objectives, outcomes and values and uses for water were signed off at a Nation meeting at Nyah. The final contribution was signed off by a Tati Tati MLDRIN delegate.

8.3.6.1 Description

Tati Tati Wadi Wadi First Nation are the Traditional Owners of their Country, river, lakes, creeks and lagoons and respectfully share tribal boundaries with the Mutti Mutti, Latji Latji, Wadi Wadi, Kurenji, Barkinji and Wergaia First Nations.

Tati Tati Wadi Wadi First Nation is represented in the Northern Victoria and Wimmera-Mallee water resource plans through interests around the Robinvale-Swan Hill area, with a focus on the Murray River and its tributaries and floodplains, and in Lake Tyrell, a terminal lake at the edge of the Avoca Basin.

"The Tati Tati Wadi Wadi people have lived on this Country since time immemorial, and we are the Sovereign First Nation of our River and Mallee country. We are the Traditional Owners of land, water, culture, language, ancestral heritage, law, customs, secret and sacred objects, songs, stories and artist impressions."

**Brendan Kennedy, Tati Tati MLDRIN delegate
May 2018**

Tati Tati Wadi Wadi Aboriginal Corporation was established in May 2007.

8.3.6.2 Current or pending agreements

Tati Tati Nation is a member of Murray Lower Darling River Indigenous Nations (MLDRIN). It is a strong advocate of MLDRIN as an inclusive and representative organisation for Traditional Owner groups in the Murray-Darling Basin.

Tati Tati Wadi Wadi people have never ceded their sovereignty, nor have they consented nor authorised any others to govern over their people and Country.

Tati Tati Wadi Wadi in working with the Victorian Government to provide their contribution to water resource plans state that their responses to water resource planning are in no way an admission of traditional ownership of water other than that of the Tati Tati Wadi Wadi people. The Nation further emphasised that it does not surrender its waterways nor recognise ownership of their water to any State or Commonwealth Governments or their representatives.

The Nation is not currently in any Native Title, Traditional Owner Settlement Act or Registered Aboriginal Party negotiations.

8.3.6.3 Existing reference/scoping materials

Tati Tati Wadi Wadi received funding through Victoria's water resource plans to conduct an Aboriginal Waterway Assessment at several sites of significance to the Nation. Tati Tati Wadi Wadi Traditional Owners group whom actually participated in the Aboriginal Waterway Assessment maintains intellectual copyright over the Aboriginal Waterway Assessment report.



Figure 8-6: Scar tree near Margooya Lagoon (Tati Tati Wadi Wadi workshop)

Credit: DELWP

Back row from left: Toby Kirby, Chris Kennedy & Kob, Jade Kennedy, Brendan Kennedy, Cahill Kennedy, Kathleen Terrick,

Front row from left: Harold Ian Kirby, Robert (Bob) Kennedy, Rebecca Kennedy, Jessica Kennedy (girl), John F Kennedy, Thomas Kennedy & Jaylan Kennedy, Joshua Paul Pep Kirby, Bonney Kirby (girl), Jason Bootsy Kirby



8.3.6.4 Preferred means of engagement

Tati Tati Wadi Wadi asserts that no one person can speak for Country. It's preferred means of engagement with Government is initially through the participating Tati Tati MLDRIN delegate/s, who then determines the most effective way to engage more broadly.

Tati Tati Wadi Wadi has expressed strongly that decisions on how water is managed, including flow regimes, volumes, and structures to manage water, should be made in collaboration with Traditional Owners from both the perspective of improving cultural outcomes and applying cultural knowledge. In addition, Government needs to understand discussions in regards to structures on Country should not be limited to cultural heritage as understood through the Aboriginal Heritage Act.

During consultation for the Victorian Government water resource plans, Tati Tati Wadi Wadi has told Government that it wants to be funded to work alongside the Government to improve cultural outcomes on Country:

"We want to be driving this bus and be able to implement our cultural sciences – at the moment we are not even in the bus, we are sitting at the back of the trailer."

Brendan Kennedy, Margooya Lagoon, 2018

Tati Tati Wadi Wadi seeks ongoing and respectful conversations with Government in a collaborative and co-managed structure, with access to talk directly to people in leadership positions, and not have their voice diluted through gatekeepers or through people with any conflicts of interest on Country.

Tati Tati Wadi Wadi asserts that collaboration should be cohesive across land, fire, biodiversity and water, to produce a shared perspective and better outcomes for Country.

"The Northern Victoria Water Resource Plan will provide the opportunity to build on these objectives and, through deeper engagement, identify specific outcomes for water on Country."

8.3.6.5 Water resource plan response

The Victorian Government commenced discussions with Tati Tati Wadi Wadi regarding water resource plans in 2017, following the funding of the Tati Tati Wadi Wadi Aboriginal Waterway Assessment. Tati Tati Wadi Wadi included Victorian Government water resource plan representatives in the Aboriginal Waterway Assessment at several locations, and discussed some of the observations and emerging objectives for water in subsequent meetings in the Robinvale area. Representatives from Tati Tati Wadi Wadi met with the Government and MLDRIN in a planning meeting to map out the formal approach to contributing to Victoria's water resource plans. Through MLDRIN, DELWP provided funding for workshops and gatherings on Country, including a Nation meeting held on October 29 2018 to finalise the Water Resource Plan objectives and outcomes.

Over these meetings, workshops and gatherings on Country, Tati Tati Wadi Wadi has identified key objectives over a series of topics:

Caring for Country

“Tati Tati Wadi Wadi have a cultural responsibility to make sure water that flows through Country is healthy and flows downstream for Traditional Owner groups. We need to be resourced and supported to be able to fulfil that cultural responsibility.”

**Approved at the Tati Tati Wadi Wadi Nation meeting,
October 29, 2018**

Tati Tati Wadi Wadi have approved a series of objectives for caring for Country, in relation to water and to land impacted by water use, activities and regimes.

The Traditional Owner group has also outlined a need to work in partnership with Government to be a part of a coordinated approach to monitor annual water flows and the impacts of water management and planning on Country, including rivers, creeks, wetlands, lakes, floodplains and swamps and their associated ecosystems.

Capacity through Government resourcing was an objective raised by many participants in the Tati Tati Wadi Wadi meetings. Government funding was seen as a key to Tati Tati Wadi Wadi to revive cultural sciences, enabling them to use their cultural methods to improve the health of Country, and pass down the knowledge to younger generations.

Connected Country

Meetings on Country with Tati Tati Wadi Wadi included several discussions on infrastructure to change water flows or courses, including structures installed as part of the Murray-Darling Basin Plan Sustainable Diversion Limit Adjustment Mechanisms.

“Tati Tati Wadi Wadi do not agree and do not provide permission for the construction and operation of structures to regulate water on Country. Tati Tati Wadi Wadi do not agree to Sustainable Diversion Limit Adjustment Mechanisms in replacement for natural flows.

Don’t put structures into land where our ancestors are.”

**Approved at the Tati Tati Wadi Wadi Nation meeting,
October 29, 2018**

Tati Tati Wadi Wadi wants environmental water delivered on Country in a way that links the channel of the river to the floodplains, creeks and wetlands, rather than through artificial means or infrastructure. The Traditional Owner group has stated to the Victorian Government through the water resource plan consultation that structures on Country are barriers that impede on their wellbeing and are the equivalent to environmental pollution.

Respect and control

For water on Country, Tati Tati Wadi Wadi people seek to be ongoing and equal participants with Government departments and their delivery partners, including Catchment Management Authorities and Water Corporations.

**Basin Plan
s10.52(1)**
Table 8-8: Tati Tati Wadi Wadi objectives and outcomes

Objectives	Outcomes
Tati Tati Wadi Wadi want more healthy, fresh water to flow through our Country, particularly over winter, every year.	Tati Tati Wadi Wadi determines the level of improvement needed for water quality and quantity, based on our determination of what meets our cultural requirements and outcomes.
	Tati Tati Wadi Wadi to assess and monitor whether there is improved water quality and more volumes of water required, and if that satisfy our cultural needs and objectives.
Funding to be provided for each Traditional Owner Nation as identified by MLDRIN in the water resource plan areas to have an Aboriginal Water Officer and water program funded and supported.	We are resourced to work on Country and recognised, respected and remunerated for our expertise.
Aboriginal Waterway Assessments, cultural flows and management plans be resourced by Government, and prepared or conducted on Tati Tati Wadi Wadi Country.	Tati Tati Wadi Wadi be resourced, supported and empowered to conduct Aboriginal Waterway Assessments, manage cultural flows and undertake management plans.
	Tati Tati Wadi Wadi to work with Catchment Management Authorities to discuss their water needs and be involved in bids for water for the environment, and the timing of when water is released.
Tati Tati Wadi Wadi to be gainfully employed to use cultural practices in a sequence agreed by Tati Tati Wadi Wadi people to improve water quality and increase cultural outcomes, including traditional burns and de-snagging.	Water quality and volumes support cultural outcomes for water on Country.
Tati Tati Wadi Wadi people to have access to water and waterways on Country for cultural wellbeing, cultural economic purposes, practices including swimming, drinking, canoeing.	Tati Tati Wadi Wadi values and uses for water are supported, encouraged and facilitated.
Cultural values are protected and adhered to by private and public landowners.	Water management needs to be reviewed, to ensure water on land that is privately owned can be managed in a manner that is respectful of cultural values.

Objectives	Outcomes
Ecological restoration and conservation is driven by Tati Tati Wadi Wadi traditional ecological knowledge, with intellectual property retained, expertise fully funded, and support provided.	As equal participants, engagement between Tati Tati Wadi Wadi and Government and agencies is ongoing, resourced and respectful and Tati Tati Wadi Wadi are considered as equal participants in making decisions.
Tati Tati Wadi Wadi have ongoing collaboration and ultimately empowerment with Government and agencies to restore connectivity of wetlands and waterways, and improve the health of water on Country, and on how water is used and managed on Country.	Tati Tati Wadi Wadi people work with Government and delivery partners to make decisions to improve the health of water on Country.
We are adequately resourced and given the opportunities, and provided the water, to have control of how and when cultural watering objectives are met.	Tati Tati Wadi Wadi have access to water entitlements, and to have a seat at the table in regard to environmental watering decisions.
Tati Tati Wadi Wadi asserts that Government needs to align its processes across land, water, fire and biodiversity to collaborate with the people to produce a shared perspective. That Government funds Tati Tati Wadi Wadi to prepare a Country Plan, that all Government departments and agencies must refer to.	Collaboration with Tati Tati Wadi Wadi is cohesive and reflective of a shared perspective that is designed to allow Tati Tati Wadi Wadi to go directly to Government.

8.3.6.6 Case study

Tati Tati Wadi Wadi spoke in great detail in consultation with Victoria's water resource plans about waterways of significance, referring to the lakes and the wetlands as lungs, and a great, inter-connected system hosting many ancestral sites. The people spoke of how water decisions made in isolation of considerations for Country degraded culturally significant sites through poor water quality, loss of flows, pest species dominating landscapes due to changed water management regimes, and of sites being cut off from the rest of Country. As an example of an area of interest, the Tati Tati Wadi Wadi group talked with DELWP several times at Margooya Lagoon.



Margooya Lagoon, east of Tol Tol, is easily accessible to the Robinvale township and supports an abundance of native flora and fauna. The lagoon is important to the Tati Tati Wadi Wadi Robinvale community, not only because of its proximity to town, but as an important cultural site.

Concerns around Margooya Lagoon

While the Margooya Lagoon has an Environmental Watering Plan developed by the Mallee Catchment Management Authority, Tati Tati Wadi Wadi are concerned with:

- poor water quality
- degraded habitat for birds, native fish, plants
- The regulator installed at the lagoon, which waters the lagoon from the opposite end from the original feeder creek (dry during consultation in 2018)

Tati Tati Wadi Wadi wants to be involved in the water management of the Margooya Lagoon to achieve:

- revegetation of native plants for cultural practices and as habitat and food for bird, fish and fauna
- re-stocking native fish into the lagoon
- reinstatement of how the lagoon receives water

The Traditional Owner group would also like to have a protected place at Margooya Lagoon for them to visit and camp, without sharing with outside visitors

Margooya Lagoon values and uses

Accessible as it is to town, Tati Tati Wadi Wadi consider the Lagoon to be a significant place to connect with Country. They would like to improve the traditional access of the Lagoon to improve accessibility.

The creation of a culturally safe place would enable Tati Tati Wadi Wadi to re-energise culture and educate younger generations.

8.3.6.7 Values and uses

Consultation with Victoria's water resource plans naturally included considerable discussion around the values and uses water has for Tati Tati Wadi Wadi people, including its importance in the past, how it is valued today, and aspirations for the future.

There was talk about the many scar trees that are on Country and how they need water to survive and stay in the landscape, the ceremonial grounds that are now covered with thistles and not receiving any water, the connection of language, and discussion about many individual waterways and water bodies and their connection to Tati Tati Wadi Wadi.

Values and uses and the relevant waterways and water bodies discussed include but are not limited to:

- Old Camp Creek and Bumbang Creek, both which have cultural values
- Belsar Island which was a place to visit, fish and swim
- fish traps at Hattah Lakes and Belsar Island
- thousands of generations of Traditional Owners, including descendants from Tati Tati Wadi Wadi around Chalka Creek
- Lake Mournpall which is an important part of the cultural landscape
- Murrumbidgee Junction and Wakool Creek, on the border
- Burra Creek, which has no water at all, and includes an ancestral site
- Wood Wood, which needs water for the trees and the ancestral sites
- Nyah-Vinifera, which has a ceremonial site and many ring trees
- Kulwin, as a potential area of significance for groundwater.

Lake Tyrell, which has cultural significance for many clans, including Wergaia which as part of Barengi Gadjin Land Council has Native Title over part of the area. Tati Tati Wadi Wadi believes Lake Tyrell needs a resource assessment to understand when and how the water should flow to the lake. There is a thought that Lake Tyrell was once connected to the Murray, not just the Wimmera- Mallee water system.

Tati Tati Wadi Wadi describes gadini (water) as central to beliefs, culture and survival as a First Nation. As stated in the Tati Tati submission to the Murray-Darling Basin Plan (2012), Tati Tati Wadi Wadi people have a "deep relationship with the waters, rivers, lakes, creeks, lagoons, tributaries, wetlands, trade routes, gathering places and sacred sites in our traditional lands, all of which hold great significance to us."

The submission explains water has economic importance as a source of food, fibre, medicine and helps grow the plants used to make tools and cultural implements, and that the decline in the water quality and changes to the way water flows and is distributed has had a corresponding socio-economic impact on Tati Tati Wadi Wadi people.

In the words of the Tati Tati Wadi Wadi people, water is integral to song lines and creation stories.

8.3.6.8 Cultural flows

Consultation with Tati Tati Wadi Wadi has included discussion on cultural water entitlements, as a means to achieve either cultural outcomes, or provide economic opportunities. The people see that having a say on how environmental water can be used, including where, when and how, will improve cultural outcomes, however having access to water entitlements as a Traditional Owner group would give greater autonomy in how that water may be used. In addition, as First Peoples, Tati Tati Wadi Wadi assert they have an entitlement to cultural water rights. In its submission to the Murray-Darling Basin Authority on the Murray-Darling Basin Plan, it was stated that:

“The Tati Tati vision is for the Murray-Darling Basin Authority and its partner authorities to respect our right to own Gadini water and to provide direct water ownership rights with an allocation of 10 gigalitres every two years to be transferred – with funding – to Tati Tati. This would enable Tati Tati to ensure that our Gadini water system sustains our traditional, spiritual, cultural, economic and social existence for the present and into the future.

This water will help to replenish and restore highly culturally significant places for Tati Tati people... there should be water allocations for Traditional Owner First Nations to enable us to discharge our cultural responsibilities.”

**Tati Tati Traditional Owners Submission on the proposed
Murray-Darling Basin Plan, April 2012**

“Water encompasses Country like a living, breathing thing.”

**Approved at the Tati Tati Wadi Wadi Nation meeting,
October 29, 2018**

8.3.7 Taungurung

The Taungurung contribution was developed and signed off by the Taungurung Land and Waters Council (TLAWC), with support from the Taungurung Water Officer.

"Waydjak bunbunarik liwik-nganjin yaraga-ngala dhumbali daada gurnap biik-nganjin yulendj-ngajin. Nganga-ngala biik-nganjin yaraga-ngalaburndap gerr ngarrnga buk wilanja-nganjin

(We are the descendants of our old people, and we have an ongoing responsibility to look after inheritance, which is our Country and our culture. We look after our Country because we have an intimate relationship like thousands of generations before us.)"

Taungurung Buk Dadbagi

8.3.7.1 Introduction

Taungurung have strong cultural, spiritual and economic connections to their land, water, and resources (Country). As custodians of their Country, Taungurung have managed their land and waters sustainably over thousands of generations. The process of dispossession has interfered with the connection between Taungurung and their Country, which is vital for the survival/reintroduction of Taungurung culture and traditions. The connection to land, waters, and resources on Country is vital for Taungurung health and wellbeing.

The Northern Victoria Water Resources Plan comprises the full extent of Taungurung Country. The main basins within Taungurung Country include *Boregam* (Campaspe River), *Waring* (Goulburn River), the Broken River, the King River, and the Ovens River. The waters of *Waring* have a special connection with Taungurung, including its tributaries the Yea River, Acheron River, King Parrot Creek, Rubicon River, Jamieson River, Howqua River, and Delatite River.



Figure 8-7: Taungurung Buk during the Aboriginal Waterway Assessment

Credit: Will Mooney MLDRIN

The area comprises a great number of lakes, small wetlands and swamps; and some small rivers and tributaries such as Lake Nagambie, Lake Eildon, Lake Eppalock, Reedy Lake, Lake Cooper, Horseshoe Lagoon and Gaynor swamp, Back Creek (near Reedy Lake), Hughes Creek and Sevens Creek, among others.

The current water management framework has denied customary governance systems over land and water, as well as the Taungurung's complex understanding of Country as a 'living

entity' and their obligations for taking care of it. Although Taungurung recognise there has been an important procedural shift in water management in Victoria, these initiatives have focused mostly on gathering traditional values and knowledge related to waterways and increasing the participation of Taungurung in water management, but success in the full recognition and expansion of Taungurung water rights, in line with the principles of true self-determination, is still limited.

The Northern Victoria Water Resource Plan (NWRP) contribution recognises that Taungurung people enjoy close spiritual connections with our Country and have developed sustainable economic practices. We had, and continue to maintain, a special relationship with all of our lands, mountains, and waters. We are now immersed in the process of gathering and protecting our values and the customary uses of water and increasing our participation in water management within the region. This process is an ongoing effort supported by DELWP and other Government agencies. It is essential that this process continuously contributes to the NWRP in the future.

Taungurung Land and Waters Council (TLAWC) has recently been funded by DELWP to develop its response to the Northern Victorian Water Resource Plan, and update our Country Plan: *Taungurung Buk Dadbagi*, making our water goals and aspirations more detailed and explicit. The Taungurung Buk Dadbagi Water chapter will reflect on our objectives and aspirations related to water, our responsibility of healing our rivers and wetlands; the Taungurung values and uses of water and our expectations to transform the water management in Victoria.

The consultation process has made it clear that Taungurung water management should be evolving over time; thus, Taungurung goals and aspirations can't be fully addressed in this input to the NWRP. Therefore, this document must be considered 'a living breathing tool' in permanent dialogue with the Taungurung Buk Dadbagi Water Chapter which should be referenced in the NWRP. Reference to Taungurung Buk Dadbagi in the NWRP will assure we are reflective and will also allow us to review and revise our priorities and objectives regarding water management.

Following the principles of true self-determination, it is our interest to keep full control over water policy without any restrictions coming from our NWRP contribution.

The *Taungurung Buk Dadbagi* Water Chapter will also assist and guide the *Baan Ganalina* (Guardians of water, Taungurung water knowledge holder group) and strongly support the Water Policy Officer. In this sense, we believe the *Taungurung Buk Dadbagi* Water chapter will enrich and support Taungurung's contribution to the NWRP development and implementation.

8.3.7.2 Taungurung Land and Waters Council - intellectual property rights

As custodians of Traditional Ecological Knowledge, we request the protection of the intellectual property of the information shared in the NWRP, to ensure cultural and environmental knowledge is protected and managed according to the principles of true self-determination. The protection and management of Traditional Ecological Knowledge are critical as knowledge could be misappropriated and disrespected in the future. Intellectual property rights reflect the custodianship and authority of the TLAWC. All intellectual property rights of water knowledge and practices are vested upon TLAWC, who hold the right to keep the cultural and environmental knowledge confidential. The use or reference of this information for purposes other than informing the Northern Victoria Water Resource Plan requires free, prior and informed consent obtained through appropriate consultation with Taungurung.

8.3.7.3 Taungurung Buk Dadbagi – key aspirations

Taungurung Land and Waters Council has released *Taungurung Buk Dadbagi* which outlines our vision and aspirations for our community and Country. *Taungurung Buk Dadbagi* guides TLAWC, our partners and stakeholders to implement action in our interest. We can also use



Taungurung Buk Dadbagi to monitor and measure the effects of our actions. We hope *Taungurung Buk Dadbagi* will be used as a 'living breathing tool for action and reflection' that can be refined as we grow as a community and organization.

Taungurung Buk Dadbagi provides six areas of action. Each section contains a key aspiration, required actions, timelines, and responsibilities.

Key areas for actions are:

1. Identity, recognition, and rights: Daabak (Strong)
2. Always were and always will be strong, proud Taungurung, connected and caring for our Country, culture and people
3. Health and wellbeing: (Daanboor Mon)
4. Taungurung people are strong, healthy and happy
5. Cultural heritage: (Yulendj)
6. Our Knowledge is gathered, protected and preserved
7. Taungurung traditional knowledge: (Taungurung Yulendj)
8. Taungurung knowledge is gathered, protected and preserved
9. Caring for Country: (Biik – Nganjin Dabbagi)
10. Guardians of our Country are active and respected
11. Economic development and employment: (Ngi-Agat Munga)
12. Taungurung – Driving ethical economic development and employment for our people and Country

8.3.7.4 Taungurung Buk Dadbagi – water chapter

Taungurung Land and Waters Council has recently been funded by DELWP to reflect on the outcomes of the Aboriginal Waterways Assessment (AWA) they held last year, supported by the Murray Lower Darling Rivers Indigenous Nations (MLDRIN), to inform more detailed goals and aspirations related to waterways to be included in a water chapter of the revised *Taungurung Buk Dadbagi*. As *Taungurung Buk Dadbagi* is considered a 'living breathing tool for action and reflection,' this is an ongoing process. Taungurung advises all goals and aspirations relating to waterways cannot be presented in this document and in no way does this document exclude future aspirations Taungurung may have relating to water. The current high-level objectives are summarised below:

- establish formal recognition of and fully exercise and expand Taungurung water rights, including managing and protecting waterways within Taungurung Country in compliance with the Traditional Owner Settlement Act (TOSA)
- increase recognition of Taungurung knowledge, values and uses of waterways; and incorporation of Traditional Ecological Knowledge in water management and sustainable natural resource management achieving cross-cultural transfer
- establish formal partnerships with CMAs, water managers, Councils and other statutory authorities within Taungurung Country to increase our knowledge and involvement in the management of waterways to transform the water governance model in the region towards one of best practice
- obtain a higher level of control over water resources through the acquisition of water entitlements for cultural, environmental and economic development purposes, taking on other statutory authorities' management responsibilities
- implement culturally appropriate mechanisms and means of engagement to act on waterways within Taungurung Country

- build two-way capacity of Taungurung and water management agencies to partner and
- collaboratively manage water resources on Taungurung Country in line with the principles of true self-determination. All this will enable us to be considered an equal partner in water management and raises cultural awareness in the broader community about our role in caring for Country
- achieve ecological restoration of riverine ecosystems and improve the water quality of impacted waterways due to river flow regulation and harmful land-use practices within Taungurung Country
- secure Taungurung access to culturally and spiritually significant sites, and resources related to waterways
- secure the protection of intangible heritage connected to waterways
- Taungurung expect that the State and its agencies will willingly contribute to the progress of these objectives and aspirations about water management in line with Taungurung's right to self-determination.



Figure 8-8: Taungurung Buk during AWA at Tarcombe – Hughes Creek

Credit: TLAWC

8.3.7.5 Taungurung Land and Waters Council agreements related to water policy and partnerships

Table 8-9: Agreements related to water policy and partnerships

Agreement	Objective(s)
Recognition and Settlement Agreement – RSA (Executed on 2018, waiting for ILUA to be registered on the National Native Title Tribunal)	“Recognises the Taungurung’s Traditional Owner Rights and to confer rights as to access to, ownership and management of areas within the Agreement Area; and for the purposes of decision-making rights and other rights that may be exercised in relation to the use and development of land or natural resources in the Agreement Area.”
Natural Resource Agreement – NRA (Executed on 2018, waiting for ILUA to be registered on the National Native Title Tribunal)	Taungurung Land and Waters Council is given the opportunity to actively participate in the development and review of natural resource management policies and natural resource management regional strategic plans that affect the Agreement Area. “The Parties agree that the Corporation has the right to participate in the management of the Natural Resources of the land, and the Parties will work together to develop appropriate strategies to enable the Corporation to participate and obtain employment for Members in the management of Natural Resources.” Also, Taungurung has ‘take and use rights’ for personal use of flora and fauna – no licensing is required, but no commercial use of resources is permitted.
Traditional Owner Land Management Agreement – TOLMA (Executed on 2018, waiting for ILUA to be registered on the National Native Title Tribunal)	“Enables the establishment of a Traditional Owner Land Management Board (Board) and joint management of the Appointed Land (12 parks and reserves). This will give effect to the Recognition and Settlement Agreement and enable the knowledge and culture of the Taungurung People to be recognised in the management of the Appointed Land.”
Traditional Owner Land Natural Resource Agreement – TOLNRA (Executed on 2018, waiting for ILUA to be registered on the National Native Title Tribunal)	“All Members may carry out any of the following activities on Traditional Owner Land: access, occupy and use the land; as to Natural Resource other than land: access, hunt, take, use or interfere with the Natural Resource; or cut, dig up or remove the natural resource; or sell or give away any of the Natural Resource; or any other similar activity in relation to the Natural Resource; take or use Water from a waterway or bore in accordance with section 8A of the <i>Water Act 1989</i> (Vic); enter, remain on and camp on the land; gather together to conduct non-commercial cultural activities on the land”

Agreement	Objective(s)
Land Use and Activities Agreement – LUAA (Executed on 2018, waiting for ILUA to be registered on the National Native Title Tribunal)	Specifies the types of land use activities that may be carried out on or affecting Public Land in the Agreement area, and the level of consultation or negotiation required with Taungurung (routine, advisory, negotiation or agreement). The LUAA also outlines a formula for the payment of community benefits to Traditional Owners for certain negotiation and agreement activities. The LUAA is legislated, and non-compliance is considered an offense.
Partnership Statements – PS Goulburn Broken CMA North East CMA North Central CMA (not signed yet)	The purpose of this Partnership Statement is to: comply with the provisions and actions in <i>Schedule 11</i> of the RSA, outline the relationship between the GB/NC/NE Catchment Management Authority to deliver on CMA commitments of the RSA, further develop a relationship between the organisations that delivers outcomes that go beyond compliance with the RSA; and contribute to the full exercise and development of Taungurung cultural rights over land and water management, and to fulfill their responsibilities to look after Country.
Registered Aboriginal Parties – RAP (Recognized on July 2009)	Registered Aboriginal Parties (RAPs) are organizations that hold decision-making responsibilities under the <i>Aboriginal Heritage Act 2006</i> for protecting Aboriginal cultural heritage in a specified geographical area. On 16 July 2009, Taungurung Land and Waters Council receives recognition as a Registered Aboriginal Party (RAP) and the VAHC appoints Taungurung Land and Waters Council as a RAP for much of its application area. Since then the Victorian Aboriginal Heritage Council has assigned further sections of area to Taungurung Land and Waters Council for which it has sought to be a RAP (See Map 1 and for a more detailed description, including GPS boundary markers, refer to the Taungurung Recognition of Settlement Agreement.
Member of Federation of Victorian Traditional Owner Corporations (FVTOC)	Taungurung Land and Waters Council is committed to the progress and expansion of Traditional Owners water rights, the development of water policy and transformation of water governance in Victoria.
Member of Murray and Lower Darling River Indigenous Nation (MLDRIN)	Taungurung Land and Waters Council participates in the development and expansion of Aboriginal water rights and the pursuit of Aboriginal water in collaboration with other Traditional Owners.

8.3.7.6 Taungurung boundaries and Recognition of Settlement Agreement

On the 26th of October 2018, Taungurung Land and Waters Council and the State signed the Recognition and Settlement Agreement (RSA the State of Victoria and, 'as an alternative to the Taungurung seeking a native title determination under the Native Title Act 1993'). As stated in the Agreement, it formally recognises the Taungurung as the Traditional Owners of their Country and confers rights over land and natural resources. By signing the RSA, the State also acknowledges the continued suffering of Taungurung people through the implementation of laws and policies that discriminate against them in the nineteenth and twentieth centuries; the devastating effects of colonisation upon Taungurung and the role it played in dispossessing Taungurung People of their Country.

Taungurung Country has been legally recognised by the RSA, and it extends from the west upper catchments of the Boregam (Campaspe River), starting at the meeting point of the



Registered Aboriginal Party (RAP) boundaries of the Taungurung Land and Waters Council and Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc.

The western boundary of Taungurung extends northerly along the *Boregam* (Campaspe River), up to the town of Rochester. From the town of Rochester, Taungurung boundary generally extends south-easterly to the town of Euroa, and generally north-easterly through the coordinated points specified in the RSA until its junction with the centreline of the Ovens River, southwest of the town of Everton. Then Taungurung boundary generally extends south-easterly along the centreline of the Ovens River to its headwaters and following the east branch of the Mount Smythe Creek until its headwaters. Then south-westerly along the Great Diving Range.

The southern boundary of Taungurung Country generally extends westerly along the southern ridgelines of the Great Dividing Range back to the commencement point previously mentioned (for a more detailed description, including GPS boundary markers, refer to the Taungurung Recognition of Settlement Agreement).

8.3.7.7 Taungurung Land and Waters Council principles of engagement

Taungurung Land and Waters Council has recently employed a Water Policy Officer in July 2018, as part of the Aboriginal Water Grants Program funded by DELWP, to continue the collection of Taungurung values and uses of water, increase our participation in water management, build capacity within the corporation and contribute to the development of Taungurung water rights. With this in mind, Taungurung request that the Water Policy Officer must be considered as the first contact for all waterways matters.

Also, Taungurung Land and Waters Council has recently created the *Baan Gandalina* (Guardians of water), a Water Knowledge Holder Group which will support and advise the Water Policy Officer, assist in project development and implementation and plan and conduct cultural activities on waterways. It would be the role of the Water Policy Officer to inform the Water Knowledge Holder Group and prepare consultation processes if required for any future policy development, evaluation or endorsement. By managing any consultation process and the decision-making, Taungurung Land and Waters Council will secure its self-determination and autonomy.

Taungurung consider that the engagement process should be guided by the following principles and practices to be considered as an equal partner in the planning and management of land and water:

- it should take place everywhere Taungurung rights would be affected in compliance with RSA/ TOSA
- the engagement process must start early and must be an ongoing relationship between Taungurung and the institutions involved (free, prior and informed consent) not a mere tick in the box
- the process must be flexible and culturally appropriate regarding timeframes and deadlines that meet Taungurung needs. It is expected to be a consensus within Taungurung, so the process must take into account and respect the organisation structure and ways of decision making (creating Traditional Owner centered governance and operating systems)
- any process must be open to negotiations, not merely to approve things or comment on decisions halfway done (creating the enabling conditions for self-determination)
- the process must ensure the right support and assistance needed by Taungurung to be part of the process (creating the enabling conditions for self-determination)
- full information should be available and accessible to Taungurung (free, prior and informed consent)
- Taungurung Land and Waters Council intellectual property rights must protect any oral or written contribution resulting from this engagement process

- Taungurung feel confident that in adhering to the above principles we can contribute to water management in the region in partnership with DELWP and other state agencies to achieve our water aspirations and objectives in line with the principles of self-determination.



Figure 8-9: Shane Monk, Matthew Shanks and Michelle Monk at Wicket Hill reserve during Aboriginal Waterway Assessment

Credit: Will Mooney / MLDRIN

8.3.7.8 Taungurung culturally significant sites

We believe a single input to the NWRP can't comprehensively include all Taungurung values and uses of water, nor its water management goals and aspirations. The complexity of the Taungurung understanding and relationship with water can't be captured by a single document, so it is stressed that the following report in no way diminishes the significance of other rivers and wetlands not mentioned or listed within the NWRP. In this sense, the following list doesn't exclude other small rivers, tributaries, and wetlands within the Taungurung Country.

8.3.7.9 Objectives – outcomes – values and uses

The following objectives and outcomes are the accredited text for Taungurung:

Basin Plans s10.52(1)

Table 8-10: Taungurung objectives – outcomes – values and uses

Objective	Outcome	Values and uses
Develop and fully exercise/implement Taungurung water rights and water management according to the TOSA	Self determination	Social, economic, cultural, environmental, educational
	Compliance of the agreements (TOSA)	
	Improve Taungurung health and wellbeing	
Development of the Country Plan, achievement of goals regarding waterways	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations	Social, economic, cultural, environmental
	Self-determination	
	Rivers and wetlands aspirations and goals are explicit on Country Plan Taungurung Buk Dadbagi)	
Establish partnerships with CMA and statutory authorities for project funding and implementation. Develop new partnerships with water holders and corporations.	Project development and implementation on waterways	Social, cultural
	Equal partners in water management	
	Increase Taungurung capacity for project development	
	Strengthening relations with CMAs, Water Corporations, and other agencies.	
Obtain funding to plan and implement Aboriginal Waterways Assessments on significant rivers and wetlands within Taungurung Country	Gathering and protection of Taungurung values and uses	Social, economic, cultural, environmental, educational
	Increase Taungurung health and wellbeing	
	Capacity building, reinforce the <i>Baan Ganalina</i> development	
	Identify and protect culturally and spiritually significant sites; and intangible heritage related to waterways	
	Reconnecting Taungurung with significant sites	
	Incorporate Taungurung traditional environmental knowledge to water management and sharing knowledge	
	Improve Taungurung's role in water management	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Build two-way capacity for engagement	

Objective	Outcome	Values and uses
Named unnamed creeks and wetlands across Taungurung Country, introduce Taungurung names for significant sites	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	Cultural, environmental
	Assist to identify and protect cultural heritage and sensitive areas	
	Protection and revalorisation of Taungurung language and culture	
	Improve Taungurung role in water management and cultural heritage protection	
Reduce and manage the impact of river flow regulation on rivers and wetlands	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	Social, cultural, environmental
	Restore Taungurung Country to a pre-European condition	
	Restore habitats and healing of Country	
Rehabilitate natural habitats in waterways and wetlands preferably by employing and training Taungurung people	Healing of Country	Social, cultural, economic, environmental
	Obtain job positions for Taungurung	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Restore native flora and fauna for cultural purposes	
Reduce and manage the impact of harmful activities and practices	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	Social, cultural, environmental, educational
	Healing of Country	
	Restore Taungurung Country to a pre-European condition	
	Raise awareness of the broader community about the impacts of harmful practices on Country	

Objective	Outcome	Values and uses
Continue to reconnect Taungurung people with Country, through assessments and Country visits	Improve Taungurung health and wellbeing	Social, economic, cultural, environmental, educational
	Self-determination	
	Improve the Taungurung role in water management and cultural heritage protection	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Reconnecting Taungurung with significant sites	
	Identify and protect culturally and spiritually significant sites; and intangible heritage related to waterways	
Continue to reconnect Taungurung people with Country, through assessments and Country visits	Improve Taungurung health and wellbeing	Social, economic, cultural, environmental, educational
	Self-determination	
	Improve the Taungurung role in water management and cultural heritage protection	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Reconnecting Taungurung with significant sites	
	Identify and protect culturally and spiritually significant sites and intangible heritage related to waterways	
Continue to reconnect Taungurung people with Country, through assessments and Country visits	Improve Taungurung health and wellbeing	Social, economic, cultural, environmental, educational
	Self-determination	
	Improve the Taungurung role in water management and cultural heritage protection	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Reconnecting Taungurung with significant sites	
	Identify and protect culturally and spiritually significant sites; and intangible heritage related to waterways	

Objective	Outcome	Values and uses
Increase Taungurung participation in water management and project implementation	Obtain job positions for Taungurung	Cultural, economic, social
	Self-determination	
	Improve the Taungurung role in water management	
	Capacity building, reinforce the <i>Baan Ganalina</i> development	
Increase Taungurung capacity and confidence to engage in water management	Self-determination	Social, cultural, environmental
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
Reduce the presence of weeds and pest preferably by employing and training Taungurung people	Healing of Country	Social, economic, cultural, environmental
	Restore Taungurung Country to a pre-European condition	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Restore native flora and fauna for cultural purposes, allow food and fiber resources and culturally important plants	
	Obtain job positions for Taungurung	
Obtain water entitlements for cultural and environmental purposes (superficial and groundwater)	Potentially manage land and water in Joint Management areas	Social, economic, cultural, environmental
	Obtain a higher level of control of water resources	
	Restore water to significant sites, water delivery to support cultural practices and objectives	
	Make water accessible to Taungurung	
Obtain water entitlements for economic development (superficial and groundwater)	Explore economic opportunities for Taungurung	Social, economic, cultural, environmental
	Expand Taungurung water rights	
	Explore possible participation in the water market, gain water trading experience and obtain economic returns from temporary trading	
	Obtain job positions for Taungurung	
	Self-determination	
	Improve Taungurung health and wellbeing	

Objective	Outcome	Values and uses
Obtain funding for research on cultural flows or Aboriginal water	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	Social, cultural, environmental
	Expand Taungurung water rights	
	Potentially manage land and water in Joint Management areas	
	Identify and protect culturally and spiritually significant sites; and intangible heritage related to waterways	
	Gathering and protection of Taungurung values and uses of water	
	Capacity building, reinforce the <i>Baan Ganalina</i> development	
	Improve the Taungurung role in water management	
Raise cultural awareness within the broader community about Taungurung culture, land and water rights	Self-determination	Social, cultural, economic
	Improve the Taungurung role in water management	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
Partner with CMAs for the planning and implementation of seasonal watering proposals. Increase the capacity to become managers of environmental waters in the future	Restore water to significant sites	Cultural, environmental
	Take on management responsibilities for seasonal watering proposals and management	
	Obtain job positions for Taungurung	
	Improve Taungurung role in water management, influence the delivery of environmental water in Country.	
	Compliance of the agreements (TOSA)	
	Build two-way capacity for engagement	
	Incorporate Taungurung traditional environmental knowledge to water management	
	Capacity building, reinforce the <i>Baan Ganalina</i> development	

Objective	Outcome	Values and uses
Obtain funding for research and implement projects for restoring water to disconnected wetlands and swamps due to river flow alterations	Restore water to significant sites	Cultural, environmental, social
	Improve the Taungurung role in water management	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	
	Healing of Country	
	Improve food, fiber and plants sources for cultural purposes	
	Restore Taungurung Country to a pre-European condition	
Participation in rivers and wetlands Advisory Groups in all CMA and statutory authorities, engaging with other stakeholders within the community	Improve the Taungurung role in water management	Cultural, environmental, social
	Capacity building, reinforce the <i>Baan Ganalina</i> development	
	Incorporate Taungurung traditional environmental knowledge to water management	
	Build two-way capacity for engagement	
	Raise awareness of the broader community about Taungurung culture and participation in water management	
Establish and implement a culturally appropriate way for engagement	Self-determination	Cultural
	Improve the Taungurung role in water management	
Obtain funding and support to sustain the <i>Baan Ganalina</i> workshops and consultations when needed and maintain the Water Policy Officer position over time	Self-determination	Cultural
	Capacity building	
	Improve the Taungurung role in water management	
	Increase water literacy within Taungurung	

Objective	Outcome	Values and uses
Obtain funding to research on the Waring pre-European conditions and the effects of river regulation	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations / Caring for Country	Cultural
	Incorporate Taungurung traditional environmental knowledge to water management	
	Improve the Taungurung role in water management	
	Increase water literacy within Taungurung	
Obtain funding for research and implement projects regarding cultural practices in waterways. Also, research and implement projects regarding sustainable contemporary uses of waterways	Incorporate Taungurung traditional environmental knowledge to water management	Cultural, environmental, economic
	Improve the Taungurung role in water management	
	Capacity building, reinforce the <i>Baan Ganalina</i> development	
	Improve Taungurung health and wellbeing	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations	
Build capacity through employing, procuring and training Taungurung in water management and water-related projects	Obtain job positions for Taungurung	Cultural, environmental, economic
	Capacity building, reinforce the <i>Baan Ganalina</i> development	
	Improve the Taungurung role in water management	
	Improve Taungurung health and wellbeing	
	Contribute to achieving <i>Taungurung Buk Dadbagi</i> goals and aspirations	

8.3.7.10 Case study - Taungurung Land and Waters Council – Aboriginal Waterways Assessment 2017

The Aboriginal Waterways Assessment (AWA) is a culturally appropriate tool and process that allows Traditional Owners to assess and monitor rivers and wetlands environmental health so that they can provide informed decisions and build confidence about the water management within their Country. At the same time, the AWA tool contributes to the process of gathering information about the cultural values and uses of water, rivers, and wetlands. It was developed collaboratively by the Murray Lower Darling Rivers Indigenous Nations (MLDRIN), the Northern Basin Aboriginal Nations (NBAN) and the Murray-Darling Basin Authority (MDBA), adapting the Maori Cultural Health Index to the Australian context.

Taungurung Land and Waters Council has conducted one AWA in 2017 in collaboration with MLDRIN, MDBA and the Goulburn Broken Catchment Management Authority. The participants of the assessments consisted of six Taungurung members who were part of the planning and implementation of the assessment tool. In total, thirteen sites were visited which included billabongs, wetlands, lakes, river junctions and reaches of the *Waring* (Goulburn River). The reaches and features were chosen within the mid-Goulburn, due to the special connection of Taungurung with *Waring* and its relevance for Taungurung cultural landscape; the high environmental value of *Waring*; and because the river has been highly transformed by river flow regulation.

The sites visited were:

Site name	Description/location
The Breakaway	Billabong near Alexandra
Splitzgerber	Anabranh of Waring just off Wharengawren Road in Alexandra
Molesworth Billabong	Billabong 15km northwest of Alexandra near the Molesworth Nature Conservation Reserve
Ghin Ghin	A reach near the junction of Waring and the Yea River.
Horseshoe Lagoon	Small Billabong near Trawool within the Horseshoe Lagoon Flora and Fauna Reserve
Praetermissa	A reach near in front of the Horseshoe Lagoon Flora and Fauna Reserve.
The Whitehead's mouth	Waring and the Whitehead's Creek's junction
Homewood	An anabranh near the Homewood Nature Conservation reserve.
Gardiners Road site	Freshwater swamp off Waring.
Wicket Hill Reserve	Reserve located in the Hughes Creek, a tributary of Waring.
Tarcombe	A reach of the Hughes Creek, in the junction of the Stewart Creek and Hughes Creek.
Reedy Lake	Within the Reedy Lake Nagambie Wildlife Reserve, 35 km from Seymour.
Police Paddocks	A reach near within the Seymour Police Paddock reserve in the Waring.

During the AWA, Taungurung shared knowledge about cultural values and uses of water and other linked resources, collected data, measured and assessed through observation and discussions environmental health, and completed the individual surveys for each site. At each assessment site, Taungurung received information from specialists about the river and wetlands environmental conditions and management history. The data collected contributed to identifying the cultural and environmental values for each site and helped Taungurung people develop informed management objectives for each site.

In brief, the AWA identified the impacts of river flow regulation and its effects on habitats and streams. Also, a strong correlation between good environmental health and high cultural significance was found. The most culturally significant sites were located far or disconnected from the main channel of *Waring*. The tool also allowed Taungurung to identify a set of major threats for these waterways including:

- the deep changes in river flow and the impacts of river regulation
- the effects of harmful practices and activities (land clearing, grazing, and farming related practices)
- poor vegetation conditions
- presence of pests and weeds, and harmful introduced species (carp)
- erosion of river banks and soil degradation
- changes in water availability and water quality
- habitats and riverine ecosystems no longer support native flora and fauna
- mismanagement of recreational practices such as camping, 4WD and motorbike access, illegal logging, hunting and fishing, and littering.

The AWA allowed Taungurung to address specific management actions for each site. Also, broader objectives were developed:

- achieve ecological restoration and conservation
- improve water quantity and quality
- improve Aboriginal access to sites and resources
- increase Taungurung influence in water management
- restrict access to some areas and manage the impacts of harmful activities
- develop educational programs for the community
- better regulation and improve management practices (pests and weed control).

Taungurung values and uses of waterways are considered traditional ecological knowledge, highly valued and culturally sensitive. During the consultation process, Taungurung has decided to keep most of this information confidential and will not be shared in any stage of the NWRP implementation. However, it was agreed that part of the information could be briefly informed as follows: Taungurung people have lived on this Country for more than a thousand generations, our waterways are considered as highways or travel routes for Taungurung. In addition, many of these sites are resource-rich, so they are to be considered sources for food gathering, fishing, hunting and gathering medicinal plants. We have a strong spiritual connection with most of the sites assessed in the AWA, they are considered culturally and spiritually significant and proof of ongoing occupation; some of the participants described the sites as gathering areas for Taungurung in the past, but also as current teaching places, good for sharing knowledge and practice cultural activities.



Horseshoe Lagoon – Trawool

Photo Credit: MLDRIN

The outcomes from the AWA 2017 were:

- increased Taungurung's role and involvement in the planning and management of waterways
- increased capacity and confidence of Taungurung in water management
- reconnecting Taungurung with their Country
- strengthen relations with CMA, Water Corporations and other state agencies and authorities
- development of new projects and proposals.

As a result of the assessment, Taungurung Land and Waters Council in collaboration with the Goulburn Broken CMA have planned and obtained funding for two projects in two of the sites assessed: Reedy Lake and Horseshoe Lagoon; also, both institutions have presented proposals for a wetland restoration project in the Goulburn River.

The first project that has been funded is "Taungurung, restoring water, restoring Country," TLAWC is working in collaboration with Goulburn Broken Catchment Management Authority, Parks Victoria and Goulburn-Murray Water. The main project goal is to protect cultural and natural resources on Taungurung Country through restoring water to relevant sites, such as Reedy Lake which was pointed out as having highly cultural and ecological relevance for Taungurung.

The project consists of four visits which will be conducted at different times of the year; October, December and March, to allow a more comprehensive assessment of seasonal species and how they respond to changes throughout the year. A total of seven Taungurung men and women have participated in the assessment also, Taungurung Land and Waters Council personnel and representatives from Goulburn Broken Catchment Management Authority, the Federation of Victorian Traditional Owner Corporations, the Department of Environmental, Land, Water and Planning, as well as industry specialists.



Taungurung during Reedy Lake Assessment – Reedy Lake

Credit: Alejandro Voysest/TLAWC

The project has had two visits, which allowed Taungurung People to reconnect closely with Country and to engage directly with specialists and managers. This experience facilitates the sharing of knowledge between Traditional Owners, managers, and planners; at the same time builds skills and capacity among participants to identify wetland features, flora, and fauna and understand water ecology. Each visit comprised a cultural assessment day where Cultural Heritage surveys were conducted, several heritage sites and features like mounds and scarred trees have been recorded and will be registered for protection shortly.



Waring

Source: Shane Monk/TLAWC

The project “Taungurung, restoring water restoring Country” will help Taungurung Land and Waters Council to improve its participation in land and water management, gain confidence to discuss management of Country in other scenarios; and it will contribute to building partnerships, facilitating engagement and raising cultural awareness among managers and planners.

The second project is the restoration of the Horseshoe Lagoon. Taungurung Land and Waters Council in collaboration with Goulburn Broken Catchment Management Authority, Parks Victoria and the local landholders will try to restore water to the billabong. After the first feasibility meeting with the parties involved, the project will look to engage with a consultant to prepare a brief environmental water plan. The plan will outline the features and values (including cultural values) of the wetland and set ecological and hydrological objectives concerning these values. The goal is to include Horseshoe Lagoon in the 2019/2020 wetland Seasonal Watering Proposal to the Victorian Environmental Water Holder. The proposal needs to be completed by April 2019 and if approved and water is available, which is most likely, water could be delivered to the wetland in spring 2019.

The AWA is a culturally appropriate tool that can deliver positive environmental outcomes and contributes to the recognition of Aboriginal knowledge, values, and uses. AWA's contribute to the recognition of the Taungurung connection to Country, triggers the transmission/sharing of knowledge and reinforces the membership to a political community with a specific ethnic and environmental political stance towards water governance and water management. AWA's reflect on the political context where customary authority and management practices are denied and grapple for recognition.

Due to the success of the AWA held in 2017, Taungurung Land and Waters Council is now looking for funding and planning to undertake new AWA's in collaboration with North East CMA and North Central CMA. These assessments will increase Taungurung's engagement and involvement in water management within those two jurisdictions and will allow Taungurung to set specific goals and management objectives in those areas.

8.3.8 Wadi Wadi

Wadi Wadi Country is located just west of Swan Hill, extending west towards Ouyen and south of Robinvale, straddling the Murray River.

A joint consultation was undertaken with New South Wales Department of Industry (DOI Water). This was the first time New South Wales and Victorian State Governments delivered a joint consultation for water resource plans and agreed to adopt New South Wales' approach to engagement. This involved contracting independent Aboriginal consultants, Strategic Small Business Solutions (SSBS), to undertake the engagement to provide a sense of independence, and to safeguard cultural knowledge.

All material in the following parts is First Nations Cultural Knowledge provided by Senior Traditional Owners and Traditional Owners of the Wadi Wadi Nation for this consultation report. Senior Traditional Owners also provided guidance on the consultation process and report draft.

Wadi Wadi contribution was reviewed and signed off by nine senior Traditional Owners who were nominated by the MLDRIN delegates.

There are a group of Traditional Owners who identify as Tati Tati Wadi Wadi. Please refer to a separate contribution at [Section 8.3.6](#).



Figure 8-10: Wadi Wadi workshop participants on the Murray River in Swan Hill

Credit: DELWP

8.3.8.1 Themes

“Managing water is complex and we need a seat at the table and there are a few seats at the table available now. That is the opportunity for the First Nations people right now. Get your information into the water resource plans to have your say”

Darren Murray, Principal Aboriginal Cultural Liaison Officer, DOI

From the interviews and workshops, it was evident that the following issues emerged as crucial to the Wadi Wadi Nation participants;

- water represents life
- grave concerns over present care of waterways is paramount
- special memories and spiritual and physical cultural connections to waterways are integral,
- accessibility is an issue
- First Nation management or input into waterways is strongly desired
- a firm belief that First Nations people hold solutions to present day waterways problems is collective
- financial assistance is required to repair and maintain damaged waterways under First Nations control and stewardship.



Figure 8-11: Murray River at Robinvale

Credit: Andrew McMahon, Strategic Small Business Solutions

Water is “Life”

The Wadi Wadi Nation participants said simply that the word water to their people is “Life”.

Water is connected to all aspects of their lives, physically, culturally, and spiritually. It is the actual presence of a body of water that is crucial, as the body of water and the animal and plant life it contains connects to the land and the land connects to the animals and people it supports.

Water for connectivity denotes well-being, in the physical, spiritual and cultural sense.

First Nations views on water for survival in the physical sense differs from the value First Nations people place on water and waterways.

For example, a Wadi Wadi workshop participant noted upon first viewing a digital map of the Nation waterways that a particular lake had taken on the physical form of a very young baby.

The importance of this discovery was evident the next day when it was divulged to the consultants that the baby of the lake had been a discussion topic amongst Nation members at the previous nights’ BBQ and beyond.

Care of waterways

Grave concerns over current care of waterways was a strong recurrent theme emerged across all face to face interviews and during the workshops. That the current care of and for Nation waterways is inadequate, ineffective and damaging to the waterways was/is a collective concern of all participants. The colour and quality of the water in the rivers is not as remembered in the childhoods of the elders and Traditional Owners. There were stories of clear and concise memories of children fishing in the river with mothers and grandmothers and being able to “clearly see the yellowbelly approaching”.

Water clarity is not the case today. First Nations Wadi Wadi people collectively describe the water as murky. Reasons cited for the murky quality of the waterways are pollution from recreational boats, racing boats, paddle steamers with diesel engines, poor stewardship, less native plants, more weeds, erosion and a rapid decline in fish stocks due to lack of breeding space.

There is serious concern for Aboriginal youth and the cultural experiences they miss out on that tie them to family, identity and tradition. Due to the rivers poor water quality, particular memories of Christmas Day celebrations on the river, with everyone swimming to cool down are not occurring as often, or not at all in particular regions as the Traditional Owner’s do not consider the river healthy enough to swim in.

Carp are of huge concern to the Wadi Wadi people, their prevalence and the long-term riverbank damage results in the decimation of fish native to the river system. There is major concern that the premise of sharing water, prevalent amongst First Nation communities is a concept not achievable under current western style governance methodology. First Nations people clearly expressed a belief of favouritism towards farmers in the current water sharing system, and that farmers either do not want to or do not know how to effectively and efficiently manage waterways.

Cultural connections

Special memories physical, spiritual and cultural connections to waterways are paramount to the people. If the waterways are not sustained naturally, the land suffers, the animals and plant life suffer, and the question of survival becomes a real and genuine concern.

The concern for First Nations people is not just one of the survival of the people, but of the survival of the land itself. Healthy water is at the core of the health of the land and the entire eco-system.



Figure 8-12: Culturally significant artefacts

Credit: Andrew McMahon, Strategic Small Business Solutions

Historically for Wadi Wadi people the waterways are integral to the stories that are passed down from their ancestor's generation after generation about caring for the water and the land.

Traditional Owners are very deeply concerned that the knowledge held for millennia may be lost as the waterways suffer and the occasions for creating memories connected to water and land decline and the physical, spiritual and cultural connections are lost to Wadi Wadi youth.

Additionally, younger members of the Wadi Wadi Nation expressed a deep yearning to gain more knowledge of the water, the land and the history of their recent and long departed ancestors, so they may be able to continue their inherent culture and pass the lessons onto their children in perpetuity.

Accessibility

Accessibility to waterways is vital to the First Nations Wadi Wadi people. The water, land, plants and animals cannot be monitored for health, quality and cared for, fish cannot be accessed in the traditional way for eating and sharing with family, fish stocks cannot be monitored, and maintenance of the waterways and significant and sacred sites is problematic.

The recognition and accessibility to birthing trees, burial sites, scar trees, artefacts and the respect due to massacre sites is of concern.

Cultural events are less likely to occur due to lack of accessibility and continuity of cultural identity may be at risk.

First Nation management

First Nation management and input into waterways is strongly desired and financial assistance is required to repair and maintain damaged waterways under First Nations control and stewardship. From the workshops emerged a constructive plan to for the Wadi Wadi people to form a committee, register a corporation with ORIC and apply for funding through the Aboriginal Water Unit at DELWP. A DELWP employee presented at the workshop and advised of funding pathways available to successful applicants.

Wadi Wadi people expressed their desire to run a program of waterways monitoring and management, using First Nations rangers to care for the waterways using proven traditional methods. It was noted that in some areas, First Nations people were already attempting to care for waterways by daily walking the banks and removing rubbish, such is their concern for the decimation occurring.

It was identified that funding for a boat, a four-wheel drive and wages are required to begin a program, the concept being that First Nations rangers would act as a conduit to authorities to advise of illegal incidents, but also as a deterrent to potential criminal activity. First Nations people would also act as educators to the public, about caring for the river using sustainable methods of management and control. From this, an income stream could be possible, with culturally appropriate tours of First Nations history being made available to tourists, thus providing funding for the continuation of the caring for waterways program.

Stewardship

A firm belief that First Nations people hold solutions to present day waterways problems is collective. Throughout the consultation journey with the Wadi Wadi Nations Traditional Owners and the Wadi Wadi workshop participants it was clear that there is a common belief that solutions exist for the current problems with the waterways. The consensus presented was that these solutions have been available for all time, there is knowledge accrued over thousands of years and is there for the asking, the First Nations people just need to be asked and more importantly, actively listened to with action taken using the knowledge shared, with continuing involvement and real, genuine and meaningful inclusion of First Nations people.

A First Nations Wadi Wadi Elder described in detail instances of sharing knowledge with water authorities on where to sink drills to access water and being within mere metres or centimetres of the water table as proven when accessed. This ability the First Nations people attribute to is down to being so connected to the land they can read it, from experience, from memories, from oral history and from an innate ability to feel the land and its individual story.

8.3.8.2 Categories of values and uses

Basin Plan
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Table 8-11: Wadi Wadi - Values and uses

Themes	Categories	Detail
Water is “life”	Connectivity- physical, spiritual and respect for all lifeforms including the land and water itself	The emotive and symbolic thoughts, feelings and ideas evoked by images and visual connectivity with bodies of water such as the “baby of the lake” are representative of the water is “life” ideology. Community gatherings, corroborees, healing properties, cultural identity are all interwoven with the water is “life” theme.
	Animals	Murray cod, river mussels, yabbies, yellowbelly, redfin perch, black bream, tench and catfish, birdlife, kangaroos and rabbits, turtles, turtle eggs, swans, swans’ eggs and platypus.
	Plants	Bush medicine (old man weed), burning bark (for fishing).
	Physical and emotional well-being	Participants reported strong feelings of water bodies acting as calmatives, relaxing and destressing them when feeling low or anxious. Older Wadi Wadi Nation members recalled physical well-being when they were able to access waterways and maintain physical activity on a regular basis, for food gathering and recreational purposes.
		In one instance, a member who trained in her youth as swimmer off country and stalled, returned to Wadi Country and built her strength swimming the Murray River where the spiritual connectedness she felt inspired her on to winning gold medals.
		She also recalls the mob swimming alongside her, feeling the connections and enhancing their own physical and emotional well-being.
		Another mob member tells the story of a drug addicted First Nations youth being ordered to spend time on the river at the suggestion of his father. The youth distressed, connected to the water and is now recovered.

Themes	Categories	Detail
Grave concerns over current care of waterways	Inadequate, ineffective and poorly managed waterways	Stories of algae build up and disappearing water bodies and swamps, lagoons and billabongs were common throughout the interviews and workshops. Deep concern over declining and decimation of native fish stocks due to lack of fish breeding grounds and severely polluted and eroded rivers was voiced repeatedly. The empty swamps contribute heavily to the declining fish stocks and they (empty swamps) are directly related to poor water management. To First Nations Wadi Wadi people, water sharing is a duty, it is a resource to take care of all things, past, present and future and it is feared that Western style management systems inherently do not understand how to effectively share water.
Accessibility	Restricted and problematic accessibility to waterways	Restricted access to waterways, through legally enforced restrictive policies allowing farmers excessive access to water or through societal recreational pastimes such as 4WD access destroying habitat for both plants and animals and damaging natural pathways to waterways is causing concern to Wadi Wadi people. They feel they are unable to access fresh food sources, bush medicine or to care for the waterways as required culturally. Lore customs are passed from generation to generation on caring for the land and the water and restricted accessibility is counteractive to that process.
First Nations stewardship over waterways	Custodial First Nations ownership	First Nations Wadi Wadi people see control and cultural ownership of the waterways as integral to the future of water in Australia. To that end, a committee was formed with the intent of forming an Aboriginal Corporation to run a 'Management and Monitoring' Waterways program under First Nations control. Initially funding would be required through the Victorian Aboriginal Water Program.
First Nations solutions to waterways issues	Collective consensus	Across the interviews and workshops was the belief that solutions to restore the water quality and address the water sharing issues are available and positive outcomes are achievable if the Wadi Wadi people can take control of the issues through the implementation of the above-mentioned water management program.

Feedback

Feedback from First Nation Wadi Wadi Members are outlined in [Table 8-12](#) below.

Table 8-12: Feedback from First Nation Wadi Wadi members

Feedback	Source
"Water is Life"	Workshop
"Empty waterholes, swamps, lagoons and lakes are heartbreaking"	Face-to-face interview
"I connected spiritually to the river on my Country and trained in that river and won gold medals in state swimming championships"	Face-to-face interview
"There is no separation of the land from the water - they need each other"	Workshop
"It is Aboriginal lore to protect and care for the water and the land"	Face-to-face interview
"Anyone, no matter where they are from, or animals or plants who are on Country need to be protected and cared for with the land and the water"	Face-to-face interview
"Let the cultural flows come back naturally"	Face-to-face interview
"The river itself is a lifeforce to us"	Face-to-face interview
"Culturally and spiritually the river, the creeks, they are a part of you"	Face-to-face interview
"Us TO's think this is special that we are being asked what we think about water"	Face-to-face interview
"We, the Aboriginal people have already restored (through funding) a dried-out wetland, Perricoota, cause we know how to do it and the birds are back now and breeding. Now it needs protecting but there are no people on the ground to do that"	Face-to-face interview
"Christmas Day celebrations were very special on the river, in those days we (all the kids) could swim in the river with the adults watching over us, but now, we don't think the river is right to swim in. So we don't really have Christmas down here. We drank the river water until the 1980"	Face-to-face interview
"Oh yes, we always drank the river water, it was clear and bright, and you didn't have to take your own water with you like you do now"	Face-to-face interview
"Aunty used to send us kids down to the river to spear fish for our tea. We always got good fish to feed us all. Now I have a boat to fish in and all I can catch is carp"	Face-to-face interview

Feedback	Source
Ceremonial occasions, one TO and Wadi member reported their grandfather was a Ceremonial Man who would conduct initiation ceremonies in the River	Face-to-face interview
They want to be able to bring these rites of passage back to community, but would not let the young people into the river now as it currently is	Face-to-face interview
"Water is for cleansing"	Face-to-face interview
Water connects Aboriginal people, "upstream share with downstream"	Face-to-face interview
"We still get inspiration just being near the water, I live the culture everyday but when I'm near the water I dance"	Face-to-face interview

8.3.8.3 Evaluation

Table 8-13: Wadi Wadi - Risks

Themes	Categories	Detail
Water is "Life"	Connectivity	Poor water quality lessens accessibility that and weakens connectivity. Water is now not drinkable and a bad colour and not good for swimming. Cultural connection to water is integral to identity
	Animals	Less animals, far less native fish, yabbies, freshwater mussels, a finding of 8 netted (1 albino) platypus which all died, less fresh food available for people, carp are devastating the rivers
	Plants	Overgrowth of weeds, less to no bush medicine plant life available
	Physical and emotional well- being	Less physical activity leading to health issues, poor diet lacking nutrients from fresh foods, less access to the calmativ effects of the waterways leading to spiritual anxiety, depression and perhaps drug and alcohol problems
Current care of waterways is inadequate	Waterways damaged	Algae build up, damaged riverbanks, erosion, poor water quality, poor flow, 12 empty swamps, lagoons and creeks, silt has doubled (firestick burning solves silt issue)
Stewardship	Restricted access	Inability to care for water and land as required by First Nations Lore and gather food and plants for traditional purposes
Solutions	Custodial control	Without First Nations control and input, water problems will continue and worsen
	Problem solving for waterways	First Nations Wadi Wadi members collectively agree that they hold the knowledge to solve the current issues and maintain strong, healthy and viable waterways into the future

8.3.8.4 Impacts

Table 8-14: Wadi Wadi - Impacts

Feedback	Source
"There is so much pollution from the boats, there are so many on the river"	Wadi Wadi member
"The race in Echuca starts in the wrong place, it is killing the area the fish breed in"	Wadi Wadi member
"There was so much silt from not opening the gates enough, that when gates were opened the river went black"	Wadi Wadi TO
"A farmer let something into the river and the gum trees died"	Wadi Wadi TO
"Uncontrolled tourism causes the river to be unhealthy"	Wadi Wadi TO
We need more of this, this asking us TO's what to do about the water so we can fix it"	Wadi Wadi TO
"The breeding grounds are affected in the river and now the creeks and the off-shoot waterways are wet and dry depending on weir releases, the fish stocks are too low now"	Wadi Wadi member
"We need water put back into the swamps, the bush tucker and medicine are gone"	Wadi Wadi TO
"Water releases are mainly for the farmers, the irrigators"	Wadi Wadi TO

Feedback

Table 8-15: Wadi Wadi - Feedback

Quote	Source
Government and farmers don't know how to share the water, so our sharing water beliefs are at risk.	Wadi Wadi member
We have no rights, not in this conversation, and we need a licence to be connected to water.	Wadi Wadi TO
Our way is a preserved way of life – and advanced way of looking after Country, that way is at risk of dying out.	Wadi Wadi member
Our storytelling, our gathering on the water, our language has all changed because of a need for secrecy.	Wadi Wadi member
The Government need to realise culture is at risk and needs to be practiced traditionally and we need access for connection to our water and Country.	Wadi Wadi TO
We see illegal fishing and we don't like it.	Wadi Wadi member
Parks and Wildlife have restricted culturally significant areas.	Wadi Wadi TO
Physical and spiritually emotional places are not accessible and are of historical significance.	Wadi Wadi TO

Quote	Source
The feelings of safety and healing have been lost because we can't spend time in the water, putting our health at risk.	Wadi Wadi member
When we lived on the river as kids, the river was a shop, we got our food and our water and now we can't, and the young ones can't. We only ever took what we needed.	Wadi Wadi TO
Drug, alcohol and domestic violence issues are occurring and putting us at risk, because of a lack of access to water, to culture and cultural activities.	Wadi Wadi member

8.3.8.5 Objectives and outcomes

The MDBA Part 14 Guidelines advise the aim of consultation processes should be 'to identify Traditional Owners' objectives for water management, and the desired outcomes that the objectives would contribute towards.'

'Objectives are commonly understood to mean 'aspirations' or 'goals' and is often expressed as wishes.'

Basin Plan s10.52(1)(a)

Table 8-16: Wadi Wadi - objectives

Feedback
To have full "First Nations control of bush and water and that will result in fixing the problems".
"To every problem there is a solution and Aboriginal people are the solution and have the solution to water problems".
"Everything be respected, respect everything TO's have fought for – respect falls under Lore.
"We want Government to engage more with Aboriginal people".
To no longer feel like we are sharing our knowledge with Government and not being listened to. We are Traditional Owners of the land and should be Custodians of the land".
To have genuine, real world jobs for Aboriginal people, like water and land rangers. To have MLDRIN advocate for funding so Wadi Wadi can set up a corporation through ORIC and apply through the Aboriginal Water Unit at DELWP for funding for an Aboriginal Water Ranger Program (AWRP) to operate in the Wadi Wadi area.
We want to define our objectives and work towards outcomes.
To stop going around in circles, sick and tired of it, we want to move forward.
To have cultural sites of significance identified and protected.

**Basin Plans
s10.52(1)(b)**
Table 8-17: Wadi Wadi – outcomes

Feedback
Carp are controlled, fish are re-stocked and breeding grounds are monitored and maintained, plants and bush medicine thrive again as First Nations control and management programs are implemented.
Rivers flow naturally again, waterholes fill up naturally and swamps will be healthy and full of wildlife. We want to drink the water, swim in the water and heal ourselves and our kids in the water.
Cultural identity, spirituality, connectivity and accessibility to water are all restored and rebalanced through respect for Aboriginal knowledge. Burial sites and sites of historical significance can be monitored and respected. Spirits can rest and not be upset by being disturbed.
Good communication with Government and ongoing commitment from Government to respect and act on Aboriginal Lore.
Receive funding with MLDRIN support for funding application to the Aboriginal Water Program and commence Aboriginal Water Ranger Program on Wadi Wadi traditional land, to begin culturally appropriate training and implement traditional methods of managing waterways. The ranger will report to the Wadi Wadi Corporation Committee with the Committee reporting to the funding body. Observation and diligence is the key with the rangers reporting problems to appropriate authorities as required.
Signage will be in place and Aboriginal rangers will be surveying and maintaining and monitoring the rivers in line with the AWRP policies and procedures.
To have moved forward and have ongoing positive outcomes and decision making by water planners.
To have moved forward with the identification of all culturally significant sites and protective mechanisms in place where required.

8.3.9 Wamba Wemba

Wamba Wemba contribution was distributed to the Wamba Barapa Working Group on 11 December 2018 and the 8 March 2019 by the First Nations Legal and Research Services. There were no content amendment suggestions or objections to the report.

8.3.9.1 Description

The Wamba Wemba would like to note that their contribution to the Water Resource Plan is a snapshot in time. The aspirations presented are dynamic and will continually progress and be updated as the broader landscape and context changes. There is an intention to keep this document up to date on a website in the near future and should be referred to for the latest version.

Clans/family groups

The Wamba Wemba Nation is defined by many clan groups that form approximately 16 family groups for the Nation. The clan groups are descendants of Wamba Wemba families.

The Wamba Wemba people were the first Traditional Owner group of this local land and waters and continue to be acknowledged as an important part of this area's history.

Country

Wamba Wemba areas of interest are around the Loddon River, reaching northwards from Kerang, Victoria to Swan Hill, and including the area of the Avoca River, southwards towards Quambatook. In a north-easterly direction, areas of interest is over the New South Wales-Victorian border to Boorrarban and Moulamein, and extended to the vicinity of Barham and Lake Boga in Victoria. The Wamba Wemba also have interest in Lake Tyrell along with other Traditional Owner groups and their contribution has been included in the Wimmera Mallee Water Resource Plan.

They may have other Country of interest that has not yet been identified.

Scope

The Wamba Wemba is a cross-border Nation with areas of interest in both Victoria and New South Wales. This document focuses on aspirations within Victoria. Wamba Wemba's contribution in the Northern Victoria Water Resource Plan has been updated since the submission of the Wimmera Mallee WRP in February 2019.

The Wamba Wemba look forward to the engagement for the New South Wales Murray and Lower Darling water resource plans in near future.

Organisations/Working Groups (NRM)

The main organisations and groups that Wamba Wemba people are involved in (within Victoria) are:

Table 8-18: Organisations and groups

Organisation Groups	Brief Description
Wamba Barapa Working Group (through First Nations Legal and Research Services)	They are in the process of progressing their native title claim and have requested that DELWP engages with the group where possible regarding on matters that affect their rights and interests on Country.
Barapa Wamba Water for Country Steering Committee	They are funded through DELWP Aboriginal Water grants and work with the NCCMA to make decisions on the Barapa Wamba Water for Country Project.
Wiran Aboriginal Corporation	They currently have six directors who are focusing on setting up the governance structures.

8.3.9.2 Current or pending agreements

Native Title and Traditional Owner Settlement Act

The Wamba Wemba and Barapa Barapa peoples are in the preliminary stages of their native title matter which may include progressing to a settlement agreement under the Traditional Owner Settlement Act 2010 (Vic).

Registered Aboriginal Party (RAP) (Cultural Heritage)

Wamba Wemba does not currently have RAP status, however, the group is undertaking the required preliminary work to apply to be recognised as a RAP for their Country.

Traditional Owner views regarding arrangements

Traditional Owners noted frustration with the engagement process and advocated to be included at all levels of negotiations. Wamba Wemba Traditional Owners have expressed that the engagement process with stakeholders must be open and transparent and the group is adequately resourced to engage at an equal level with stakeholders. The Wamba Wemba group has noted that there are challenges in acquiring resourcing for the Corporation and to call full group meetings to consider stakeholder proposals.

8.3.9.3 Existing reference materials

Aboriginal Waterway Assessment

An Aboriginal Waterway Assessment was undertaken in 2015 by Wamba Wemba in the Werai Forest, New South Wales as part of a pilot research undertaken by the MDBA to test the tool in the Australian context.

No AWAs have been done with Wamba Wemba in Victoria. In partnership with the North Central CMA and MLDRIN, Wamba Wemba are planning for an AWA at Round Lake and Lake Boga to link with environmental watering programs (subject to funding). Traditional Owners at the workshop thought before environmental watering is done, an AWA should be conducted on that site.

Use and Occupancy Mapping

In 2009/10 a use and occupancy mapping project was conducted by the MDBA in conjunction with MLDRIN, Yarkuwa and the Deniliquin Local Aboriginal Land Council in the Werai Forest, New South Wales. Many Wamba Wemba Traditional Owners were involved in the project and several Traditional Owners are trained in use and occupancy mapping.

Kerang Wetlands Ramsar Action Plan

NCCMA developed a detailed action plan in coordination with the multiple stakeholders with a role in managing these wetlands. This included Wamba Wemba and Barapa Barapa Traditional Owners who were involved in identifying cultural values and specific management actions to look after the wetlands.

Additionally, the North Central CMA has co-ordinated monitoring and NRM programs in the area in collaboration with Traditional Owners including: weed control, revegetation, controlling rabbit populations and fencing high priority vegetation.

Barapa Wamba Water for Country Project

The current project builds on the Barapa Water for Country project, which commenced in 2014 to identify and map traditional values and sites of cultural significance in the Gunbower Forest. The second phase of the project focused on flow objectives and how these will deliver cultural outcomes in the Gunbower Forest. This project was initiated through the Living Murray Program, giving focus to the Gunbower Forest Icon site.

In 2018-19 the project has extended to gain understanding of the cultural values and aspirations of wetlands on Wamba Wemba Country as well including the Kerang Lakes.

Indigenous Response to the Living Murray Initiative (2003)

The Murray-Darling Basin Commission (MDBC) commissioned a report to detail Indigenous responses to achieve its vision of "a healthy River Murray system, sustaining communities and preserving unique values". The report includes responses received during consultation with the Wamba Wemba in 2002. This has been included in the values and uses, risks and impacts and the objectives and outcomes sections of this contribution as it is still highly relevant.

Victoria's Framework of Historical Themes

This project included a case study on the social and cultural heritage landscape of Lake Boga. This has been included in the values and uses section of this contribution.

North Central CMA Waterway Strategy 2014 – 2022

Recognises the knowledge, culture and perspectives of Aboriginal people and the importance of rivers and wetlands for Aboriginal values and uses. Actions in the strategy include:

"The North Central CMA will work with Traditional Owner groups to strongly align the 2014-22 North Central Waterway Strategy and 'Whole of Country Plans' and continue to explore opportunities to work with Traditional Owner groups on the strategy's priority waterways" (p.14).

Mallee CMA Waterway Strategy 2014-2022

Recognises that Traditional Owners continue to have connection with the Mallee's natural landscapes and values near waterways. It outlines the following goals:

"To protect the extent and condition of Cultural Heritage (Indigenous and non-Indigenous) sites associated with waterways; and to increase community capacity for, awareness of and participation in waterway management."



The strategy outlines the following principal *“Traditional Owners – the skills, knowledge and perspectives of Indigenous people will be incorporated into waterway management.”*

Future Funding of \$40 million

In May 2018, the Federal Water Minister David Littleproud announced a commitment of \$40 million over 4 years across the Basin to support the acquisition of water to support Aboriginal cultural and economic outcomes. This is the first significant commitment of funding to purchase water for First Nations in Australia. Traditional Owners at the workshop felt that this funding needs to be distributed evenly amongst Traditional Owner groups in the Basin.

8.3.9.4 Preferred means of engagement

The Wamba Wemba currently have two MLDRIN delegates with New South Wales and Victoria representation. It was suggested that MLDRIN delegates require more resourcing so that they can pass on information from meetings to the wider Traditional Owner group.

The Wamba Barapa Working Group is an interested stakeholder and a point of contact for proponents undertaking work on Wamba Wemba Country. First Nations Legal and Research Services, through the delegated lawyer for Wamba Wemba procedures, is a preliminary contact point for the Working Group. For any substantial and important decisions regarding activities and projects on Wamba Wemba Country, the Working Group will refer these decisions to the full native title group.

Traditional Owners in the workshop requested for Government to engage directly with Wamba Wemba people and not through peak body organisations. Where groups are compliant with Government agencies, they should be contracted to deliver projects. There should be capacity building of Traditional Owner organisations. Government organisations should go directly to Traditional Owner organisations and be the first point of contact.

Wamba Wemba people expect to be reimbursed for their time. They are contributing to the discussion as consultants and should be recompensed accordingly e.g. travel, out of pocket expenses and loss of wages. If meetings are held mid-week, many Traditional Owners are unable to attend without compensation for loss of wages. Additionally, many Traditional Owners no longer live on-Country and appreciate support to be able to travel to the meetings/gatherings/field trips.

During the Nation meeting most people indicated that they preferred receiving information via post rather than email. They also appreciated face to face engagement as it shows respect.

Wamba Wemba have concerns from the lack of consultation from all Government departments and water agencies to date and provided an example that environmental watering decisions seem to be made before the public including Traditional Owners know about them. It would be interesting to know what is being watered; why it is being watered; and how much water is being delivered over how many days. This would allow the opportunity to visit the site or co-ordinate an event associated with the watering. It was also suggested for Traditional Owners to undertake an Aboriginal Waterways Assessment before environmental watering occurs.

Representatives from Wamba Wemba indicated that they would like to be aware of NRM projects across the sector and it was suggested to meet more regularly as a Nation to learn about and have input on various projects across the relevant teams/organisations.

Representatives felt that Government do not have a clear understanding of the Aboriginal social structure (Nation Groups, clan groups, family groups) and how to engage effectively. There was a suggestion that there should be a representative from each family group involved.

8.3.9.5 Values and uses

The following statement was prepared by Ken Stewart and shared during the workshop receiving support by other Traditional Owners to include it in the Water Resource Plan as an explanation of why Country is important.

"OUR LAND and WATER

As a person of Aboriginal descent with close ancestral links to both Murray River Country and the Mallee/Wimmera Country there are many materials as well as ethereal markers in the present landscape that connect us to our People's long history of association with the Landscape.

With the passing of time since European colonisation there has been a rapid decline in the practice of cultural traditions that have been passed from one generation to the next since time immemorial.

This makes all archaeological sites highly significant to firstly our Elders as some of them witnessed our Ancestors living the cultural practices that created these sites, secondly to me and my generation as this is how and where the Elders pass on to us the knowledge and wisdom of our culture, thirdly to our children and the future generations as this is our Ancestral Legacy.

While this holds true for all material culture sites such as mounds, middens, scarred trees and artefact scatters our burial places and the skeletal remains they hold are sacrosanct and are the most sacred sites we know because these are the resting place of our Ancestral families.

I and many others of my Aboriginal Countrymen and Countrywomen feel that we have been entrusted with the care and protection of these sites and song lines until it is time to pass this responsibility to the next generation.

Kenneth Stewart



Workshop and field trip

During the first workshop, an open discussion was had about why water is important to Wamba Wemba people with consideration of environment, social, economic and spiritual aspects. Aboriginal values and uses of water were also spoken about more informally during the field trip. The main themes that emerged included:

Lifeline

During the workshop water was described as *"a lifeline – without it we have no fish or animals"*. Another person mentioned *"looking after the environment is looking after culture"*. The presence and quality of water is the largest influential factor on the cultural health of the rivers, lakes and wetlands. Water itself is a cultural value simply by its presences and its' wide-ranging effects on other cultural resources.

Identity

There is an inextricable connectivity between identity, spirituality and water.

"land and water are important to maintain identity and spiritual connection" – Wayne Firebrace

Wamba Wemba identity is bound through their connection to land and water and includes: totems, language, stories, beliefs and values. Creation stories are part of the river and it is important to maintain fish passage to protect creation (MDBC, 2003). There is the legend of the Bunyip in Swan Hill.

"Our lives are connected to the river as well as our emotional wellbeing" (MDBC, 2003).

Plants and Animals

There is a spiritual, cultural and ecological connection between water and the animals and plants that depend on water. During the workshops and field trip there was mention of plants used for bush medicine, food, craft such as basket weaving and ceremony artefacts. Native plants such as native mint and flax lily were predominately used. Scar trees are valued as a historical reminder of traditional harvesting techniques. Floodplains were noted as important and box trees, red gums, she-oaks and acacias communities need to be maintained (MDBC, 2003)

Animals commonly discussed included: turtles, black swans (including swan eggs), fish, Murray cray, yabbies and mussels. The red tail black cockatoo and brolga were noted as being important. It is culturally important to preserve these animals to hunt and fish and continue a social/spiritual connectivity to the waterways.

"Murray cray is a delicacy food used in ceremonial occasions like weddings... Only take the big ones, not the ones with eggs. Aboriginal people only took what they wanted to use".

Stephen Morrison

During the field trip, the North Central CMA proposed to do a project with Traditional Owners on Murray Crays and a joint application for funding was submitted in February 2019. Traditional Owners recognise that the water regimes and river patterns are linked with seasonal activities for communities along the river.

Livelihoods

It was mentioned that waterways support livelihoods whether it's through providing food sources to eat, sell or to enjoy hunting as a customary activity. A lot of Traditional Owners caught and sold rabbits and fish for income. Communities used to drink from the river and resources were shared in times of hardship.

It was also recognised that there are potentially economic opportunities through aquaponics etc.

Lake Tyrrell

During conversations with one Traditional Owner, they highlighted Lake Tyrrell as a sacred place for men to navigate at night time "sky reflection".

Literature

Further Wamba Wemba values and uses are listed below based on a literature review.

Social and Cultural History of Lake Boga

Lake Boga has a rich social and cultural history and has a case study prepared on it to demonstrate Victoria's heritage (Heritage Council, 2018). The Aboriginal values for Wamba Wemba people identified in the case study include:

- stories associated with the formation of the landscape, explaining the lack of trees around the lake, features associated with the lake and the river, the local fauna and the moon (the formation of ancestral landscape)
- Evidence of numerous campsites and middens containing food remains of bone and fresh water shellfish, earth ovens used to cook meals, surface scatters of stone artefacts and burial sites (aboriginal economy, resources and customs)
- The Wamba Wemba occupied a wide area within the Kerang Lakes system including Lake Boga and nearby Lake Mannaor as well as land up to the banks of the Little Murray River (Barne Mille) and the Murray River.
- European settlement placed pressure on the Wamba Wemba populations as pastoralists were threatening their land, resources and cultural traditions. The Moravian Mission was established in 1851 and closed in 1856 unable to attract many Aboriginal people.
- In the late 19th century, land selectors moved into the area and water supply was formed to supply the new agricultural settlement. The town of Lake Boga developed to include railway station, shops and a school.
- Many Wamba Wemba people worked on rural land selections or worked on pastoral or agricultural properties e.g. seasonal work including delivered mail, worked as shearers, stockmen or within the town itself.

During the field trip it was evident that Traditional Owners maintain a close association with Lake Boga and the township. This included the primary school and the cemetery and memories of spending time with family along the edges of Lake Boga.

Traditional Owners also mentioned seasonal work such as grape picking as well as working at the stockman station, loading bales of hay and cutting wood for the paddle steamer.

Kerang wetlands

The Kerang Wetlands Ramsar Site Action Plan (State of Victoria, 2017) highlights Aboriginal values (for both Wamba and Barapa) including:

- mounds, scar trees, middens, burials, hearths, surface scatters and isolated artefacts
- the wetlands continue to function as places of spiritual and cultural connection



- the wetlands provide habitat for flora and fauna that are important resources for food and medicine.

There is an abundance of cultural heritage sites with many recorded on the Aboriginal Cultural Heritage Register and Information System (ACHRIS). There are also sites that are not registered as a means of privacy and protection from the public including:

- important places for ceremonial or spiritual purposes
- places of gathering and social meetings
- camp sites
- fishing or food gathering sites
- places of trade
- women's and men's sites
- burial and ceremonial sites.

8.3.9.6 Risks and impacts

During the workshop, Traditional Owners were asked "What are some of your concerns about water management and its impact on Aboriginal use and values?".

"If you don't look after the bush it will impact the river – everything is connected. Water affects everyone and influences multiple systems (economics, food, etc.)"

Richie Kennedy Junior

The main themes raised included:

Water quality decline from land clearing, erosion of the river banks, blue green algae and blackwater events. The decline in water quality is reducing the cultural health of waterways by rendering the water unusable for humans and impacting plants and animals.

Inappropriate recreational use such as jet skis, boats and 4x4 produce pollution and destroy habitat and impact on ability to swim.

Water regulation has completely changed the flow regime and near Swan Hill the river drops to very low levels impacting on social use and enjoyment of the river. Additionally, many wetlands in Wamba Wemba Country were noted to be drier than normal and a general comment that trees look stressed and cultural resources that would normally be expected are absent. Natural flows have been removed (MDBC, 2003). The environmental flows are not coordinated to Indigenous practice (MDBC, 2003).

Water oversubscribed creating a barrier for Aboriginal people to enter the water market and sustain a livelihood with one person commenting "land is worth nothing without water". There is also recognition that water needs to be respected, conserved and it is important for keeping Country healthy. Water tends to be in the hands of individuals and multi-national companies (MDBC, 2003).

Over fishing of the rivers and people not following good fishing practices "only take what you need – that's what we have done for generations". Additionally, there were comments that now the river is full of carp and there was also concern releasing the carp virus and what the side effects will be.

Lack of involvement of Aboriginal people in water management has been detrimental to environmental and cultural health of waterways. Traditional Owners feel like a minority, are not adequately engaged and noted a lack of transparency the way water is managed and where the funding is going. Science of natural resource management does not incorporate cultural knowledge (MDBC, 2003).

Decline of spiritual connection to waterways: The spiritual connection of Indigenous peoples is not recognised (MDBC, 2003). Traditional Owners feel they are losing their spiritual connection to the living world (MDBC, 2003). It was mentioned that people are not spending as much time on Country anymore and are losing the understanding of the landscape, where things are and why. One person mentioned that there is particularly a lack of women involved. "Compensation should be made available for loss of livelihood and disruption to enjoyment of our spiritual and cultural life" (MDBC, 2003).

Un-named Waterways: during the workshop it was raised that there are many un-named waterways that have Aboriginal values and uses and may not be included in plans/ conversations.

8.3.9.7 Objectives and outcomes

The Wamba Wemba people have had a living connection with the rivers and wetlands for tens of thousands of years and are recognised as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage. They have an interest in managing waterways to protect cultural heritage due to long connection to the land and resources.

During the workshop, Traditional Owners were asked "How would you like the water in rivers and groundwater managed?" and "what is your vision for water management in 5 or 10 years?". The responses have formed the objectives and outcomes for the WRP.

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Table 8-19: Wamba Wemba objectives and outcomes

Objectives	Outcomes
Encourage kids to stay in school and provide opportunities such as water sampling to start engagement	Clear pathways for youth to work in the water sector and go into leadership positions
Provide a pathway for employment for youth in the water sector	
Set-up cadetships for youth	
Provide training and mentoring to promote leadership	
Every CMA to have a dedicated Aboriginal position or identified role (meaningful position that is supported with ongoing training, clear positions description, long term contract and structure).	
Government agencies to have direct engagement with Traditional Owners especially regarding job opportunities e.g. water quality monitoring, fish and bird monitoring, weed control, fencing, revegetation, fish habitat/fish ladder construction, installation of fish screens, etc.	

Objectives	Outcomes
Building strong networks between Aboriginal people, Traditional Owners and Government for forward progression. Suggested on-going engagement (hold forums twice a year with waterway units, CMAs, Parks, TO's etc.)	Working in partnership with Government organisations
To secure ongoing project funding for the Water for Country project	
For the Wamba Wemba to directly receive funding and resourcing from Government to manage their own projects (and not go through peak bodies)	
For MLDRIN delegates to receive resources and support so they can report back to the broader Wamba Wemba group	
Traditional Owner Involvement in environmental watering decisions to look for opportunities for cultural outcomes and to minimise the impact on cultural values. For example, watering should be high in winter and low in summer. Floods should occur every 3 months and floods should last for 6 months.	
To influence decisions on how the \$40M is distributed amongst Traditional Owner groups in the Murray-Darling Basin	
Improve communication and engagement across all Government departments and other agencies	
To develop a project between NCCMA and Traditional Owners to restock Murray cray and yabbies	
Replenish fish stocks (good for culture/ traditional practices)	
To link outcomes from Aboriginal Waterway Assessments and Use and Occupancy Mapping to inform environmental watering programs	
Manage recreational users of waterways (jet skis, boats and 4X4)	
Work together with other Traditional Owner groups to create change.	
Management plans need to incorporate Traditional Owner perspectives at the local level	
Inclusion of Traditional Owner interest within policy, framed in legislation	
Undertake full assessment of waterways in the Country. Document Elders, knowledge as we go, build the information over time. We are unable to tell the Government everything in a day	Document, learn and share knowledge to preserve culture
Do a skills audit across Wamba Wemba to understand who can contribute to what projects. A few Traditional Owners are trained in cultural mapping.	
Consideration of Aboriginal values and uses for unnamed waterways as well as named waterways	
Dual naming system in place with the Aboriginal name and history of the site	
Learn cultural knowledge to pass onto the younger generations. Teach language of everything related to land and water. If Aboriginal people do not work together the culture will be lost	

Objectives	Outcomes
Reinstate more natural watering regimes wherever possible	Protect and manage culturally significant sites
Manage flows to restore habitat and protect wildlife especially for species of cultural and iconic significance e.g. black swan, Murray cray, yabbies, red tail black cockatoo and brolgas for example	
To build and manage a local fish hatchery to restore populations of native fish in the waterways	
Improve management of tourism to minimise damage of cultural sites	
Joint management of waterways through funding and job positions (rangers, fisheries positions)	Work towards self-determination
Build a cultural centre to share history and cultural significance of Lake Boga. It may include a conference room, tourist information and sells arts/crafts.	
Secure land for cultural learning and set-up livelihoods on-country. Secure water licenses and have the opportunity to trade.	
Develop activities/program to support women to connect with waterways such as: collecting reeds for basket weaving, collecting eggs etc.	
Restore and maintain vegetation with bush medicine, craft, ceremony artefacts and food sources (for example, native grasses, common nardoo, old man weed, cumbungi, common reeds).	

The ultimate goal is for healthy bush, healthy rivers and healthy people.

8.3.9.8 Environmental and cultural flows

During the workshops and field trip there were many discussions regarding cultural flows and environmental flows. A couple of people even questioned why there is any difference between them at all, given that healthy community is so closely related to healthy country, and environmental water is delivering healthy Country.

Subsequent to this, Traditional Owners thought there needs to be more collaboration between environmental water managers and Aboriginal groups, so that there is greater understanding of each other's objectives. One example was highlighted during the engagement that some environmental water targeted breeding and movement of Murray Hardyhead (which some Traditional Owners couldn't see the value in), yet environmental watering managers are trying to discourage Redfin (which is a favoured fish to eat for some Traditional Owners). This conversation highlighted the difference between environmental flows and cultural flows – cultural flows should be something that Aboriginal groups have complete control over, and not be bound by restrictions that apply to environmental water. While there will be large crossovers between environmental and cultural flows (e.g. looking after river-red gums, Murray Cod), there will also be difference (e.g. environmental flows would target Murray Hardyhead while Aboriginal groups may want to farm Redfin), which is why cultural flows are needed in addition to environmental flows.

Another point that came up repeatedly was that there was inadequate cultural assessment during environmental watering events. An example given was of watering at Hattah Lakes could impact on burial sites or scar trees, yet there was no Traditional Owner on site to make sure the significant sites were not affected.



During the consultation, representatives from the Mallee CMA and North Central CMA were keen to listen and work together to scope meaningful projects with cultural outcomes through the environmental watering program.

Other concerns raised about cultural flows were about the National Cultural Flows Research Project. Some Traditional Owners were wondering how it could be endorsed when they had not been consulted.

8.3.9.9 References

Murray-Darling Basin Commission (2003) *Indigenous Response to the Living Murray Initiative*

State of Victoria, Mallee Catchment Management Authority (2014) *Mallee Waterway Strategy 2014 – 2022*

State of Victoria, North Central Catchment Management Authority (2014) *North Central Waterway Strategy 2014 – 2022*

State of Victoria, North Central Catchment Management Authority (2017) *Kerang Wetlands RAMSAR Site Action Plan*

State of Victoria, Heritage Council (2018), *Case Study 6: Lake Boga, Social and Cultural Heritage Landscape*

8.3.10 Weki Weki

The Weki Weki contribution was distributed to all Weki Weki people who attended the Nation meetings. There were no content amendment suggestions or objections to the report. The contribution was signed off by the Chair and Director of the Weki Weki Aboriginal Corporation and by both MLDRIN delegates.

8.3.10.1 Description

Area of interest

Weki Weki has strong association with the Murray River and its tributaries and surrounding lakes and wetlands nearby Robinvale, Boundary Bend and Piangil. On the Victorian side, Weki Weki's area of interest extends south to Lake Tyrell. Weki Weki Country continues across the border to New South Wales with several rivers feeding into the Murray being places of interest such as the Murrumbidgee River and the Edwards River or Kyalite River.

The Weki Weki identify as river people (mille gounditch) and have ancestral links with other river tribes from Echuca to the South Australian border historically known as N'erget Nation.

Organisations

Weki Weki Aboriginal Corporation

Memberships

Weki Weki currently have two MLDRIN delegates.

8.3.10.2 Current agreements

Native Title, Traditional Owner Settlement Act and Registered Aboriginal Parties

Weki Weki are not currently pursuing Native Title and do not currently have RAP status.



Figure 8-13: Weki Weki Elders (from left): Joyce Kennedy, Richie Kennedy Senior, Greg Kennedy, Ray Kennedy



8.3.10.3 Preferred means of engagement

Weki Weki would like to work co-operatively with Government agencies and see it as important to save the river "How can you help us, help you, save the river?". The preferred means of engagement are:

- contact the Chair of the Weki Weki Aboriginal Corporation
- for full group gatherings broaden the invitation to notify as many people as possible. Allow adequate notification of upcoming meetings
- the only way to run a meeting is to let the Elders run the meeting. Elders sitting at the front of the room and leading the meeting
- Weki Weki would like the same fair process that other Nations are receiving
- to recognise Weki Weki as a cross border Nation in Victoria and New South Wales
- to be reimbursed for the sharing of cultural knowledge. Traditional Owners are similar to consultants and consultants are typically reimbursed for their time
- to consider signing a Memorandum of Understanding to work with Government. There is an expectation that Government will deliver on its promises
- Government should notify people a couple of months in advance prior to environmental watering events.

8.3.10.4 Risks and impacts

During the workshop, Traditional Owners were asked "What are some of your concerns about water management and its impact on Aboriginal use and values?".

The main themes raised included:

Decrease in water quality: Water was clean and clear decades ago. You could see the bottom and could drink the water. There used to be platypus, you can't go yabbing anymore and there are not as many fish. Noticed that pelicans have unusual behaviour sitting in the branches of a dead tree almost too scared to go in the water.

- concern over recent fish deaths at Menindee Lakes due to blue-green algae
- concern over black water events – years ago the water turned black, yabbies were crawling out of the water; fish were dying; it smelt bad
- concern over the sprays from agriculture/horticulture infecting the water.

Highly regulated flow regime: Limiting access to natural flows needed for a healthy environment. Inadequate flows and pipelines mean fish can't migrate anymore and they are dying. There is no longer water in many of the waterways and noticed the animals and plants are no longer present. It impacts Traditional Owners' cultural connection and ability to spend time in these places, to catch food, to practice ceremony and to continue sharing knowledge.

Imbalance of power: MDBA and the National Party, National Farmers Federation are the most powerful people in Australia and control the water. Aboriginal people do not have the same level of influence. Weki Weki also feel like they are on the "B list" of Traditional Owner Groups and noted the lack of funding allocated to groups in the north west of Victoria.

Water theft: Farmers get away with what they are doing. Stealing water today is common and farmers need to be held more accountable. Irrigators have been caught out cheating the system by manipulating meters.

Overallocation of water: Farmers have a licence to pump the lake dry (e.g. Lake Benanee, New South Wales) – this shouldn't happen. The future seems to be based on continually draining the basin rather than thinking of alternative solutions.

Large water users with little local benefit: A lot of agriculture is exported overseas e.g. almonds. It doesn't benefit locals and uses large amounts of water. Grapes are another example of profits leaving the area with massive amounts of water use and pesticides. Cattle and dairy industry also use large quantities of water. Sand mining is causing environmental damage. All are profiting from our land.

Badly degraded sites of significance: Difficult to restore especially with competing demands for water. This has an impact of people's connection to Country and understanding of Country.

Lack of understanding of Traditional Owner interests: Environmental watering have a history of flooding areas without consulting Traditional Owners. It's hurting the Country and animals. Traditional Owners have also been cautious about sharing cultural knowledge.

"Some plants such as special medicine plants are dying out. The land is sick and we need to fix it. When the land gets sick, we get sick."

Tourism: Boat races are destroying the river banks and impacting on habitat, fish eggs etc.

8.3.10.5 Values and uses

During the workshops, an open discussion was had about why water is important to Weki Weki people with consideration of environmental, social, economic and spiritual aspects. The main themes that emerged are shown in the table below.

Table 8-20: Values and uses

Theme	Detail
Home – spiritual and cultural connection	"We grew up on the river with large families." "Rivers and beaches in Thailand and Philippines means nothing to me. I think of the Murray River and I can't wait to get back. The cultural and spiritual connection is more important than their beaches and rivers. It is where we were born and brought up." "Our rivers and waters draw us back home. We won't live far from the river." "Where I've been for the last 38 years, I have not put my hands and feet in the river. I say it is not my river. My river is the Murray River. Every time I go back home, I reconnect to the river because of the 38 years of loss that I've had." "Granny and grandad knew where to camp on island to avoid flood waters. The family still uses that camping spot. Old camp, momo's, artefacts, family gatherings. But there is no more water down there. It's all dried up. No yabbies, we want water back there."
Ancestral connection	"The river is our ancestors' bloodstream. Without the river we can't survive, the river without us can't survive."
Health and wellbeing	"When the river is sick, we get sick. When my kids are sick I get them in the water like a cultural baptism. When the river is healthy we are healthy."

Theme	Detail
Role as caretakers	"Our role is to care for the land." "Water doesn't have a monetary value to us, it has a sentimental value. All we are worried about is looking after it. We want to make it healthy again. Because the water has sentimental value to us, only we can protect that water." "Our cultural activities shouldn't be used for economic activities." "We can use tourist activities. Re-stock the rivers with more native fish but do not sell the fish and deplete the rivers – to me that's wrong." "There was a legend, the population on the river got too big and they couldn't feed everyone. One group had to move down the river and move away. One mob stayed on the south and the other mob had to move to Narangirri. They were sent down there because tribes got too big. We did take care of the rivers when the tribes got too big people had to move away. Look at the documentation, there may have been 80-100 never more than 300-400 people. It wasn't sustainable."
Knowledge of Country	"Our people knew where to camp because they knew that creek bed, when it would fill up. They knew what we read in our books now. That's what I want to be, where I want to get to. Especially with women's business. We are losing the knowledge. How will I teach the next generation women's business?" "In Robinvale where it has flooded, a lot of the non-Aboriginal people look at us about what is going on. We've got stories for thousands of years. They know we have the answers."
Food	"The river was our life blood for food – hunting and fishing. We didn't know any other way than living on the river." "You only took enough fish from the river to feed your family. You didn't take it to take to town to make a quid from it." "Even in flood time, we used to walk to the billabong and catch yabbies... especially down at Randells creek. It was a regular thing and now there is no water there. We can't enjoy our cultural connection." "Now you can't go fishing and guarantee you'll catch anything. Food sources are dying off there."
Animals	Fish, crustaceans, birdlife, animal life, humans, kangaroos. There used to see platypus in the river. Remember seeing pelicans along the river around Robinvale, now you don't see many pelicans. "There's birds that migrate here. If their area is messed around, they won't come back. When we put water in a mini lake, birds from Darwin came back and breed. If you muck around with waterways, you muck around with the bush and everything related to it. It's all connected. It's like a jigsaw and you take one piece out...."
Plants	Medicine plants: old man weed, salt bush..... (and many more not listed here).

Theme	Detail
Trading	"Traditionally trading of goods has been done. People still go hunting. People bring fish around.... kangaroo, whatever you get your hands on, especially during sorry business." "We had trade and economics going back thousands of years. We invented trade and economics in this country. Our way is someone's daughter married someone's son."
Ceremonies	"A lot of our ceremonies used to happen down on the rivers - that's not happening anymore."
Transport	"Our mob built massive 20 foot canoes to help [foreigners] cart their wool around Euston/Robinvale."

8.3.10.6 Objectives and outcomes

During the workshop, Traditional Owners were asked "How would you like the water in rivers and groundwater managed?" and "what is your vision for water management in 5 or 10 years?". The responses have formed the objectives and outcomes for the Water Resource Plan.

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Table 8-21: Weki Weki objectives and outcomes

Objectives	Outcomes
Develop programs to involve young people to look after Country. Involve kids early so we can move forward. For example, during school holidays kids could work with us and learn from us.	- work experience for young people - knowledge passed on to the next generation - give young people the chance to have a say - pathway to employment - improved health and wellbeing
Funding for training and employment of 20-30 people from each tribe to look after the Murray River and other important rivers and lakes 24 hours a day, 7 days a week. Funding could be generated by taking 5% off water bills. <i>"Instead of spending money on us being sick, this will make us healthy. Everyone wins. You don't get sick when you're out bush. You don't get sick when you're working either. Everyone likes working and getting an income."</i>	- increased employment on Country - reduced water theft - empowerment - self-determination - social and emotional wellbeing
To co-ordinate a State-wide meeting for Traditional Owners from all over Victoria to meet together to discuss water resources as a whole. To co-ordinate meetings for the Murray River mob to see if we are thinking the same way and heading in the same direction.	- cultural knowledge shared between tribes - empowerment and strength - strengthen network - workshop and bounce ideas around - unity and collaboration between mobs so we're on the same level - work together and support one another

Objectives	Outcomes
To revive cultural practices of Weki Weki women especially related to waterways.	• inclusion of Weki Weki women in water management decision making • protection of sacred sites • revive cultural practices • pass on knowledge to next generation • more time on Country • empowerment • improved health and wellbeing
Slowly releasing water so that creeks and other waterways/cultural areas of significance are maintained in a more natural way.	• a slow release will keep the water clean and healthy. It will lead to improved food sources, fish migration, breeding, laying eggs, birthing etc. Animals will have a natural way of life • improved health of culturally significant sites
For Weki Weki to be involved in decision making processes and influence the sustainable use of water. For example: • preventing overallocation of water from lakes that are at risk of drying out • conserving water rather than continually draining this precious resource • developing long term alternative management strategies	• improved health of waterways and wetlands • decisions are influenced by Weki Weki as an equal partner
To protect cultural heritage and sites of significance – we need to look after medicine plants, animals, bird migration sites, women's birthing tree, for example. Certain places cannot be disturbed. Ancestral burial places must be respected.	• protection of cultural heritage and sites of significance • more abundance of animals and birds and ground covers and bush medicines. • enhance cultural knowledge and connection to country • improved health and wellbeing
To redirect unused water allocations to an Aboriginal Water Bank, that is inclusive of Murray River Nations. Aboriginal delegates to choose where the water goes based on needs (refer to cultural flows section below).	• self-determination • empowerment • inclusion of traditional knowledge in watering • improved cultural and environmental outcomes • improved health and wellbeing
Weki Weki has access to water entitlements to lease and trade and generate income to manage Country	• manage water autonomously • develop an income stream to fund activities to care for Country

Objectives	Outcomes
To recruit our own water officers so we can understand the business of water	• self-determination • empowerment • improve communication between Weki Weki people and Government agencies • influence decision making • more funding for projects on Country
To maintain and monitor waterways back to health. We need to look after plant and animal populations.	• increase understanding of changes of animals and plants on Country • monitoring provides evidence to inform further projects • improve health of plant and animal populations around waterways.
To own and operate nurseries and fish farms to foster endangered species and reintroduce them to the environment	• increase population of native fish and endangered species • Aboriginal owned business that increases training and employment for Weki Weki people • self-determination • empowerment
To share our cultural knowledge to save the river. If we don't tell Government agencies how they are damaging the river and our culture they'll never understand us. We need to see eye to eye with the Government agencies and come up with other solutions to water management.	• inclusion of traditional knowledge in water management • improved river health • improved cultural health • improved health and wellbeing
To celebrate our culture through art, photography, presentations, etc. We need to show our customs, traditions, preserve life. Art is the way culture is documented. How water links to creation stories. Knowledge is contained in art. Art reflects past, present and futures.	• artwork to document and share history and culture around waterways • improved understanding of Weki Weki culture and knowledge
To educate ourselves about water management. For example, undertake an AWA on Weki Weki Country	• improved knowledge and understanding of water management • improved partnerships • more influence of decision making • better integration of traditional knowledge with western science

8.3.10.7 Cultural Flows

The only way is through an Aboriginal water bank where we can determine where to allocate water. We need to own and maintain cultural water and decide when and where its released for the benefit of the river. Water cannot be sold or leased to anyone because that creates corruption. We'd sit around a conference table and decide. Like tribal days where we decide what area needs help first. We would only hold water that can be released to the environment for the benefit of the environment. We need to have cultural seasons and knowledge of when to release water for the environment. Aboriginal people need to own water and say where and when it should be released. It doesn't matter if it's a mob in New South Wales. They would submit a plan for us and we would consider it.

We want to see areas of cultural heritage and sites of significance flourishing. There should be an abundance of animals, birds, ground covers and bush medicines. That's how we are going to learn and model what our ancestors did.

We cannot leave it up to Government to look after cultural flows as they are easily corrupted to those who pay dollars for the election.



Figure 8-14: Members of Weki Weki and DELWP staff at Nation Meeting in December 2018, Tooleybuc.

Back Row: Stuart Lovejoy (DELWP), Jerome Kennedy. Second Row: Marty Robinson (DELWP), Richie Kennedy Junior, Georgina Davis, Kathleen Terrick, Jessica Freame (DELWP). Front Row: Jade Kennedy, Jarrod Kennedy, Richie Kennedy Senior, Ray Kennedy, Joyce Kennedy, Greg Kennedy

8.3.11 Yorta Yorta

The Yorta Yorta contribution was developed by the Aboriginal Water Officer and signed off by the CEO of the Yorta Yorta Nations Aboriginal Corporation (YYNAC).

8.3.11.1 Description

Yorta Yorta Nations Country and People

Yorta Yorta Country radiates out from the Murray River on both sides in all compass directions, roughly from Cohuna in the west to just outside Albury/Wodonga in the east to a northerly point in New South Wales approximately 20-30 km past Finley and extends south into Victoria just short of Nagambie. Yorta Yorta Nations region includes the lower Goulburn River, and towns such as Echuca, Cohuna, Shepparton, Benalla, Corowa, Wangaratta, Glenrowan, Rutherglen, Chiltern, Wahgunyah, Thoona, and Violet Town.

The people of the Yorta Yorta Nations are comprised of 8 different clan groups, where the Yorta Yorta language is spoken by all of the Yorta Yorta clans.

The Yorta Yorta Nation is comprised of people with undeniable bloodlines to the original Ancestors of the land of the Yorta Yorta Nation. These bloodlines link our past, present and future to one another, with traditional laws, customs, beliefs and sovereignty intact.

We have continued to exercise our natural rights as the indigenous occupants and owners of Country. Our social, spiritual, economic and cultural links with the area have never been broken, in other words our relationship with our Country has continued since time immemorial.

The survival of the ancestral lands, waters and all its children are equally important for the continuity of the Yorta Yorta Nations timeless connection with our inherent right. For us – the land has a spiritual connection; it's our mother. The human spirit is born from our land and creator and returns to it upon death. The land supplies us with everything that we need for living. We must look after it, so that it looks after us in return.

Organisations

The main organisations and groups that Yorta Yorta people are involved in are:

Table 8-22: YYNAC groups

Organisation/Group	Brief Description
Yorta Yorta Nations Aboriginal Corporation (YYNAC)	YYNAC was established, amongst other objectives, to represent the members of the family groups who are descendants of the original Ancestors of the Yorta Yorta Peoples; to make decisions and act on any matters of significance to the Yorta Yorta Peoples; and to enter into agreements with any person, Government agency or authority in relation to the protection of Yorta Yorta Country. YYNAC is governed by a board of seven (7) Directors with one of those Directors being an Elder's Representative and the Council of Elders comprised of 16 Yorta Yorta Family Group Representatives. The Chief Executive Officer manages the day-to-day operations of the organisation, cultural heritage officers, water policy officer, The Living Murray officer, researchers and administrative personnel. The water policy officer is funded by DELWP. The purpose is to assist in prioritising and streamlining Aboriginal water opportunities, building networks through engagement, consultation and collaboration with agencies.
Woka Walla Natural Resource Management Crew	Woka Walla is a Yorta Yorta Nation Aboriginal Corporation's owned and operated enterprise that provides meaningful employment and training for Yorta Yorta and other Aboriginal people. Our employees are committed to learning, working and caring for all aspects of Yorta Yorta lands, water, cultural heritage and the environment.
Traditional Owner Land Management Board	Jointly manage the Barmah National Park with Parks Victoria (refer to following section for more information)

Existing References

- Yorta Yorta Nation whole of Country Plan (2012)
- Water Plan
- MOU with the Goulburn Broken Catchment Management Authority
- Membership of MLDRIN (two delegates)

8.3.11.2 Current Agreements

The Yorta Yorta Nations' struggle for land justice has a long history of oral & documented evidence of Yorta Yorta Nations attempts to gain land justice with the encroachment of European occupation of the Traditional land and water of the Yorta Yorta Nation area since 1860 to present day.

Yorta Yorta Nation is well recognised across Australian Indigenous Nations and will continue to fight for recognition of and self-determination for our people and Country.

Native Title

Yorta Yorta v Victoria was a native title claim dismissed by Justice Olney of the Federal Court of Australia in 1998. Appeals to the Full Bench of the Federal Court of Australia in 2001 and the High Court of Australia in 2002 were also dismissed.

The determination by Justice Olney in 1998 ruled that the 'tide of history' had 'washed away' any real acknowledgement of traditional laws and any real observance of traditional customs by the applicants.

An appeal was made to the full bench of the Federal Court claiming, "the trial judge erroneously adopted a 'frozen in time' approach" and "failed to give sufficient recognition to the capacity of traditional laws and customs to adapt to changed circumstances". The Appeal was dismissed in a majority 2 to 1 decision.

The case was taken on appeal to the High Court of Australia but also dismissed in a 5 to 2 majority ruling in December 2002

Traditional Owner Settlement Act (TOSA)

The YYNAC is currently considering/negotiating a TOSA with the Victorian State Government and looking at areas of interest and considering the values that will benefit the Yorta Yorta Nations people.

Registered Aboriginal Party (Cultural Heritage)

The YYNAC has been designated as a Registered Aboriginal Party (RAP) by the State Government representative body the Victorian Aboriginal Heritage Council since 14th of September 2007.

This gives the YYNAC the rights to manage and protect their Cultural Heritage in their respected Country.

Yorta Yorta Co-operative Management Agreement

While the Yorta Yorta were found by the Federal Court not to meet the legal standard of native title under the **Native Title Act 1993 (Cth)** the State recognised that the Yorta Yorta have a connection to their Country.

On the 10th of June 2004 the State of Victoria went into a Co-operative Management Agreement with YYNAC establishing the Yorta Yorta Joint Body. The State and the Yorta Yorta implement the objectives of this agreement via direct engagement between Yorta Yorta, Parks Victoria and DELWP.

Traditional Owner Land Management Agreement

In October 2010, the State entered into a Traditional Owner Land Management Agreement with the Yorta Yorta. This agreement established the Yorta Yorta Traditional Owner Land Management Board (under section 82B of the Conservation, Forests and Lands Act 1987 (Vic). The key role of the Board, as set out in the Yorta Yorta Traditional Owner Land Management Agreement, is:

"To enable the knowledge and culture of the Yorta Yorta people to be recognised and incorporated into the management of Barmah National Park through the carrying out by the Board of its functions, powers and duties."

8.3.11.3 Partnerships and projects

YYNAC are custodians of our Traditional Lands and it is important to look after Country including all the plants and animals that make up Culture and Lore. YYNAC are in high demand



to represent Yorta Yorta interests in project planning, approvals and cultural heritage management. As YYNAC are under-resourced, we rely on working in partnership with NRM agencies to deliver projects and achieve outcomes. The following is a brief overview of YYNAC's involvement with projects across various NRM agencies.

Integrated Water Management Plans

Integrated water management is a collaborative approach to planning. It brings together organisations that influence all elements of the water cycle including: waterways, wastewater management, alternative and potable water supply, stormwater management and water treatment.

YYNAC are at early stages of involvement with the North Central Catchment Management Authority (NCCMA), Goulburn Broken Catchment Management Authority (GBCMA) and North East Catchment Management Authority (NECMA). They are currently developing a feasibility study for Traditional Owner engagement.

Through the Coliban Integrated Water Management Plan one of the project's is to do a AWA along the Campaspe River from the head waters to the Murray River which will be inclusive of Taungurung and Dja Dja Wurrung. This is at early stages of development and may provide a good example of Aboriginal Nations working together on a common cause.

The Goulburn Broken Integrated Water Management Plan is also looking at shared project with Taungurung along the Seven Mile Creek and the Upper Owen River reach, which is also at early stages of development.

Environmental Watering Proposals

Each year, CMAs meet with community members to develop their regional seasonal environmental watering proposals for the coming year.

The GBCMA are keen to involve YYNAC in watering proposals for areas such as Loc Gary, Kanyapella Wildlife Reserve and Barmah National Park.

The Living Murray Project

The Living Murray program is funded by the Commonwealth (MDBA) and aims to improve the ecological condition of significant forests, wetlands and lakes along the River Murray. The Living Murray program focuses on maintaining the health of 6 icon sites, chosen for their high ecological and economic value, and their cultural and heritage significance to Aboriginal people. The sites encompass areas of high conservation value — the floodplains, wetlands and forests along the Murray, the Murray's estuary and the river itself.

The sites relevant to the Yorta Yorta include Gunbower Forest and Barmah-Millewa Forest. There is the Living Murray Indigenous Partnerships Project that aims to ensure Indigenous community knowledge, values and perspectives are considered in each of the icon site management plans. There is The Living Murray (TLM) Facilitator employed through NCCMA for Gunbower Forest and a TLM Facilitator employed through YYNAC for Barmah-Millewa Forest. Part of their role is to maintain and enhance a professional approach to YYNAC's involvement in the program.

As the program is very broad, there have been a lot of investment and studies done or are in progress for the Gunbower Forest and Barmah-Millewa Forest.

Lower Ovens Conservation Action Plan

The Conservation Action Plan is an International standard for planning and monitoring conservation projects. NECMA facilitated workshops with community members to discuss the local environment and to share knowledge. The plan identifies natural assets of high value and

the threats currently affecting them, and outlines and prioritises a series of evidence-based conservation strategies to address these threats.

The Aboriginal Water Policy Officer has provided initial comments regarding cultural significance of various sites and suggestions to include Traditional Ecological Knowledge and cultural watering (not just environmental flows) with a presentation to the Council of Elders for consideration.

Floodplain Management Strategy

NECMA Floodplain Management Strategy (FMS) is a single, regional planning document for floodplain management; and a high level regional work program to guide future investment priorities to address existing and future flood risks in the north east region. It provides a starting point for councils and other stakeholders to identify priority flood management activities to address local needs.

YYNAC will contribute to the FMS to highlight significant cultural sites to ensure there is no undue harm. It is recommended for a representative from NECMA to present at the Council of Elders meeting so they have input and understanding of the outcomes regarding Traditional Owner engagement.

NCCMA Projects

NCCMA has worked with the Woka Walla crew around cultural value monitoring project and up skilling in areas bird surveys and water bugs.

The NCCMA would like to consult with YYNAC on several water related projects:

- potential CEWO bid from NCCMA and looking at whether YYNAC would like to assist in the bidding process
- River Tour April 2019 looking at having YYNAC and Elder's inclusiveness and input to the boat tour around Campaspe to Echuca & Gunbower area
- Gunbower TLM program for 2018-2019 including seeking Yorta input into seasonal watering proposal and understanding Yorta preferences for how to direct the cultural monitoring funding
- Gunbower Cockatoo Lagoon - NCCMA will provide an update on the project and seek Yorta feedback on preferred option for improving the water regime for the lagoon
- offer of Gunbower tour with Council of Elders to better understand water management and seasonal watering of Gunbower and looking at what project NCCMA are investing in
- native fish recovery project: planned to undertake concept designs for two fishways on Taylors Creek (upstream Ghow Swamp) to link Gunbower and Loddon systems for fish passage. NCCMA are seeking YYNAC input to the proposal if the funding bid is successful to update the fishway concept is and how it helps to look after Country.

Aboriginal Waterways Assessment (AWA)

New South Wales Parks & Wildlife Services in conjunction with the Murray Lower Darling Rivers Indigenous Nation (MLDRIN) funded and co-ordinated an Aboriginal Water Assessment (AWA) to look at the Cultural Values of Millewa National Park with the Traditional Owners. This was completed on November the 5th - 9th of November 2018 with Traditional Owners from Country.

It was a great week out in the field with the outcomes of naming the project that is a representation of the people from the Nations called the Woongi which means 'The People'.

After the week-long assessment MLDRIN will assess the finding and will schedule another meeting to talk about the results and will inform the Traditional Owns on what the result are and



then it will be up to the group to determine on what information that they agree to share with State Government departments.

Ghow (Kow) Swamp Conservation Management Plan

Ghow (Kow) Swamp is a large, artificially modified swampy wetland used as an extensive water storage facility by Goulburn-Murray Water (GMW) as a component of the Victorian Mid Murray Storages and Torrumbarry Irrigation Area.

Ghow (Kow) Swamp has long been recognised at State and National level as an area of high archaeological and cultural significance. The complex archaeological landscape at Ghow (Kow) Swamp is recognised as not only one of Australia's most significant Aboriginal burial places, but the largest single collection of ancestral remains dating the late Pleistocene in the world.

Aboriginal Victoria (AV), in association with the Yorta Yorta Nation Aboriginal Corporation (YYNAC) have commissioned Dr Vincent Clark & Associates to provide a Cultural Landscape Conservation Management Plan (CMP) for Ghow (Kow) Swamp, Victoria. The CMP aims to address gaps surrounding the understanding of cultural heritage at the swamp, and to propose conservation management measures. Artificial alteration of water levels at Ghow Swamp has caused erosion of the banks and threatens to destroy cultural heritage sites. It is important to create a CMP to help address threats to the landscape and cultural heritage and suggest conservation policies to implement to protect this important site.

Ghow (Kow) Swamp Land and On Water Management Plan

The Land and On Water Management Plan is facilitated by GMW and is developed and implemented by the community. They are relying on community ownership and the ability to attract funding. Activities include planning and sourcing funding for initiatives that address a range of land and on-water issues such as:

- increasing community awareness and involvement;
- community safety
- recreation and tourism
- maintaining healthy ecosystems
- cultural heritage
- the operational management of lakes, dams, etc..

8.3.11.4 Preferred means of engagement

The YYNAC exerts the right to Free Prior Informed Consent when engaging within the YYNAC Traditional lands of the nations; the right of their Traditional Ecological Knowledge and places of significance; and the right to the protection of their cultural heritage sites.

YYNAC has the rights to:

- Own, manage and control their Indigenous Knowledge;
- Be consulted about use of Indigenous Knowledge;
- Give or withhold consent around use of Indigenous Knowledge (the free, prior informed consent right);
- Make self-determined decisions about Indigenous Knowledge.

YYNAC has a Council of Elders (CoE) - Elders hold a wealth of knowledge about language, history and culture. They are consulted on projects in local areas, and on specific historical topics on which the group may have expertise.

For this reason, the Elders group are important to the consultation and consent for the use of Indigenous Knowledge, which gives direction and advice on approvals to the use of our TEK and decision on Cultural Heritage protection.

The CoE meets bi monthly and at times have full agendas and getting agenda items to be presented may take 4 – 8 weeks in advance so planning and timelines from the department or agencies should take that into consideration when looking at meeting with the CoE.

When engaging the YYNAC as it has various levels of governance make sure you are focus on the right officer for the project at hand.

When engaging with YYNAC make sure all information is clear and transparent and time for response from YYNAC is adequate without short timelines.

YYNAC has a schedule of fees for various services which it administers, so please take into account when consulting, planning and budgeting projects.

8.3.11.5 Values and uses

All of Country is significant because of the rich, diverse and aquatic nature of Yorta Yorta lands and resources, the Yorta Yorta were largely fishing people.

YYNAC has strong interest in the water industries as water is the symbol of life and major part of the spiritual and cultural connection to Country.

The rivers, lakes, lagoons, anabranches, rushlands, billabongs, and creeks, which are all central features of the area, provided them with an abundance of fresh water foods and a sustainable economic base.

They also supplemented these by hunting and collecting other foods from the surrounding woodlands and plains. The area fits into the concept of a broad based economy (smorgasbord theory) one that is capable of producing a wide variety and abundance of food which requires a minimum energy input.

This created the conditions in which more time could be devoted to kinship and maintenance of cultural connections with the ancestral lands.

As indicated water is not only essential for the continuation of Yorta Yorta culture and traditional rights, but is also important for the replenishment of natural resources and the survival of the ancestral lands themselves. In this context the Yorta Yorta don't make any distinction between water and land but see them as one whole system.

Black Dog Creek has particular cultural significance as a pathway to the high Country. There was the trading of Greenstone (from the Howqua near Mansfield) by Taungurung with Yorta Yorta Nations people and there are significant and historical place in the Lower Ovens;

Ovens/Blackdog Ck was once a large wetland: now altered, what's left in wetlands and Billabongs still are important gathering/cultural sites; most of which have been significantly altered but nevertheless important sites.

8.3.11.6 Objectives and outcomes

YYNAC has requested a community gathering to develop a whole of Country Plan which includes consideration of water objectives. The Yorta Yorta Water Policy Officer had led the engagement to date and highlighted the following aspirations.

Basin Plans s10.52(1)

Table 8-23: Objectives and outcomes

Objective	Outcome
To expand YYNAC to have a well-resourced water unit including a water manager for high level negotiations; a water officer to meet on ground deliverables and a water policy officer to help co-ordinate the projects.	Resources including funding to keep YYNAC highly functioning organisation and to proactively keep up with demand in the water/NRM sector.
To develop a consultancy to service the NRM industry and to secure funding to resource projects, for example: boats, GPS, computers, software and other relevant equipment to put us in pare with other consultant groups working in this space.	Change in paradigm in the way Government is working with Aboriginal organisations.
To be on the front foot of negotiations with industry. This includes: - To proactively manage and work with Government departments - To work to our own timelines, not Government timelines; - To prepare our own reports instead of relying on short-term, last minute funding. We can choose and control what studies are done and how they are done. - To hire consultants to do aspect of the work as we require. - To have direct access to funding and not go through an intermediary organisation - To have clear transparency of where money is coming from and going to. - Instead of sitting fees etc. allow Yorta Yorta people to decide how they would like to work.	Pathway towards self determination.
To secure funding to undertake a whole of industry proposal on better governance and ways of working within Aboriginal organisations.	
To teach industries to recognise the importance of Yorta Yorta people's connection to the environment through their custodianship.	Increased awareness, understanding, respect and protection of Yorta Yorta interests and custodianship.
To protect, preserve and raise community awareness of the importance of Aboriginal Heritage at significant water sites like Ghow Swamp.	Healthy Country and economic outcomes for Yorta Yorta people.
To look after Country through Land and Water management to restore and maintain our wetlands, rivers, waterways, tributaries, and lagoons which in turns looks after our flora and fauna that make up our Cultural Lore.	

Objective	Outcome
To have decision making in the water planning process, water sharing and distribution,	Equal influence “at the table” with other representatives from the water industry. Increased integration across the industry.
To develop a cultural flow that will complement the current water management process and have input to the current water flows that goes through Country.	Watering Country for healthy Country and achieving economic outcomes for Yorta Yorta people.
To build TEK into strategies where appropriate e.g. red gum thinning, protection of wetlands, links with cultural lore, bring back native animals and plants etc. and involve Elders onsite to discuss TEK.	“Bring people back, bring Country back”. It will provide a better living culture, better caring for Country and better outcomes for Country.
To have the opportunity for customary practices on-Country. This includes Identifying different cultural practices for men and women’s business	
To bring youth groups back on Country and give the next generation opportunities to get out on Country and work on-Country.	

8.3.11.7 Cultural flows

As already emphasised in this document, Yorta Yorta people are predominantly water-based people whose lifestyle focuses on and around waterways.

The provision of natural water flows is therefore fundamental to the continuation of our culture and traditional rights because of its fundamental role in replenishing our natural environment and ensuring the survival of our ancestral lands. In this context, we have never made a distinction between the terrestrial and aquatic environments within our lands but have always seen them as part of one, holistic system.

The Yorta Yorta lands include some very large wetland systems whose natural functions, survival and productivity depend entirely on regular flooding from the bigger rivers such as the Ovens, Goulburn, Murray and Edwards.

Unfortunately, as has been well documented, the aquatic environments within the Yorta Yorta lands have been just as modified as the terrestrial environments.

The major changes to the natural water regime have been as follows:

- significant reductions in the frequency, extent and length of floods, resulting in far fewer wetlands being flooded than formerly
- fundamental shifts in the timing of flooding from late winter and spring (as a consequence of winter rainfall and snow melt) to summer and autumn (as a consequence of controlled releases from dams for irrigation)
- the artificial creation of permanent wetlands from what were once intermittent wetlands because of summer releases of excess water
- changes in the temperature regime of regulated rivers, because of releases of cold water from storage dams
- massive increases in nutrient and sediment runoff as a consequence of agriculture and vegetation clearance throughout the catchment



- the creation of barriers across most of the major waterways, so preventing the movement of instream wildlife
- the removal of thousands of logs from the streams to 'facilitate' stream flow in time of flood
- the introduction of exotic species of fish.

From these issues YYNAC would like to have the opportunity to develop a cultural flow that will complement the current water management process and have input to the current water flows that goes through Country.

8.4 Having regard to Aboriginal water values and uses

Traditional Owners have cultural, spiritual and economic connections to land, water and resources through their associations and relationship with Country. They have managed land and water sustainably over thousands of generations but historically Aboriginal connections and rights to water have not been an influencing factor in the development of Victorian water policy.

The environmental and consumptive uses of water are relatively well understood as water resource planning concepts; however, Aboriginal values and uses of water are not as well understood by Government.

Aboriginal water values and uses are discussed further in the individual Traditional Owner contributions.

8.4.1 Assessing risk to Aboriginal values and uses – a precautionary approach

While Aboriginal values and uses of water encompass a wide range of cultural and environmental benefits, Victoria's Water Resource Plan Risk Assessment grouped these benefits together as 'Aboriginal Water' as the limited information did not support risks to be assessed differently for each sub-group of Aboriginal use.

Aboriginal Water is an emerging term to describe the full range of Aboriginal interests and aspirations in water. It encompasses 'Aboriginal environmental and cultural outcomes' and 'cultural flows' including entitlements and identifies improvements in environmental outcomes, and economic benefits for Aboriginal communities.

Due to the historical exclusion of Traditional Owners in water ownership and management, a number of very high risks to the availability and condition or quality of surface water to support Aboriginal beneficial uses have been identified in the Northern Victoria Water Resource Plan Risk Assessment (see [Chapter 5](#) and [Appendix B](#)).

8.4.1.1 High and very high risks to the availability and condition of water to support Aboriginal water values and uses

Several high and very high risks were identified in respect of the condition and availability of water to support Aboriginal water values and uses. These risks are identified in [Table 8-24](#).

Table 8-24: Risks to availability and condition of water to support Aboriginal water values and uses

Risk	Availability of water	Condition of water
Surface Water		
Very High	climate change government failure to proceed with strategies and programs for improved management of land use practices	climate change government failure to proceed with strategies and programs for improved management of land use practices
High	extreme drought bushfire farm dams.	extreme drought farm dams extreme wet bushfire land use change non-compliance with the Victorian Water Act earth resources development pest and weeds
Medium	extreme wet land use change increased utilisation of entitlements non-compliance with the Victorian Water Act major asset failure	increased utilisation of (existing) entitlements flooding and overbank inundation point source discharge major asset failure
Groundwater		
Very High	climate change.	N/A
High	earth resources development	earth resources development
medium	extreme drought bushfires land use change farm dams increased utilisation of water access rights increase in the number of entitlements leading to increased take	N/A

Continued availability of water relates to the ability for Aboriginal communities to access water either at a particular time or in a particular volume. Therefore, the above identified causes or impacts on continued availability may change the seasonality of water (i.e. when it is available) or the volume of water available in the system for all users.

Condition of water primarily relates to water quality. Water quality is assessed in terms of whether the water is fit for purpose.

These risks are outlined in more detail in [Appendix B](#).

Increases in earth extraction industries were seen to pose a threat to groundwater quality.

The risks to Aboriginal water use were rated as very high to medium in recognition of the very limited information available to determine how Aboriginal water uses might be affected by the changes in the water resource. For example, Aboriginal water use may be affected by salinity, pathogens or changes in surface water seasonality, but there was not sufficient information available on which to base this relationship.

Impacts on meeting environmental watering requirements and maintaining priority environmental assets are also recognised as risks to Aboriginal water values and uses. These risk ratings are largely due to the lack of understanding and formal recognition of how Aboriginal organisations and individuals may wish to use water and the volume required for those uses.

Therefore, Aboriginal water use is assumed to have a medium to very high sensitivity to any changes to surface or groundwater.

8.4.2 Strategies to address risk to Aboriginal water

The Basin Plan requires all medium to high risks to have strategies developed to address them. There are dozens of strategies cited to address risks to Aboriginal values and uses. This is because addressing the cause of the risk – for instance, climate change or non-compliance – has its own set of strategies to deliver improved management of water resources including Aboriginal values and uses.

Risks related to Aboriginal values and uses, and the strategies to address them are contained in **Appendix B** in **Table 3.2.17** to **Table 3.2.28** for the Northern Victoria water resource plan area **Table 3.4.17** to **Table 3.4.26** for the Victorian Murray water resource plan area and **Table 3.3.5** to **Table 3.3.14** for the Goulburn-Murray water resource plan area.

Table 4.2.1 contains an explanation of the strategies identified to address these risks.

As knowledge is shared between the water sector and Aboriginal communities, more targeted strategies can be developed to further lower or mitigate risks to the availability and condition of water for Aboriginal values and uses.

The core strategy for addressing risks to Aboriginal values and uses is Strategy 31 – recognising and managing for Aboriginal values. This strategy is cited for every risk associated with Aboriginal values and uses. Strategy 31 is a reconfirmation of Chapter 6 of *Water for Victoria* recognising and managing for Aboriginal values and the four actions contained within that chapter. The development of Victoria's Aboriginal water policy is discussed below. Under the Basin Plan, the Basin states are required to report annually on the effectiveness of the management of risks to Basin water resources.

Upon accreditation of the Northern Victoria Water Resource Plan, the Victorian Government and its agencies are obliged to report annually on compliance or progress with the water resource plan, including strategies to mitigate risk (section 10.43). The MDBA has a role in enforcing compliance with accredited water resource plans across the Basin. Victoria has committed to review the content of the Northern Victoria Water Resource Plan upon any change of policy or statutory instrument to determine whether it is consistent with Victoria's approach to water resource management. If the change of policy or legislation requires amendment to the water resource plan, Victoria is required to undertake consultation regarding the proposed amendment and provide reasons to the MDBA regarding the need for the amendment. These commitments are outlined in **Chapter 1**.

8.4.3 Identifying opportunities to strengthen protection of Aboriginal water values and uses: Victoria's Aboriginal Water Program

Throughout 2015 and 2016, the Victorian Government worked with Traditional Owners and Aboriginal communities to develop a new Aboriginal water policy which became a cornerstone of the *Water for Victoria* policy paper released in October 2016. The policy was developed in partnership with Traditional Owners through a specially formed Aboriginal Reference Group, extensive consultation under the Victorian Water Plan Aboriginal Reference Group, and supplementary commentary from community sessions and submissions over an 18-month period. The aims were to ensure greater Aboriginal inclusion in decision-making, and to incorporate Aboriginal values and uses of water into the State's water management and planning framework.

The Aboriginal water policy sought to redress the very limited opportunity Traditional Owners had previously had to be involved in water planning and management decision-making. It included a \$4.7 million investment to help identify Aboriginal water objectives, and a further \$5 million to work in partnership with Traditional Owners and Aboriginal Victorians to develop a roadmap for access to water for economic development. The Victorian Government committed to identify seed funding and business finance opportunities to support Aboriginal enterprises investing in water.

The Victorian Aboriginal water policy provides a framework to support the preparation and implementation of water resource plans that meet the requirements of the Basin Plan (Chapter 10, Part 14). It provides three broad strategies for addressing risks as identified in the Risk Assessment ([Appendix B](#)). These are for the Victorian Government to:

- recognise Aboriginal values and objectives
- incorporate Aboriginal values and traditional ecological knowledge in Victorian water management and planning and
- work with Traditional Owners and Aboriginal Victorians to build capacity to increase Aboriginal participation in water management.

Water for Victoria directs an ongoing partnership approach between Traditional Owners and Victorian Government water managers to:

- support Aboriginal participation in Victorian water planning and management frameworks through collaborative structures that address the rights and interests of Victoria's Traditional Owners
- increase capacity for shared benefits to realise Aboriginal water outcomes through working with Water Corporations, CMAs and the VEWH
- build capacity to increase Aboriginal participation in water management.

The above objectives and outcomes reflect the actions identified in Chapter 6 of *Water for Victoria* and are reflected in the accredited text below. Objectives and outcomes identified by each Traditional Owner group are included in [Section 8.3](#).

**Basin Plans
s10.52(1)(a)**

1. For the purposes of section 10.52(1)(a) of the Basin Plan, the following objective of Indigenous people are identified in relation to managing the water resources of Victoria's North and Murray water resource plan area:
 - a. to develop respectful partnerships between Traditional Owners, Aboriginal Victorians and the Victorian Government to:
 - b. recognise Aboriginal values and objectives of water in Victorian water management, policy and planning
 - c. include Aboriginal values and traditional ecological knowledge in Victorian water management, policy and planning
 - d. facilitate Aboriginal access to water for economic development in Victorian water management, policy and planning
 - e. build capacity for Aboriginal participation in Victorian water management, policy development and planning.
2. The specific objectives for Traditional Owners represented by the Barapa Barapa Nation are identified in Column 1 of **Table 8-1** and Column 2 of **Table 8-3** of Victoria's North and Murray Comprehensive Report.
3. The specific objectives for Traditional Owners represented by the Dhudhuroa, Waywurru and Yaitmathang Nations are identified in Column 1 of **Table 1.6.1 of Appendix F** to Victoria's North and Murray Comprehensive Report.
4. The specific objectives for Traditional Owners represented by the Dja Dja Wurrung Nation are identified in **Table 8-4** and Column 1 of **Table 8-6** of Victoria's North and Murray Comprehensive Report.
5. The specific objectives for Traditional Owners represented by the of Nyeri Nyeri, Ngintait and Latji Latji Nation are identified in Column 1 of **Table 8-7** of Victoria's North and Murray Comprehensive Report.
6. The specific objectives for Traditional Owners represented by the Tati Tati Wadi Wadi Nation are identified in Column 1 of **Table 8-8** of Victoria's North and Murray Comprehensive Report.
7. The specific objectives for Traditional Owners represented by the Taungurung Nation are identified in Column 1 of **Table 8-10** of Victoria's North and Murray Comprehensive Report.
8. The specific objectives for Traditional Owners represented by the Wadi Wadi Nation are identified in **Table 8-16** of Victoria's North and Murray Comprehensive Report.
9. The specific objectives for Traditional Owners represented by the Wamba Wemba Nation are identified in Column 1 of **Table 8-19** of Victoria's North and Murray Comprehensive Report.
10. The specific objectives for Traditional Owners represented by the Weki Weki Nation are identified in Column 1 of **Table 8-21** of Victoria's North and Murray Comprehensive Report.
11. The specific objectives for Traditional Owners represented by the Yorta Yorta Nation are identified in Column 1 of **Table 8-23** of Victoria's North and Murray Comprehensive Report.

<<end of accredited text for s10.52(1)(a) of the Basin Plan>>

**Basin Plan
s10.52(1)(b)**

1. For the purposes of section 10.52(1)(b) of the Basin Plan the following outcomes for the management of water resources of the Northern Victoria Basin Resources water resource plan area that are desired by Indigenous people are identified:
 - a. to partner with the water sector to make sure that the legislated objectives of the Victorian Environmental Water Holder consider identified Aboriginal water-related environmental outcomes
 - b. to incorporate traditional and ecological knowledge into water planning and management using Aboriginal Waterway Assessments and other tools developed by Traditional Owners
 - c. to achieve shared benefits in water resources
 - d. to be notified by water corporations when opportunities to access water entitlements arise
 - e. Sustainable Water Strategies to be prepared considering opportunities for access to water for economic development for Aboriginal Victorians.
2. The specific outcomes for Traditional Owners represented by the Barapa Barapa Nation are identified in Column 2 of **Table 8-1** of Victoria's North and Murray Comprehensive Report.
3. The specific outcomes for Traditional Owners represented by the Dhudhuroa, Waywurru and Yaitmathang Nations are identified in Column 2 of **Table 1.6.1 of Appendix F** to Victoria's North and Murray Comprehensive Report.
4. The specific outcomes for Traditional Owners represented by the Dja Dja Wurrung Nation are identified in **Table 8-5** and Column 2 of **Table 8-6** of Victoria's North and Murray Comprehensive Report.
5. The specific outcomes for Traditional Owners represented by the of Nyeri Nyeri, Ngintait and Latji Latji Nation are identified in Column 2 of **Table 8-7** of Victoria's North and Murray Comprehensive Report.
6. The specific outcomes for Traditional Owners represented by the Tati Tati Wadi Wadi Nation are identified in Column 2 of **Table 8-8** of Victoria's North and Murray Comprehensive Report.
7. The specific outcomes for Traditional Owners represented by the Taungurung Nation are identified in Column 2 of **Table 8-10** of Victoria's North and Murray Comprehensive Report.
8. The specific outcomes for Traditional Owners represented by the Wadi Wadi Nation are identified in **Table 8-17** of Victoria's North and Murray Comprehensive Report.
9. The specific outcomes for Traditional Owners represented by the Wamba Wemba Nation are identified in Column 2 of **Table 8-19** of Victoria's North and Murray Comprehensive Report.
10. The specific outcomes for Traditional Owners represented by the Weki Weki Nation are identified in Column 2 of **Table 8-21** of Victoria's North and Murray Comprehensive Report.
11. The specific outcomes for Traditional Owners represented by the Yorta Yorta Nation are identified in Column 2 of **Table 8-23** of Victoria's North and Murray Comprehensive Report.

<<end of accredited text for s10.52(1)(b) of the Basin Plan>>

Section 10.52(3) of the Basin Plan also provides that opportunities to strengthen the protection of Aboriginal values and uses within the water resource plan area may be identified.

**Basin Plan
s10.52(3)**

1. Opportunities to strengthen the protection of Aboriginal values and uses of water within Victoria's North and Murray water resource plan area include:
 - a. legislative changes to improve the ways that Traditional Owners and Aboriginal Victorians are engaged in water management and planning, and to improve incorporation of traditional ecological knowledge and Aboriginal water objectives and outcomes in decision making.
 - b. further engagement on the National Cultural Flows Research Project (released 2018) to identify opportunities to progress understanding of, and respond to, cultural flows in Victoria.
 - c. increased awareness of section 8A rights under the *Water Act 1989* (Vic) and to increase the capacity of relevant Traditional Owner groups to access these rights in the future.
 - d. implementation of Aboriginal Participation Guidelines for catchment management authorities, which describe key principles and actions to support Aboriginal participation and inclusion.
 - e. creation of several Aboriginal water officer positions during the development of this water resource plan and seeking funding to ensure these positions continue to progress the identification and implementation of values, uses, objectives and outcomes identified in this plan.
 - f. continued implementation of the Water for Victoria Aboriginal Water Policy, as recommitted via the risk strategies and measures in this plan, to provide opportunities for further identification and protection of Aboriginal water values and uses in Victoria's North and Murray water resource plan area and to minimise or mitigate the high risks identified as much as practicable.

<<end of accredited text for s10.52(3) of the Basin Plan>>

Note: for accreditation purposes the Plan is titled Victoria's North and Murray Water Resource Plan.

8.4.4 Building capacity and understanding of values and uses

At the request of Traditional Owner groups seeking to expand their capacity to contribute to Victoria's water management and planning framework, DELWP has funded and supported a number of projects and positions to help build understanding of Aboriginal water needs in the Northern Victoria Water Resource Plan.

Initial funding carries through to 2019 to continue to build individual Traditional Owner group objectives and aspirations and help to determine how Government can best respond. This approach recognises that water resource planning and Traditional Owner timelines do not always align. Following the expenditure of the initial funding, DELWP will evaluate the success of the projects and consider the best opportunities to continue building capacity of Traditional Owner groups.

8.4.4.1 Aboriginal Waterway Assessments

At the outset of the water resource plan process, Victoria committed to fund six Aboriginal Waterway Assessments (AWAs) in Victoria's share of the Basin, undertaken by MLDRIN in partnership with Traditional Owners, CMAs and other agencies, according to the requirements of each individual group.



The AWA program was established to consistently measure and prioritise river and wetland health through a cultural lens, so that Traditional Owner and Aboriginal Victorians can more effectively participate in water planning and management in the Basin (MDBA, 2016). MLDRIN and Northern Basin Aboriginal Nations (NBAN) authorised the design and implementation of the AWA project. The MDBA's report on an AWA pilot program in 2015 identified the following three key components of the AWA:

- place status – a statement of whether or not the place is an area of cultural significance and whether local Traditional Owners would return to the place in the future
- current use of the place – a measure of the value of a river or wetland to Aboriginal people based on whether food and other resources are available and suitable for cultural use
- cultural stream health – a measure made up of eight stream health indicators such as vegetation, riverbed condition and water quality.

The AWAs are the property of Traditional Owner groups, to choose how they use the reports compiled by MLDRIN, and how, when or if they wish to share information.

Six AWAs were funded in 2016 by DELWP and co-ordinated by MLDRIN in the Victorian section of the Murray-Darling Basin over an 18-month period. Five of the six AWAs that were completed were undertaken within the Area for the Northern Victoria Water Resource Plan for the following groups: the Barapa Barapa Water for Country Steering Committee, Dja Dja Wurrung Clans Aboriginal Corporation, Tati Tati Wadi Wadi Traditional Owners, Taungurung Land and Waters Council and the First Peoples of the Milewa-Mallee. The Dhudhuroa Waywurru Nations Aboriginal Corporation received separate funding to undertake an AWA most recently in February 2019.

8.5 Acknowledging existing legislative rights

Basin Plan requirements stipulate that a water resource plan must provide at least the same level of protection of Indigenous values and uses as existed before the Basin Plan (Section 10.55 of the Basin Plan). In determining whether the same level of protection exists since the commencement of the Basin Plan a review of existing arrangements in 2012 and any amendments to those arrangements since that time was undertaken. This section outlines these existing legislative and policy tools and arrangements.

It was determined that there was no lessening of protections since the commencement of Basin Plan. While legislative protections have not changed since 2012, Victoria has introduced new Aboriginal Water Policy under Water for Victoria which seeks to improve understanding of Aboriginal values and uses in water and build capacity of Traditional Owners to participate in water resource management (see [Section 8.3.3](#) above).

Basin Plan s10.55

Victoria's North and Murray Water Resource Plan provides the same level of protection as provided in transitional water resource plans for the Victorian Murray, Northern Victoria and Goulburn-Murray water resource plan areas as it does not operate to limit any right to take water that may be available under section 8A of the *Water Act 1989* (Vic).

<<end of accredited text for s10.55 of the Basin Plan>>

Note: for accreditation purposes the Plan is titled Victoria's North and Murray Water Resource Plan.

8.5.1 Native Title Act 1993 (Cth)

Native title is a recognition under Australian law that some Aboriginal and Torres Strait Islander people hold rights and interests in land and water where they continue to practice traditional laws and customs. These principles are contained in the Commonwealth *Native Title Act 1993*. The characteristics of Native Title vary for each group, deriving from traditional laws and customs of the relevant group. The manner in which Native Title is recognised will depend on

what is claimed and what is negotiated between all of the people and organisations with an interest in the area.

The *Native Title Act 1993* does not provide for a right to negotiate over water.

8.5.2 Traditional Owner Settlement Act 2010

The *Victorian Traditional Owner Settlement Act 2010* allows the Victorian Government and Traditional Owner groups to make agreements that recognise Traditional Owners' relationship to land and to provide them with certain rights on Crown land.

Under this Act, a settlement package can include:

- a Recognition and Settlement Agreement to recognise a Traditional Owner group and certain Traditional Owner rights over Crown land
- a Land Agreement which provides for grants of land in freehold title for cultural or economic purposes, or as Aboriginal title to be jointly managed in partnership with the state
- a Land Use Activity Agreement which allows Traditional Owners to comment on or consent to certain activities on public land
- a Funding Agreement to enable Traditional Owner corporations to manage their obligations and undertake economic development activities
- a Natural Resource Agreement to recognise Traditional Owners' rights to take and use specific natural resources and provide input into the management of land and natural resources

8.5.3 Victorian Aboriginal Heritage Act 2006

Under the *Victorian Aboriginal Heritage Act 2006*, Aboriginal people are recognised as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage.

Registered Aboriginal Parties (RAPs) have responsibilities under the Act relating to the management of Aboriginal cultural heritage. While many cultural heritage sites are near water, the Act does not prescribe how water near or on culturally significant sites is to be managed.

The Department of Justice and Regulation has provided advice on the existing claims under the *Native Title Act 1993* (Cth), the *Traditional Owner Settlement Act 2010* (Vic) and the *Aboriginal Heritage Act 2006* (Vic). This information is outlined in **Figure 8-15** and is current as at February 2019.

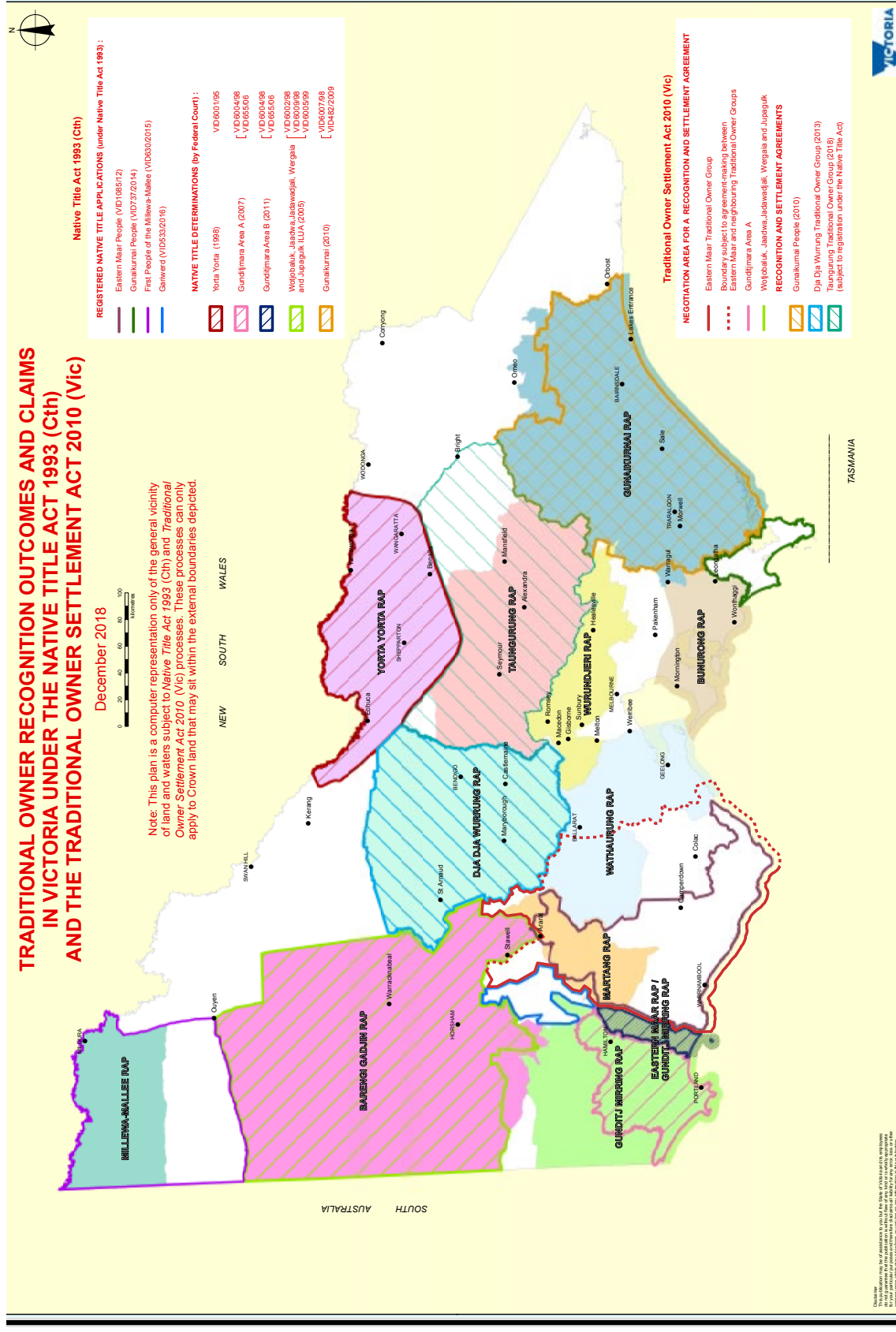


Figure 8-15: Traditional Owner recognition outcomes and claims in Victoria

Figure current at February 2019 and provided by the Victorian Department of Justice and Community Safety.

8.5.4 Statutory rights to access water

Some limited recognition of Aboriginal rights to access water was introduced into the *Victorian Water Act in 2013* for Traditional Owners who have a natural resource agreement under Part 6 of the *Traditional Owner Settlement Act 2010*.

The *Victorian Water Act 1989* provides that members of a Traditional Owner group bound by a land use activity agreement under the *Traditional Owner Settlement Act 2010* have the right under Section 8A to take and use water.

8A Traditional owner agreement for natural resources

If a Traditional Owner group entity has an agreement under Part 6 of the Traditional Owner Settlement Act 2010, a person who is a member of a Traditional Owner group bound by the agreement has the right to take and use water on the land that is subject to the agreement:

- a. *in accordance with the agreement; and*
- b. *if the water is to be taken from a place from which water may be taken under section 8(1)*
- c. *Section 8A expressly states that this right is to “use water on the land that is subject to the agreement”.*

This leaves agreements being able to authorise water to be taken and used for traditional purposes, as per the definition in section 79 of the *Traditional Owner Settlement Act 2010*. The volumes of water that could be taken are those needed for traditional purposes. There are two types of uses for traditional purposes under section 79 of the *Traditional Owner Settlement Act*:

- a. *any personal or domestic needs of members of the Traditional Owner group*

This is effectively the same as domestic uses (part of domestic and stock uses) under the Victorian Water Act 1989:

1. *The rights of a Traditional Owner group with a natural resource agreement on land owned by a member of the group to take water and use it would be the same as the domestic and stock rights under section 8 of the Victorian Water Act. This would include irrigation of a kitchen garden and watering of stock. In this respect, section 8A of the Victorian Water Act does not add anything to rights the land owner already has under section 8 of the Act*
2. *the rights of a Traditional Owner group with a natural resource agreement on Crown land would be limited by the nature of the land and the uses to which it may be put under the Traditional Owner agreement*

- b. *any non-commercial communal needs of the members of the Traditional Owner group*

This could include, for example, redesigning parts of a waterway or building fish or eel traps. Section 82 *Traditional Owner Settlement Act 2010* allows “interference” with a “natural resource” which includes stone and gravel. It also allows diverting water to generate food produce for the Traditional Owner group to eat but not sell.

8.6 Cultural flows

Cultural flows are distinct from 'Aboriginal environmental outcomes', a term which may be used to describe outcomes chosen by Aboriginal people to achieve cultural benefits from environmental water delivery.

MLDRIN has developed the following definition of cultural flows, which is recognised in the Murray-Darling Basin Plan:

"Cultural flows are water entitlements that are legally and beneficially owned by the Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, natural, environmental, social and economic conditions of those Nations. These are our inherent rights."

MLDRIN Echuca Declaration, 2007

As water entitlements, cultural flows may have a commercial benefit where any revenue accrued goes to Aboriginal people, or they may be used for customary practices, environmental outcomes or personal use.

Ownership of water by Aboriginal people can bring many benefits, including:

- improved self-esteem and empowerment as a result of being able to care for Country
- improvements to health and wellbeing through being able to see Country in a healthy state as a result of using cultural water
- potential economic returns

"As Traditional Owners, our community expectations are to use, develop and control water resources on and under our Country for economic purposes: to support and generate Aboriginal businesses that depend on water allocations; and to generate economic development opportunities through the trading of water resources on the market."

Federation of Victorian Traditional Owner Corporations Submission to Water for Victoria discussion paper, 2016

While Aboriginal environmental outcomes can occur as a result of healthier rivers and wetlands, and Victorian Catchment Management Authorities and the Victorian Environmental Water Holder are working to strengthen Traditional Owner and Aboriginal Victorian involvement, any shared benefits are still delivered via environmental water, not cultural flows.

In Victoria, there currently are no specific provisions for cultural flows as Traditional Owner-held water entitlements, although Victoria's water management framework's existing instruments and processes could be used to purchase temporary water or a water entitlement on the water market.

Traditional Owner groups consulted under Victoria's Water Resource Plans have each indicated a desire for cultural flows for surface water and groundwater.

The Northern Victoria Water Resource Plan has been developed in response to the section 10.54 requirement of the Basin Plan to have regard to the views of Traditional Owners on cultural flows. Views can be seen through individual Nation contributions.

The Northern Victoria Water Resource Plan acknowledges that Traditional Owners are seeking cultural flows and the conversation about these flows will continue as Victoria implements the Aboriginal Water Policy.

8.7 Consultation

The development of the Northern Victoria Water Resource Plan considered the views of the community and collaborated with Traditional Owners to meet the requirements of the Basin Plan.

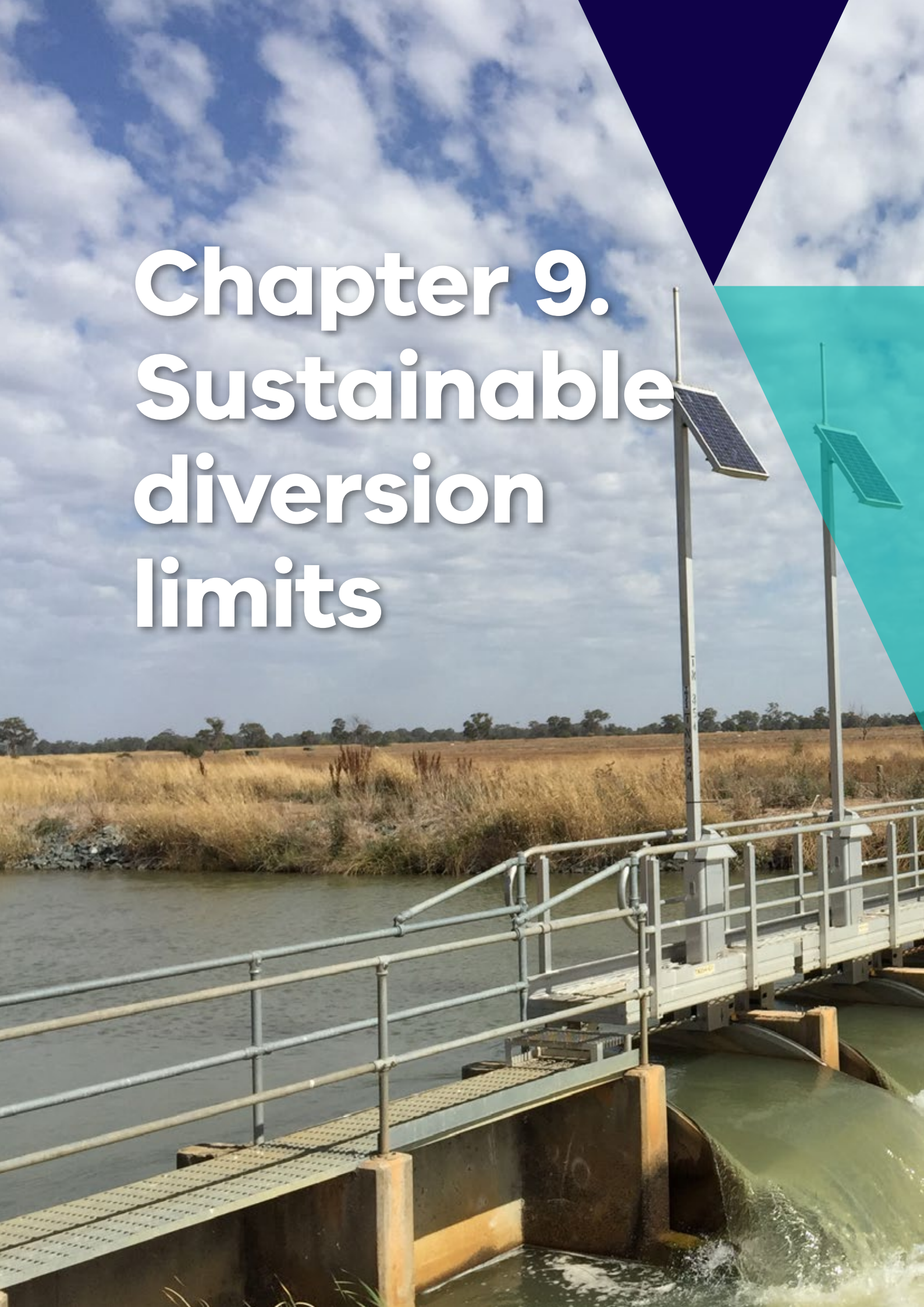
Engagement with Traditional Owners has been framed by the Aboriginal Water Policy announced in Water for Victoria. The policy is the foundation of Victoria's response to what Traditional Owners have said they want for water on Country in the Northern Victoria Water Resource Plan.

Engagement preferences of Traditional Owners in the area for the Northern Victoria Water Resource Plan are included in the individual Nation contribution.

More information on consultation of the Northern Victoria water resource plan is included in the Consultation Report ([Appendix D](#)).



Chapter 9. Sustainable diversion limits





9. Sustainable diversion limits

This Chapter outlines how Victoria will comply with sustainable diversion limits and meet requirements under Part 3 of Chapter 10 of the Basin Plan.

9.1 Basin Plan requirements

The aim of the Basin Plan is to better protect the environment through reducing how much water can be taken for consumption, while also promoting the sustainable use of water for communities, agriculture and industries.

To support this, the Basin Plan prescribed sustainable diversion limits (SDLs) as a maximum volume of water that can be taken from Basin resources for consumption. Water taken for the environment is not part of the SDL volumes.

Clause 5.05 of the Basin Plan states:

- *The objective in relation to long-term average sustainable diversion limits is to establish environmentally sustainable limits on the quantities of surface water and groundwater that can be taken for consumptive use from Basin water resources, having regard to social and economic impacts, and in doing so:*
 - *inform environmental water recovery measures, including water purchasing and infrastructure that improves water use efficiency; and*
 - *provide greater certainty for all water users, including in times of drought and low water availability; and*
 - *provide time for water access entitlement holders and communities to transition and adjust to long-term average sustainable diversion limits*
- *The outcomes in relation to the establishment of long-term average sustainable diversion limits are:*
 - *the restoration and protection of water-dependent ecosystems and ecosystem functions in the Murray-Darling Basin; and*
 - *well-informed water recovery measures, including water purchasing and infrastructure, enable a transition to long-term average sustainable diversion limits; and*
 - *greater certainty of access to Basin water resources; and*
 - *water access entitlement holders and communities of the Murray-Darling Basin are better adapted to reduced quantities of available water*

9.2 What are baseline diversion limits (BDLs) and sustainable diversion limits (SDLs)?

9.2.1 Cap reporting framework

The Murray–Darling Basin Ministerial Council introduced the Murray–Darling Basin Cap on surface water diversions in 1995 to protect and enhance the riverine environment and protect the rights of water users. The Cap introduced long-term limits on how much water could be taken from rivers in 24 designated river valleys in the Murray–Darling Basin.

The Cap also introduced a requirement that Basin States had to work out ways to turn the long-term limits into annual cap targets that take account of changes such as the weather conditions and water availability in each year.

Under the Cap, Basin states had to provide data to the Murray–Darling Basin Authority (MDBA) to show how much water was actually taken each year compared to the annual cap targets.

9.2.2 Basin Plan reporting framework

The Basin Plan introduced a new water accounting and compliance framework to replace the Cap. When the Basin Plan was being developed, estimates were made of the volume of water diverted from the Basin under the conditions and level of development that were present in 2009. These volumes, termed BDLs are the long-term average estimates of consumptive water use before the Basin Plan.

SDLs represent a maximum limit of water diverted from the Basin at an environmentally sustainable level.

The considerations for developing SDLs were:

- the baseline diversion limit, as in how much water was being extracted from river or groundwater systems for use at the time of the Basin Plan's development
- the volume of water that could be extracted from river or groundwater systems without serious adverse impacts on the Basin's environmental health
- how much water needed to stay in the Basin's river or groundwater systems so that the environment across the Basin could thrive

The MDBA assessed these considerations and identified that the sustainable level of extraction from all Basin resources was an average of 10,873 gigalitres (GL) of surface water and 3,324 GL of groundwater per year.

This total volume for the Basin was then divided into water resource plan areas for surface water and groundwater. Each Basin State is required to demonstrate how it will limit the volume of water permitted to be taken in a water resource plan area to comply with the SDL.

The water resource plan areas are further broken down into SDL resource units. In Victoria's North and Murray water resource plan area there are seven surface water SDL resource units and four groundwater SDL resource units. Further information on the water resource plan areas and SDL resource units relevant to Victoria's North and Murray Water Resource Plan can be found in [Chapter 4](#).

9.2.3 BDLs and SDLs for Victoria’s North and Murray Water Resource Plan

Surface water

Using the methods described in [Appendix C](#), Victoria has determined the BDLs, SDLs and long-term average permitted take for all surface water forms of take for the combined Victorian Murray water resource plan area as shown in [Table 9-1](#), and the combined Northern Victoria water resource plan area as shown in [Table 9-2](#). The combined volumes are shown here as they are the volumes that Victoria will determine whether there has been a non-compliance with SDLs. This is because section 6.12(2) of the Basin Plan allows for the Victorian Murray, Kiewa and Ovens SDL resource units to be treated as a single SDL resource unit and also for the Goulburn, Broken, Loddon and Campaspe SDL resource units to be treated as a single SDL resource unit. [Table 3](#) of [Appendix C](#) shows the BDLs and SDLs for each SDL resource unit.

The volumes determined for take from watercourses that are not regulated rivers (excluding basic rights) in row two of [Table 9-1](#) and [Table 9-2](#), are the volumes of take from unregulated rivers that have been estimated separately from the models, and are instead, based on average actual take data. These volumes have been provided in the interim until a two-year review is completed. The review is explained further in [Appendix C](#).

Groundwater

Victoria has not done independent modelling to determine the SDL for the Goulburn-Murray water resource plan area. Instead Victoria has adopted the baseline diversion limit and SDL figures prescribed in the Basin Plan for groundwater.

A summary of the Basin Plan groundwater management units in the Goulburn-Murray groundwater water resource plan area and the relationship with the BDLs and SDLs are shown in [Table 9-3](#).

Table 9-1: Long-term average surface water diversion limits in the combined Victorian Murray, Kiewa and Ovens SDL resource units according to the forms of take specified in the Basin Plan

Form of take – surface water	BDL (ML/year)	SDL (ML/year)	Long-term average permitted take (ML/year)
a. Take from regulated rivers (excluding basic rights) and; b. the modelled component of take from a watercourse (excluding basic rights)	1,831,671	BDL minus target recovery as at 30 June of the preceding water year ^a	equals the SDL of the relevant water year (under a repeat of historical climate conditions) ^a
Take from watercourses that are not regulated rivers (excluding take under basic rights) – out of model component	5,500 ^b	5,500 ^b	5,500 ^b
Take under basic rights including: a. Take from regulated rivers under basic rights b. Take from watercourses that are not regulated rivers under basic rights	12,016	12,016	12,016
Total take by runoff dams including:	45,614	45,614	45,614
a. <i>Take by runoff dams (excluding take under basic rights)</i>	21,880	21,880	21,880
b. <i>Take by runoff dams under basic rights</i>	23,734	23,734	23,734
Take by commercial plantations	63,941	63,941	63,941

^a target recovery is a long-term average annual volume and is determined by the volume of local and shared reduction amounts and offsets achieved through the Sustainable Diversion Limit Adjustment Mechanism – see [Appendix C](#) for further information

^b these volumes are subject to a two-year review as explained in [Part 3.1.3.2](#) and [Table 6](#) of [Appendix C](#)

Table 9-2: Long-term average surface water diversion limits in the combined Goulburn, Broken, Campaspe and Loddon SDL resource units according to the forms of take specified in the Basin Plan

Form of take – surface water	BDL (ML/year)	SDL (ML/year)	Long-term average permitted take (ML/year)
a. Take from regulated rivers (excluding basic rights) and; b. the modelled component of take from a watercourse (excluding basic rights)	1,980,556	BDL minus target recovery as at 30 June of the preceding water year ^a	equals the SDL of the relevant water year (under historical climate conditions) ^a
Take from watercourses that are not regulated rivers (excluding take under basic rights) – out of model component	31,000 ^b	31,000 ^b	31,000 ^b
Take under basic rights including: a. Take from regulated rivers under basic rights b. Take from watercourses that are not regulated rivers under basic rights	14,284	14,284	14,284
Total take by runoff dams including:	123,240	123,240	123,240
a. <i>Take by runoff dams (excluding take under basic rights)</i>	61,646	61,646	61,646
b. <i>Take by runoff dams under basic rights</i>	61,594	61,594	61,594
Take by commercial plantations	44,532	44,532	44,532

a target recovery is a long-term average annual volume and is determined by the volume of local and shared reduction amounts and offsets achieved through the Sustainable Diversion Limit Adjustment Mechanism – see [Appendix C](#) for further information

b these volumes are subject to a two-year review as explained in [Part 3.1.3.2](#) and [Table 6](#) of [Appendix C](#)

Table 9-3: Groundwater diversion limits in the Goulburn-Murray water resource plan area by SDL resource unit

SDL resource unit	Form of take	BDL ¹ (ML/year)	SDL ² (ML/year)	Long-term average permitted take (ML/year)
Goulburn-Murray: Shepparton Irrigation Region	Take from groundwater (excl. basic rights)	244,100	241,490	241,490
	Take from groundwater under basic rights		2,610	2,610
Goulburn-Murray: Highlands	Take from groundwater (excl. basic rights)	38,300	55,590	55,590
	Take from groundwater under basic rights		13,110	13,110
Goulburn-Murray: Sedimentary Plain	Take from groundwater (excl. basic rights)	203,500	211,454	211,454
	Take from groundwater under basic rights		11,546	11,546
Goulburn-Murray: deep	Take from groundwater (excl. basic rights)	0	20,000	20,000
	Take from groundwater under basic rights	0 [^]	0 [^]	0 [^]

1. estimates from column 3, Schedule 4 of the Basin Plan have been adopted

2. estimates from column 4, Schedule 4 of the Basin Plan have been adopted

[^] at the time of setting these estimates there was no take from the Goulburn-Murray: deep SDL resource unit under basic rights, this may be revised in the future

9.3 Complying with SDLs

SDLs come into effect from 1 July 2019 and will replace the Cap compliance reporting. At the end of each water accounting period, actual take is subtracted from the annual permitted take. The difference is recorded as either an annual debit or credit, as outlined in section 6.11 of the Basin Plan.

To remain compliant with SDLs, cumulative debit cannot be equal to or greater than 20 percent of the SDL (section 6.12 of the Basin Plan). The MDBA's role is to assess Basin states' compliance with SDLs and to take appropriate action for any non-compliances.

For the purposes of determining compliance with SDLs, section 6.12(2)(a) of the Basin Plan allows the combined limits for Victorian Murray, Kiewa and Ovens SDL resource units to be treated as a single SDL resource unit. Section 6.12(2)(b) of the Basin Plan also allows the combined limits for Goulburn, Broken, Campaspe and Loddon SDL resource units can be treated as a single SDL resource unit.

Victoria's obligation is to ensure that water taken does not exceed these limits:

- combined Victorian Murray sustainable diversion limit
- combined Northern Victoria sustainable diversion limit
- Goulburn-Murray groundwater sustainable diversion limit

Further information on this process and how MDBA and basin states will respond to non-compliance with SDLs can be found in Sustainable Diversion Limit Reporting and Compliance Framework – Summary (MDBA, 2018).

9.3.1 What is permitted take and actual take?

Permitted take is the maximum quantity of water permitted to be taken by each form of take for consumptive use from the SDL resource unit. The method used to determine permitted take must support compliance with the long-term SDLs.

Actual take is the volume of water taken from the system. This is assessed to make sure it does not exceed permitted take.

One of the key differences between the Cap reporting framework and the requirements under the Basin Plan is that reporting must be done for all forms of take. There are seven different forms of take identified in the Basin Plan:

- a. take from a watercourse
- b. take from a regulated river
- c. take by floodplain harvesting
- d. take by runoff dams
- e. net take by commercial plantations
- f. take from groundwater
- g. take under basic rights

All forms of take except take by floodplain harvesting apply to Victoria's North and Murray Water Resource Plan. An explanation of each form of take and the methods for determining annual permitted take and actual take are explained in [Appendix C](#) (see [Table 6](#) for surface water and [Table 11](#) for groundwater). [Table 9-4](#) provides a summary of how annual permitted take is determined and whether annual actual take is estimated or calculated. For surface water, a form of take may be determined by more than one method. For example, in the Victorian Murray, Ovens and Kiewa SDL resource units, take from a watercourse includes take from a regulated river and take from unregulated rivers. This has been determined in part by using hydrological

models, and, a small proportion is determined outside of the model using long-term average data.

For take under basic rights, the method estimates take from both a regulated river and unregulated rivers.

Table 9-4: Summary of how take is determined

Form of take	Method	
	Permitted take	Actual take
Surface water		
Take from a regulated river (excluding basic rights)	Determined using a water resource plan model with the modelled diversions scaled to match the BDL minus recovery included in the model and adjusted for environmental recovery and trade	Calculated using usage data on the Victorian Water Register
Take from a regulated river under basic rights and take from a watercourse under basic rights	Determined based on best available hydrological model information	Estimated based on best available hydrological model information
Take from a watercourse (excluding basic rights): (a) modelled component (b) out of model component	(a) Determined using a water resource plan model, adjusted for environmental recovery, trade, and offsets. (b) Determined as the long-term average take*	(a) Calculated using usage data on the Victorian Water Register (b) estimated as the long-term average take*
Take by runoff dams (excluding basic rights)	Determined based on entitlement data on the Victorian Water Register	Calculated based on entitlement data on the Victorian Water Register
Take by runoff dams under basic rights	Determined based on best available hydrological model information	Estimated based on best available hydrological model information
Net take by commercial plantations	Determined using the SoilFlux model	Estimated using the SoilFlux model
Groundwater		
Take from groundwater (excluding basic rights)	Determined by the relevant SDL	Calculated and estimated using entitlement data on the Victorian Water Register
Take from groundwater (basic rights)	Determined based on best available water user information	Estimated based on best available water user information

*interim method subject to a two-year review, see [Appendix C](#) for further information

9.3.2 Annual determinations of permitted take

Under section 10.10 of the Basin Plan, Victoria's North and Murray Water Resource Plan is required to set out the method for determining permitted take for each form of take in each water resource plan area. Section 10.12 of the Basin Plan outlines the matters that must be taken into account when developing the method.

Section 6.10 of the Basin Plan specifies that permitted take is the maximum quantity of water allowed to be taken by each form of take for consumptive use from the SDL resource unit in each water accounting period.

Victoria's approach is:

- for surface water
 - permitted take from regulated rivers (excluding basic rights) and the modelled component of take from a watercourse (excluding basic rights) assumes utilisation rates of allocated volumes as limited by State water management law as at 30 June 2009,
 - permitted take from watercourses (excluding basic rights) out of model component and the actual take is equal to long-term average take until this method is reviewed (see [Appendix C, Section 3.1.3.2](#))
 - for all other forms of take permitted take equates to the sustainable diversion limit; and
- for groundwater, permitted take equates to the sustainable diversion limit for each groundwater SDL resource unit

Actual take is the water diverted or taken by water users from the resource or system to be stored or used (see [Chapter 15](#) for more information on measuring actual take).

9.3.2.1 Surface water

The determination of permitted take in the Northern Victoria water resource plan area and the Victorian Murray water resource plan area varies depending on the form of take. These methods are based on the best available information for the relevant form of take and are set out in [Table 6](#) of [Appendix C](#).

The Victorian Water Register provides the most accurate and up-to-date information regarding water taken by entitlement holders in Victoria. It records the volume of water the entitlement holder is permitted to take during an accounting period and the volume of water actually taken against the entitlement (see [Chapter 15](#)).

Where the volume of take is estimated, the estimates are based on the best available data and latest models available. For example, the best available data includes the most recent aerial photographs for farm dams and the latest models available for determining commercial plantation interception. For more information on the best available information for each method, see [Table 6](#) of [Appendix C](#).

9.3.2.2 Groundwater

The determination of permitted take in the Goulburn-Murray water resource plan area varies depending on the form of take. [Table 11](#) of [Appendix C](#) outlines the methods used for determining permitted take for each form of take in the Goulburn-Murray water resource plan area.

These methods are based on the best available information for the relevant form of take. The Victorian Water Register provides the most accurate and up-to-date information regarding water taken by entitlement holders in Victoria. It records the volume of water the entitlement holder is permitted to take during an accounting period and the volume of water actually taken against the entitlement.

Where the volume of take is estimated, the estimates are based on the best available data. For example, the best available data includes bore construction information for domestic and stock use of groundwater.

For more information on the best available information for each method, see the Methods Report at [Table 11](#) of [Appendix C](#).

9.3.2.3 Accounting for water availability

Section 10.10(2) of the Basin Plan requires the method be applied after the end of the relevant water accounting period, having regard to the water resources available during that period.

In respect of take from a regulated river excluding basic rights and the modelled component for take from a watercourse (excluding basic rights), the impact of water availability is managed in practice on a monthly basis throughout the accounting period. Water available during the period is accounted for in the models used in the method for determining permitted take. The models are updated at the end of the water accounting period, based on seasonal conditions in the preceding period and the same allocation rules as detailed in [Section 3.3](#) of the Methods Report (see [Appendix C](#)).

For take from watercourses that are not regulated rivers (excluding take under basic rights) the interim method is based on long-term diversions until a review of the method is completed (see [Appendix C](#), [Section 3.1.3.2](#)). Annual actual take in this circumstance reflects any measures that respond to water availability as outlined in [Section 7.2.2.5](#) or water shortages during extreme dry periods as outlined in [Chapter 10](#).

There are no mechanisms to allocate or restrict take on an annual basis for all other forms of take. The estimates are based on long-term averages and the permitted take method does not account for water availability on an annual basis.

9.3.3 Ensuring actual take does not exceed permitted take

[Chapter 6](#) of this report explains the rules that govern the volume of water that can be taken from Victoria's North and Murray water systems. As discussed in [Chapter 6](#), certainty of entitlements is fundamental to Victoria's water management framework.

This certainty is provided in two distinct ways:

- limiting the ability to take and use water to those with express authorisation
- requiring the allocation of water in a system to be subject to considerations of the impact on other users, including the environment

The method for determining permitted take outlined in [Appendix C](#) for take from a regulated river (excluding basic rights) and the modelled component of take from a watercourse (excluding basic rights) incorporates the rules used in making seasonal determinations. Seasonal determinations allocate water to entitlement holders based on water availability, which is subject to climatic variability.

For all other forms of surface water take the current level authorised for consumptive use aligns with the sustainable diversion limit.

For groundwater the current level of entitlements is below the SDL. The management of allocation or actual take underneath the primary entitlement only occurs to respond to water availability in accordance with the methods identified in [Appendix C](#).

Managing access to water to make sure that actual take does not exceed permitted take is essentially done through limiting the authorisation to take water. As outlined above in [Chapter 6](#),

the Minister authorises the take and use of water through entitlements issued under the Victorian Water Act.

These entitlements are subject to terms and conditions which include:

- the maximum volume that may be taken
- the time, place and rate at which water may be taken
- limitations on the take under the maximum volume by way of allocations or restrictions imposed to respond to water availability during the accounting period

The rules relating to allocations or restrictions are included in the methods for determining permitted take. The issuing of entitlements, amendment of entitlements and exercise of powers to restrict authorisations during the accounting period are a core component of the power of the Minister, or his or her delegates, to authorise the take and use of water.

To make sure that authorisations to take water under the Victorian Water Act do not cause actual take to exceed permitted take, the Minister, and his or her delegates, are subject to the following obligations in relation to the issue of new entitlements or determining allocation or restrictions on existing entitlements in the Northern Victoria water resource plan area.

**Basin Plan
s10.11(1)**

1. From 1 July 2019:
 - a. the Minister must not amend or issue new entitlements to take water or apply restrictions to entitlements; and
 - b. an appointed water corporation must not make an allocation to entitlement holders in a declared system under section 64GB of the *Water Act 1989* (Vic) in respect of authorising take from a water resource in Victoria's North and Murray water resource plan area, if to do so would cause actual take to exceed permitted take for the relevant SDL resource unit.
2. The Department must monitor annual actual take against annual permitted take to determine whether on an annual basis, or for groundwater SDL resource units from 30 June 2028 on an average basis, annual actual take is exceeding annual permitted take.
3. For surface water SDL resource units, and groundwater SDL resource units up to 30 June 2028, if the Department identifies the cumulative balance of the difference between actual take and permitted take exceeds the sustainable diversion limits in the amount of 15% or more of the relevant sustainable diversion limit the Department must investigate the cause of the exceedance for the relevant SDL resource unit.
4. For groundwater SDL resource units after 30 June 2028, if the Department identifies the average annual take over the 10-year period ending with that water accounting period exceeds the average annual permitted take over the 10-year period, the Department must investigate the case of the exceedance for the relevant SDL resource unit.
5. If it is determined that authorisation to take water needs to be adjusted to support meeting sustainable diversion limits:
 - a. the Minister must determine whether restrictions must be applied to take and use licences; or
 - b. the appointed water corporation must determine whether adjustments must be made to future allocations under section 33AC of the *Water Act 1989* (Vic) in

consultation with entitlement holders as per the requirements under the *Water Act 1989* (Vic).

6. References to sections of the *Water Act 1989* (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only.

“appointed water corporation” means a water corporation appointed under section 64GA of the *Water Act 1989* (Vic);

Note 1: The response to section 10.08(2) of the Basin Plan, requiring the holder of a water access right to comply with the conditions specified in the water access right instrument supports the above obligation to ensure, as far as practical that actual take does not exceed annual permitted take.

Note 2: The response to section 10.13 of Basin Plan in respect of other forms of take.

<<end of accredited text for s10.11(1) of the Basin Plan>>

This obligation is included in Victoria’s North and Murray Water Resource Plan to provide assurance that no new entitlement will be issued, and no entitlement will be amended in the water resource plan area if that would result in authorised take in Victoria exceeding the permitted take and therefore cause Victoria to exceed the SDLs.

The obligation requires that the exercise of powers to adjust authorisations to respond to water availability must consider the impact on permitted take. The above obligation is enforceable under the Commonwealth Water Act by the MDBA.

9.3.4 Non-compliance with SDLs

Actual take is unlikely to exceed permitted take from a regulated river (excluding basic rights) in the long-term unless there is growth in use (i.e. an increase in the rate of utilisation of allocations across the combined SDL resource units). In such a case, corrective actions will be investigated as outlined in [Appendix C, Table 8](#), Item (g). The corrective action will be informed by the reason the SDL was exceeded. For this reason, Victoria will not pre-emptively propose corrective actions to be included in Victoria’s North and Murray Water Resource Plan to address SDL non-compliance.

9.4 Limits on certain forms of take

Section 10.13(1) of the Basin Plan states that a water resource plan must require that the long-term annual average quantity of water that can be taken from a surface water SDL resource unit for consumptive use by:

- take under basic rights
- take by runoff dams
- net take by commercial plantations

does not exceed the level specified in column 2 of Schedule 3 of the Basin Plan for the form of take.

**Basin Plans
10.13(1)**

1. For the purposes of responses to Part 3 of Chapter 10 of the Basin Plan in Victoria's North and Murray Water Resource Plan the relevant SDL resource units are the:
 - a. combined Victorian Murray SDL Resource Unit which includes Victorian Murray, Kiewa and Ovens;
 - b. combined Northern Victoria SDL Resource Unit which includes, Goulburn, Broken, Campaspe and Loddon.
2. The long term annual average quantity of water in the:
 - a. combined Victorian Murray SDL Resource Unit that can be taken for consumptive use for the forms of take listed at section 10.13(1) of the Basin Plan is the level specified in items 17-19 of Column 2 of Schedule 3 to the Basin Plan;
 - b. combined Northern Victoria SDL Resource Unit that can be taken for consumptive use for the forms of take listed at section 10.13(1) of the Basin Plan is the level specified in items 20-23 of Column 2 of Schedule 3 to the Basin Plan.

This is the level of take at a specified point in time and is represented by the estimated volume of the baseline diversion limit identified in **Table 3** of **Appendix C** to Victoria's North and Murray Comprehensive Report for that form of take from Combined Victorian Murray and Combined Northern Victoria SDL resource units.

3. Annual actual take under Victoria's North and Murray Water Resource Plan is limited by the volume of annual permitted take determined by the method specified in response to section 10.10(1) of the Basin Plan for the following forms of take:
 - a. take under basic rights; or
 - b. take by runoff dams; or
 - c. net take by commercial plantations.
4. The requirement for section 10.13(1) of the Basin Plan is met by the response to sections 10.08(2), 10.10(1) and 10.11(1) of the Basin Plan.
5. The Department will monitor actual take for the above specified forms of take and where the actual take increases above permitted take the application of section 10.13(2) of the Basin Plan to Victoria's North and Murray Water Resource Plan will be assessed by the Department and an amendment to the Plan will be pursued if necessary.

Note 1: Volume for permitted take is identified in **Table 9** (Victorian Murray water resource plan area) and **Table 10** (Northern Victoria water resource plan area) of **Appendix C** to Victoria's North and Murray Comprehensive Report. The methods for determining the volume of annual permitted take is identified in **Table 6** of **Appendix C** to Victoria's North and Murray Comprehensive Report. The Table further identifies the modelling related to determining permitted and actual take will be reviewed as follows:

- a. take under basic rights every 5 years;
- b. take by runoff dams every 10 years;
- c. take by commercial plantations every 10 years subject to any significant changes in the industry in which case a review would occur earlier.

Note 2: The relevant responses identified in (3) above relate to:

- a. section 10.08(2) of the Basin Plan which requires holders of a water access right to comply with the conditions of that right;



- b. section 10.10(1) of the Basin Plan which sets out the method for determining permitted take limits for the relevant forms of take in the Northern Victoria water resource plan area;
- c. section 10.11(1) of the Basin Plan which ensures that actual take does not exceed permitted take.

<<end of accredited text for s10.13(1) of the Basin Plan>>

This obligation is a Commonwealth obligation under the accredited Victoria's North and Murray Water Resource Plan and is enforceable under the Commonwealth Water Act.

Victorian legislation does not regulate take under domestic and stock rights, take by commercial plantations or take by runoff dams under domestic and stock rights. Access to water for domestic and stock purposes is limited by the scope of that right under section 8 of the Victorian Water Act (see [Section 7.2.1.1](#)).

Victoria does manage a portion of runoff dams through licences. Where a runoff dam collects water for purposes other than domestic and stock use under section 8 of the Victorian Water Act, a licence is required for the use of that dam to take water from the system.

9.4.1 Take under basic rights

Information is not available on expected future growth in take under a domestic and stock right. Any estimate of future trends for this form of take must be based on future climate projections.

The climate throughout all areas in northern Victoria is likely to become drier with decreased surface runoff. Streamflow in waterways is expected to become less reliable. In this climate, take under domestic and stock rights extracted directly from waterways is most unlikely to increase. Reliability concerns will make direct surface water extraction a less desirable option. Overall, no significant growth in this form of take is expected in future.

Traditional Owner rights to take water under section 8A where the Traditional Owners have a natural resource agreement under the *Traditional Owner Settlement Act 2010* are outlined in more detail in [Chapter 7](#) of the Comprehensive Report. At the time of making this report there are no circumstances of Traditional Owner groups exercising this right in the Northern Victoria water resource plan area. However, this may change as a result of the implementation of the Aboriginal Water policy outlined in *Water for Victoria*.

9.4.2 Take by runoff dams

The overall number of runoff dams is expected to increase at a low rate throughout the water resource plan area.

However, it is expected there will be small pockets where the number of runoff dams will increase at a higher rate. This could be due to a range of factors, such as peri-urban development or changes in agricultural practices. These pockets are expected to be small and localised and will have no impact on the overall low rate of growth across the water resource plan area. This is discussed in [Section 11.4.1.3](#) in more detail.

Licensed runoff dams will not increase as the Minister will not issue new licences in circumstances where it will cause the relevant sustainable diversion limit to be exceeded. The Victorian Water Act and commitments under the Basin Plan limit the ability of the Minister to issue new entitlements, as outlined in [Chapter 7](#).

9.4.3 Net take by commercial plantations

Changes in the extent of plantations within Victoria's North and Murray water resource plan area will be determined using information that is provided on an annual basis by the managers and owners of large plantation estates for bushfire and emergency management purposes.

This information will be reviewed every 10 years, subject to any significant changes in the industry which would cause a review to occur earlier, as described in [Section 11.3.2](#) and [Section 11.3.4](#).

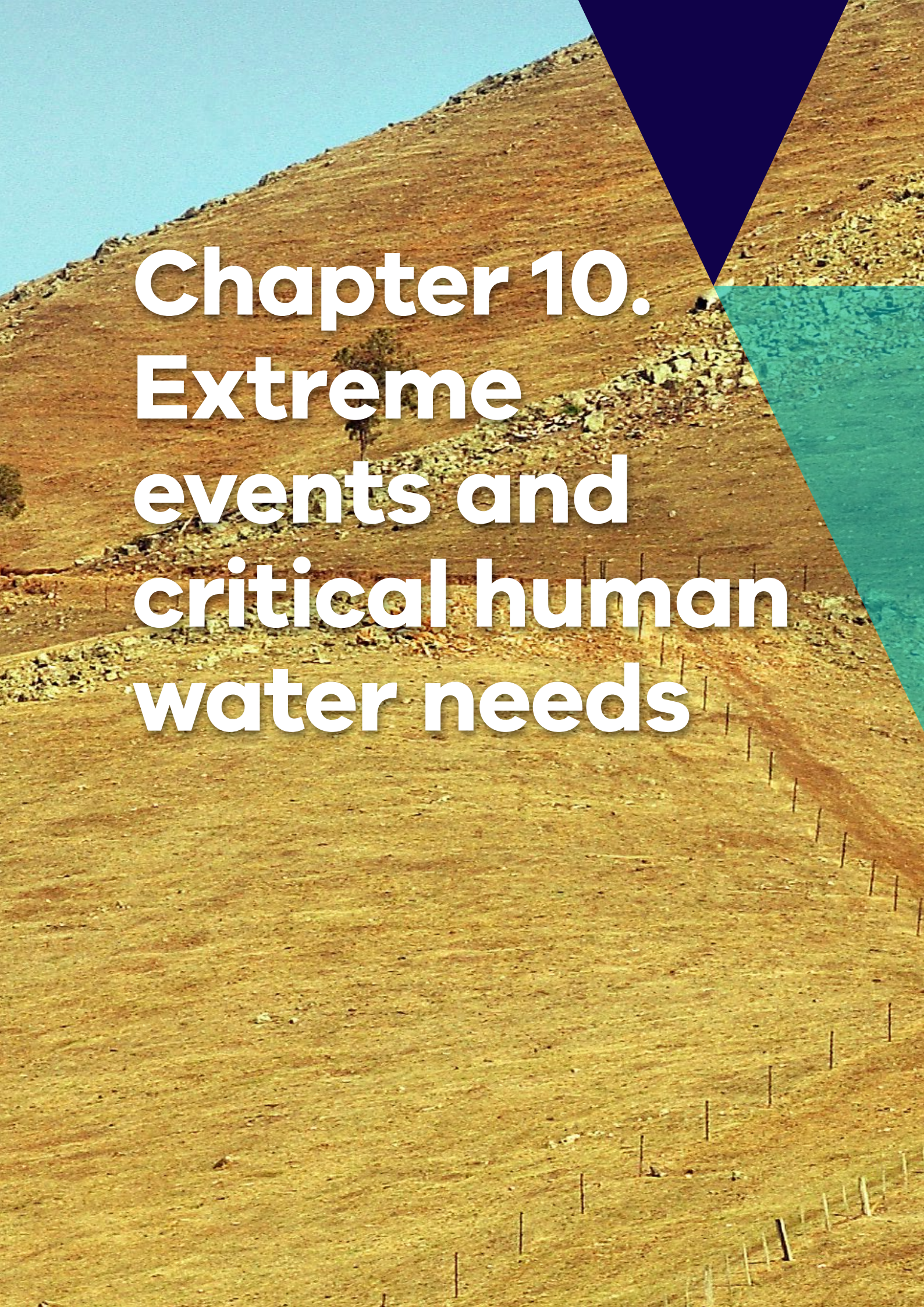
9.5 Improved certainty in estimating and measuring take

Further work is being undertaken by Victoria to improve certainty in estimating and measuring take. [Chapter 11](#) of this report, discusses the need for an improved hydrological understanding of runoff dams. Victoria will review the impacts of runoff dams and the risks they pose to water resources as part of:

- the Northern Region Sustainable Water Strategy outlined in the Victorian Water Act
- the Long-Term Water Resource Assessment outlined in the Victorian Water Act
- Action 8.4 of *Water for Victoria* (DELWP, 2016), which commits to better monitoring and reporting on the effects of emerging water uses on other uses in the Victorian Water Accounts and investigate the introduction of reasonable use limits on take for domestic and stock purposes

See [Chapter 15](#) for how Victoria will improve the proportion of take that is measured in Victoria's North and Murray water resource plan areas.



The background image shows a dry, brown, hilly landscape under a clear blue sky. A single, small, dark tree stands on a ridge. In the distance, a body of water is visible. A large, white, semi-transparent triangle is overlaid on the right side of the image, pointing towards the top right corner. The text is written in white, bold, sans-serif font across the middle of the image.

Chapter 10. Extreme events and critical human water needs



10. Extreme events and critical human water needs

This Chapter outlines the measures in place to respond to extreme events and meet critical human needs during these kinds of events. These events require alterations to business as usual operations and require water agencies from across Basin States to coordinate their actions and work together. This Chapter meets requirement under Part 13 of Chapter 10 of the Basin Plan.

10.1 Basin Plan Requirements

Part 13 of the Basin Plan seeks to ensure that water resource plans allow for a range of extreme events. Section 10.51 requires water resource plans to describe how water resources will be managed and critical human water needs will be met during these kinds of events:

- an extreme dry period – a drought that is outside the range of experience contained in the 114-year historical climate baseline
- a water quality event that results in water being acutely toxic or unable to be used for its established values and uses, such as a blackwater event or blue-green algal bloom
- any type of event that has resulted in the suspension of a statutory regional water plan in the past 50 years, including a transitional water resource plan or interim water resource plan⁴

The Commonwealth Water Act (section 86A (2)) defines critical human water needs as:

- *the needs for a minimum amount of water, that can only reasonably be provided from Basin water resources, required to meet:*
 - a. *core human consumption requirements in urban and rural areas*
 - b. *those non-human consumption requirements that a failure to meet would cause prohibitively high social, economic or national security costs*

Under this definition, water used for irrigation is not considered to be a critical human water need, but water for livestock generally is.

4. The event identified is not relevant to Victoria because our water management framework does not include statutory regional water plans and there are no powers to suspend a transitional or interim water resource plan. Therefore, this type of event will not be addressed in Victoria's North and Murray Water Resource Plan.

In Victoria critical human water needs are defined as the amount of water:

- required to supply Stage 4 restricted demand in urban areas
- supply essential domestic and stock and emergency water supply points to meet water carting requirements for rural customers
- to operate the distribution system to deliver that water

The Victorian assessment of critical human water needs is in line with the definition in the Commonwealth Water Act. It meets core human consumption requirements of Stage 4 water restrictions, emergency water supply points and essential domestic and stock needs, and of providing the water required to deliver the water to meet the core human consumption requirements.

Critical human water needs in Victoria

- Stage 4 urban water restrictions limit almost all outside water use:
 - residential or commercial gardens and lawns cannot be watered at any time
 - public gardens, lawns and playing surfaces cannot be watered at any time
 - fountains or water features cannot be filled or topped up at any time
 - hard surfaces including driveways, paths, concrete, tiles, timber decking and other paved areas cannot be hosed down except where cleaning is required as a result of an accident, fire, health hazard, safety hazard or other emergency
 - a high-pressure cleaning unit can be used, or if such a unit is not available, a hose fitted with a trigger nozzle, or a bucket in the course of construction or renovation
 - residents can wash the windows, mirrors, lights, registration plates of cars, boats or other vehicles at home, and for spot removal of corrosive substances, or at a commercial car wash, using a bucket or watering can, and only where cleaning is required for health and safety reasons, safety hazard or other emergency
 - councils and schools cannot water sporting grounds and gardens at any time
 - a new or existing pool or spa of any capacity cannot be filled
 - new or existing pools or spas can only be topped up using a bucket or watering can
 - a mobile spa can only be filled or topped up in accordance with a water use plan
 - a water toy connected to a hose cannot be used at any time
- There are more than 300 emergency water supply points throughout Victoria that provide water carting for emergency stock and domestic purposes
- Essential domestic and stock needs include rural users who access domestic and stock water from pipelines
- Water to operate the distribution system to deliver water to towns that are too big to supply water by carting and to deliver to emergency water supply points and pipelines that supply rural domestic and stock customers

10.2 Extreme events in the risk assessment

Extreme events were assessed in the risk assessment based on specific scenarios. See [Appendix B](#). Extreme events considered in the risk assessment were:

- bushfire
- extreme drought
- extreme wet period
- flooding and overbank inundation
- major asset failure
- point source discharge

These events were considered in terms of their impact on the ability to meet consumptive use, including critical human water needs, environmental use, including priority environmental assets and recreational/social and Aboriginal uses.

A summary of these medium and higher-level risks related to extreme events is presented in:

- [Table 10-1](#) for the Victorian Murray water resource plan area
- [Table 10-2](#) for the Northern Victoria water resource plan area
- [Table 10-3](#) for the Goulburn-Murray water resource plan area

Table 10-1: Summary of risks from extreme events in the Victorian Murray water resource plan area

Cause	Availability				Priority environmental assets (structural form)			Condition			
	Environment	Consumptive	Social	Aboriginal	Environment	Aboriginal	Environment	Consumptive	Social	Aboriginal	Aboriginal
Bushfire											
Extreme drought											
Extreme wet period											
Flooding and overbank inundation											
Major asset failure											
Point source discharges											

Legend

5

Very high risk

4

High risk

3

Medium risk

Table 10-2: Summary of risks from extreme events in the Northern Victoria water resource plan area

Cause	Availability				Priority environmental assets (structural form)			Condition			
	Environment	Consumptive	Social	Aboriginal	Environment	Aboriginal		Environment	Consumptive	Social	Aboriginal
Bushfire											
Extreme drought											
Extreme wet period											
Flooding and overbank inundation											
Major asset failure											
Point source discharges											

Legend	5	4	3
	Very high risk	High risk	Medium risk

Table 10-3: Summary of risks from extreme events in the Goulburn-Murray water resource plan area

Cause	Availability					Priority environmental assets (structural form)			Condition			
	Environment	Consumptive	Social	Aboriginal		Environment	Aboriginal		Environment	Consumptive	Social	Aboriginal
Bushfire												
Extreme drought												
Extreme wet period												
Flooding and overbank inundation												
Major asset failure												
Point source discharges												

Legend	5	4	3
	Very high risk	High risk	Medium risk

The risk assessment identifies a number of strategies to address the risks identified above, (in accordance with Basin Plan Requirements). These range from strengthening planning arrangements to improve resilience to extreme events for all water users, providing improved information so individuals can manage their own risk better, and making sure arrangements are in place to respond to extreme events when they happen.

These strategies cover both water availability and water condition or quality. They are listed here with more information available in [Appendix B \(Table 4.2.1\)](#).

Actions in these strategies include:

- delivering long-term watering plans
- ensuring water corporations maintain emergency water supplies
- improving understanding of climate science and how it applies to water management
- improving public reporting on water availability and user-focused information and reporting
- improving rural water supply planning
- improving state-wide water resource planning and risk assessment
- investigating increased flexibility and choice for licence-holders
- maintaining compliance with the *Safe Drinking Water Act 2003*
- managing availability risks for recreational water users
- managing exceptional circumstances by improving emergency management capability
- managing groundwater related risks, including groundwater and surface water connectivity, through Victorian planning and implementation frameworks
- managing pollution related events, such as point-source discharge
- managing risks from earth resources development
- managing salinity, waterlogging and water quality including issues arising from an extreme wet period
- managing water quality events
- monitoring and reporting on the benefits of environmental watering
- planning for supply challenges by urban water corporations
- preparing for and responding to extreme events such as bushfire, failure to meet critical human water needs, blue-green algal blooms, flooding or major asset failure
- protecting waterways and their catchments by strengthening integrated catchment management across Victoria
- protecting water quality by implementing the State Environment Protection Policy
- providing long-term investment to improve waterway health
- recognising and managing for Aboriginal values
- providing water resource information that supports planning and decisions

More specifically, the identified risks to Aboriginal values and uses of water from extreme events will be addressed through the Aboriginal Water Policy outlined in *Water for Victoria* (DELWP, 2016) and discussed in more detail in [Chapter 8](#) of this Comprehensive Report. In brief, the Aboriginal Water Policy aims to provide a framework for water planners to better understand, recognise, incorporate and manage for Aboriginal values and uses.

10.3 Extreme event management

- Water managers are responsible for communicating the risks associated with variable water availability
- Inherent in Victoria's entitlement regime is the notion that individual entitlement holders use tools like carryover and the water market to manage the risk of variable water availability
- Even with the best possible planning there will still be unexpected conditions, so the Victorian Water Act provides the Minister and water corporations with powers to address water shortages
- Water supplies supported by the River Murray fall under the responsibility of the Basin Plan and the Murray-Darling Basin Agreement which work together to prioritise water for critical human needs by establishing a tiered response to water sharing in the River Murray System

Managing water resources for all competing uses including during times of extreme events is a complex interaction of:

- climatic conditions like patterns and reliability of rainfall
- physical water systems such as supply infrastructure and natural waterways
- water-sharing arrangements like secure entitlements and trade
- water planning arrangements for preparedness in the short and long term
- demand for water for different purposes, such as domestic use including gardens, industrial use, rural consumption, including water for irrigation and stock, and environmental and recreational water

Victoria's water planning framework is designed to enable critical human water needs to be met throughout extremes of climate. It does this by integrating long-term planning, short-term planning and contingency planning, which is explained further in [Section 10.3.1.2](#) of this chapter. These arrangements complement Victoria's water entitlement framework which provides the legal basis for how water is shared (see [Chapter 7](#)).

As well as addressing the extreme events specified in the Basin Plan, Victoria has reviewed its strategies and measures for other types of extreme events. These additional events are outlined in the risk assessment at [Appendix B](#) and were assessed as a combination of their impact on consumptive uses. The strategies identified in those tables are outlined in [Table 4.2.1](#) of [Appendix B](#).

10.3.1 Managing a water shortage

The Victorian Water Act provides for a range of tools to manage access to water during water shortages.

10.3.1.1 Managing domestic and stock supply

Individuals accessing water under statutory under section 8 of the Victorian Water Act rights are responsible for their own water supply and are not subjected to restrictions or bans. Individuals bear the risk of reduced water availability. Therefore if aquifer levels drop and extraction is not possible, or surface water becomes unavailable, individuals are responsible for carting water to their properties.

Local government authorities and water corporations own and manage water supply points to provide water supplies for water carting during drought. Urban and rural water corporations offer access to potable and non-potable water respectively from standpipes connected to their

urban and rural reticulation systems for water carting. Fees apply as per the corporations' schedule of tariffs.

Many domestic and stock users who are not connected to reticulated pipelines can often store large volumes of water on site to alleviate the risks of an extreme dry period. It is not uncommon for individuals to be able to store up to five months' supply in dams or tanks on their properties, and many have extra supply available through rainwater tanks or from groundwater bores in areas where the groundwater is of acceptable quality.

Some domestic and stock users are supplied under an entitlement (either a take and use licence or water share) or a supply by agreement. Rural domestic and stock supply pipelines are managed by rural water corporations to supply domestic and stock water within waterworks districts. The water corporation manages the supply of water to these customers and rural pipeline users are required to have four days' on-farm storage.

In some cases domestic and stock customers hold water shares to meet their needs and can manage their own supplies through trade. These are customers connected to the declared water systems. However this may be an unrealistic expectation for some small domestic holdings, given the small volume of entitlement.

10.3.1.2 Victoria's water planning framework

Since the early 1990s state and federal water management policy has put measures in place to give individuals the responsibility and tools to manage their farming practices in response to climate variability, especially drought. These policies recognise that individuals are best placed to make decisions that affect their livelihoods.

These responsibilities are conferred on all entitlement holders, including urban water corporations and the Victorian Environmental Water Holder, to manage their water security with the necessary tools and by considering their own unique needs and requirements (see [Chapter 7](#)).

The conditions of the Millennium Drought required special measures, sometimes on an unprecedented scale, so that essential water needs could be met. Significant lessons were learned about delivering water for entitlement holders on regulated systems under low water availability scenarios.

The Victorian Water Act prescribes the review of regional sustainable water strategies every 10 years. These forward-looking strategies guide water management from a longer-term perspective through the collaborative development of policies.

The *Northern Region Sustainable Water Strategy* (DSE, 2009) took proactive steps to increase individual entitlement holders' ability to manage their own water supply risks. These reforms made sure entitlement holders have improved choice and flexibility to help manage water related business risks, by removing barriers to trade, improving carryover arrangements and introducing an early reserve so the distribution system can be run, even in severe drought years.

Trade and carryover are water management options available to water share holders, urban water corporations and environmental water managers in all the declared systems of northern Victoria. Setting reserves aside earlier in the season offers insurance against drought and variations in climate. Early reserves were also introduced in the Goulburn and Murray systems. Under the policy, Goulburn-Murray Water builds reserves for the following season to ensure there is enough water to operate the distribution system (including storages, rivers and irrigation delivery systems). Once allocations reach 30 percent of High-Reliability Water Shares, inflows are assigned equally to the reserve and to increasing current season allocations until the maximum early reserve volume for that system is set aside. This means that setting aside water in the early reserve finishes before allocations reach 50 percent of High-Reliability Water Shares.

10.3.1.3 Urban water planning

The urban water corporations carry out a range of long-term, short-term and contingency planning to manage the impacts of extreme events.

Urban water corporations have a vital role in water security and managing the supply of water to meet the needs of their urban customers. Under the statement of obligations issued by the Minister for Water to all water corporations in 2015, urban water corporations must prepare a strategy for managing water security to provide water services in the towns and cities in their area now and in the future.

All urban water corporations prepared an urban water strategy in 2017 to fulfil this requirement. These documents have a long-term outlook of 50 years and are based on the latest scientific research on future water availability scenarios and include drought preparedness plans. Water corporations are required to identify a range of short and medium-term water supply measures to meet urban demands, based on predicted impacts to streamflow under climate change scenarios. These plans must be reviewed every five years.

Urban water corporations in Victoria's North and Murray water resource plan area rely on surface water from regulated and unregulated rivers and creeks and groundwater to supply the towns. Some towns like Bendigo are connected to multiple regulated systems and can get water from multiple sources, while other towns rely on water from only one regulated system, like Castlemaine, or a combination of regulated system water and groundwater, such as Wangaratta. Some towns are solely connected to unregulated streams, as with Bright, or connected to unregulated streams but have back up supply from regulated systems, like Broadford. Others rely solely on groundwater, like Trentham.

The urban water corporations engage in extensive community consultation when preparing their urban water strategies. Water corporations must consult their customers on the agreed levels of service, taking into account customers' ability and preparedness to pay for increased water security.

As well as the long-term outlook, urban water corporations must prepare the following short-term planning strategies described in [Table 10-4](#).

10.3.1.4 Impact on the environment during a water shortage

[Chapter 12](#) outlines how environmental water is used to improve the environmental health of rivers and wetlands in Victoria's North and Murray water resource plan area. This includes how environmental water can be used to mitigate against the impact of extreme dry conditions. The VEWH's seasonal watering plan is prepared for the different water availability scenarios of drought, dry, average and wet, and planned actions are constantly updated based on projected conditions. Environmental watering actions are developed for each scenario, for example, during dry conditions watering actions are focused on providing refuges for plants and animals to avoid critical losses, rather than on providing breeding opportunities. This plan informs the real-time operational decisions that are made to address needs with limited resources as the season progresses.

**Basin Plan
s10.51(1)(a)**
Table 10-4: Short-term planning strategies

Mechanism	Description
Emergency management plans	Emergency management plans provide guidance in response to sudden and severe water shortages due to emergencies such as bushfire, water quality events or terrorism.
Drought preparedness plans/ drought response plans	Drought preparedness plans or drought response plans document the contingency measures the water corporation will implement to secure urban supply during times of water scarcity. This may include the implementation of water restrictions, including a decision-making framework for how and when restrictions are to be applied. As well as demand reduction measures (urban water restrictions, education programs), drought preparedness plans may outline contingency measures to further reduce demand or augment supplies. Before the unprecedented dry period between 2006 and 2009, many drought preparedness plans treated drought as relatively short term, often based on experience of historic events, such as 1967-68. All water corporations updated their drought preparedness plans in 2011-12 to incorporate the lessons of the Millennium Drought and again in 2017-18 as part of their five-yearly review.
Annual water outlooks	Urban water corporations also prepare an annual water outlook in December each year. The objective of the annual water outlook is to provide stakeholders and the community with an annual snapshot of the current total system storage levels, recent trends in water use and an outlook of storage positions under a range of streamflow scenarios for each water supply system. Annual water outlooks also identify demand management measures like water restrictions, water efficiency programs and community awareness measures to maintain security of water supply and ensure critical human water needs can be met in the 12-month period from 1 December each year.
Contingency plans	Contingency plans are prepared to respond to extreme events that are outside the short-term planning assumptions. These are often reviewed after an extreme event in order to build lessons back into short-term planning assumptions where relevant.

Case study

During the Millennium Drought urban water corporations' ability to supply many towns were severely compromised. Urban water corporations had to adapt to changing conditions to make sure that towns did not run out of water. The course of action to maintain critical human water needs depended on the design of the supply system, entitlement rules and towns' needs. As well as demand management through water restrictions and water efficiency programs, many short-term and long-term supply augmentation measures were completed.

Goulburn Valley Water's Sunday Creek system supplies Kilmore, Broadford, Wandong, Heathcote Junction and the surrounding area. The Sunday Creek system experienced extreme water shortages several times during the Millennium Drought and towns were on severe water restrictions for long periods. As a result of extremely low winter and spring rainfall in 2006, the situation deteriorated very quickly moving into summer. Towns supplied by the Sunday Creek system progressed rapidly through restriction levels as storage levels fell, shifting from stages 1 to 4 restrictions between November 2006 and February 2007. By the end of March 2007, Goulburn Valley Water had to use a range of measures to make sure the town did not run out of water.

During 2007-08 Goulburn Valley Water resorted to carting water from Seymour to supply Broadford, resulting in very high costs. Additional infrastructure was required for the carted water to be unloaded from tankers at the Broadford treatment plant. From July 2007 to December 2008, Goulburn Valley Water also pumped water from Wallan to supply Kilmore under agreement with Yarra Valley Water. Wallan is supplied from the Melbourne system and Goulburn Valley Water was able to use the pipeline that formerly supplied Wallan from the Sunday Creek system.

In December 2008 Goulburn Valley Water completed a pump station on the Goulburn River at Tallarook and a pipeline capable of supplying up to 12 ML a day to Broadford. This enabled an easing of restrictions to stage 2 in early January 2009 and the pump station and pipeline now provide increased water security to these towns.

10.3.2 Statutory powers – restricting use

The Victorian Water Act provides these powers to support a more equitable distribution of scarce water resources during a declared water shortage:

- the Minister may declare a water shortage to temporarily qualify rights under section 33AAA
- a water corporation may reduce or restrict water delivered to a serviced property under section 231 of the Victorian Water Act
- a water corporation may reduce or restrict water supplied to a serviced property under section 141 of the Victorian Water Act
- water restrictions may be applied to water supplied to serviced properties in urban areas under section 171 of the Victorian Water Act

Temporary qualification of rights may occur where the Minister has declared a water shortage exists in an area or a system. The qualification provisions of the Victorian Water Act are very broad and could be applied in many different situations and to entitlements from surface water and groundwater. This flexibility is a strength of the qualification provisions, but to ensure they are applied consistently the Victorian Government has produced guidelines to describe the circumstances in which qualifications can be issued the Temporary Qualification of Rights to Surface Water - Responsibilities of the Proponent - a guide for water corporations (DELWP, 2016).

Qualifications by nature involve a temporary change in water sharing arrangements in a given system and generally reduce one user's or class of users' rights to water to provide more water to another user or class of user. For example, a qualification of rights may involve temporarily increasing an urban water corporation's access to water in a waterway for urban supplies by reducing the required minimum passing flows downstream of the relevant harvesting point, which is a condition of the urban water corporation's bulk entitlement. Another qualification may involve temporarily reducing rural water users' access to water in one system to increase an urban water corporation's access to water in another connected system. The arrangements will apply for a determined period of time.

The water corporation may also reduce, restrict or discontinue the amount of water that is delivered or supplied to a serviced property in a range of circumstances. Section 231 of the Victorian Water Act sets out the circumstances in which the water corporation can reduce or restrict the delivery of water to customers in an irrigation district. Similarly section 141 of the Act sets out the circumstances for reducing, restricting or discontinuing the supply of water to any person. Water delivery typically refers to irrigation water or water delivered to an entitlement holder under a bulk entitlement. Water supply typically refers to urban water supply.

The circumstances in which the delivery or supply of water may be reduced or restricted include:

- insufficient capacity to deliver or supply the water (section 231(1)(a) and section 141(1)(a) of the Victorian Water Act)
- necessity to avoid future water shortages (section 141(1)(b)(i) of the Victorian Water Act)
- the quality of water available for supply does not meet the standards for its intended authorised use (section 141(1)(c) of the Victorian Water Act)

The ability to reduce, restrict or discontinue water supply in urban areas is supplemented further by permanent water saving rules and staged water restrictions. Implementation of permanent water saving rules and staged water restrictions were part of the response to the Millennium Drought. They worked to reduce the use of drinking water supplies to make sure water corporations could meet critical human needs in such times of low water availability.

Victoria's permanent water saving rules are a set of common sense rules to reduce demand and ensure we use water efficiently. These rules are in place at all times. Whenever water restrictions are also in place, the more severe rule or restriction applies. There are penalties for not following the rules.

The permanent water saving rules are uniform across Victoria and form part of each urban water corporation's permanent water saving plan. These rules took effect from November 2011.

The rules do not prevent the need for water restrictions during major droughts, but help ensure water is used more efficiently and encourage all Victorians to value this precious resource for the long term.

As water resources become incrementally less available, staged water restrictions may be imposed by urban water corporations. Four stages are currently prescribed under water corporation bylaws. These staged restrictions progressively restrict more and more outdoor uses of water. For example, the ability to water a garden is limited progressively to the use of watering cans rather than a hose, on odd or even days and at specific times. Stage 4 restrictions represent Victoria's position on what constitutes critical human water needs and operate to make sure urban water supplies are used only for those purposes in times of severe shortage.

These measures are designed to ensure the limited amount of drinking water available is secured for critical human needs for a longer period of time.

**Basin Plan
s10.51(1)(a)**

1. Water corporations may reduce or restrict the delivery of water to rural customers where there is insufficient capacity in the system. Water corporations may reduce, restrict or discontinue the supply of water to towns where there is insufficient capacity to meet critical human needs.
2. Permanent water saving rules have been in place since the Millennium Drought which provide permanent restrictions on how drinking water can be used outside the home. Water corporations may also apply staged water restrictions as water availability reduces to further restrict the use of drinking water to protect the availability of water for critical human need long term.
3. The Minister requires water corporations, under a Statement of Obligations, to undertake short term and long-term planning of future water needs to ensure available water is managed to meet critical human needs within those events that can be predicted. This planning includes a drought response plan for urban systems, and emergency management plans.
4. Where the measures employed by water corporations are not sufficient to address the impacts of an extreme dry period, the Minister may declare a water shortage in an area or for a resource and temporarily qualify rights to temporarily change the water sharing arrangements in a system by reducing the water available to holders of a water access right in the area or resource.
5. **Table 10-4** of **Section 10.3.1.4** of Victoria's North and Murray Comprehensive Report also contains a range of short-term planning strategies to manage urban water during extreme dry periods.

Section 10.3.3 of Victoria's North and Murray Comprehensive Report outlines the arrangements for managing extreme dry events in the River Murray under the Murray-Darling Basin Agreement.

<<end of accredited text for s10.51(1)(a) of the Basin Plan>>

10.3.3 Management of the River Murray during extreme dry periods

If water resources are sourced from Victorian rivers, then the arrangements as described in this section solely direct Victoria's response to water shortages. However if the resources are sourced from the River Murray the Basin Plan (Chapter 11), the Murray-Darling Basin Agreement (Schedule H) and the Commonwealth Water Act (Part 2A) work together to provide for the availability of water resources for different users during extreme events.

The MDBA adopts a tiered approach to water sharing to prioritise water for critical human needs. There are three water sharing tiers and the Basin Plan sets triggers for moving between these tiers (see **Figure 10-1**). These triggers are based on the risks to meeting and/or delivering critical human water needs, and also considers the quality of water available.

Section 11.05 of the Basin Plan establishes triggers for when water quality becomes unsuitable for critical human water needs and an emergency response is required under section 86F of the Commonwealth Water Act. The Basin Officials Committee (BOC) is responsible for the emergency response under section 86F and for managing periods of Tier 3 water sharing arrangements. To ensure an effective response, the water quality and salinity triggers for an emergency response are the same as those that trigger Tier 3 water sharing arrangements.

- under Tier 1 arrangements normal water sharing arrangements apply and Victorian entitlements can support all critical human water needs. Tier 1 arrangements also mean that conveyancing reserves such as passing flows and losses can be met for the next water year as well

- Tier 2 arrangements are triggered when volumes can be met for critical human water needs, but changes to water sharing arrangements are needed to provide conveyance water and or reserves
- Tier 3 arrangements are only triggered in extreme and unprecedented circumstances. Under Tier 3 conditions emergency responses will be agreed by the Murray-Darling Basin Ministerial Council. This would occur if there is an extremely high risk that there will not be enough water to meet critical human water needs in the next 12 months

Tier 3 is declared if:

- there are circumstances of extreme and unprecedented low levels of water availability in the system
- there is an extremely high risk that water will not be available to meet critical human water needs in the next 12 months
- either one of the following applies:
 - at least one of the states is not able to meet the volumes required for its critical human water needs
 - there is not enough conveyance water after taking available remedial action into account
 - water quality is not suitable for critical human water needs even after being treated

Each year under clause 102A of the Murray-Darling Basin Agreement the MDBA must determine how much water is needed to meet critical human water needs along the Murray. Under clause 102B of the Murray-Darling Basin Agreement the states are required to inform the MDBA of the volume and location of water needed to be set aside for the following year to meet critical human water needs.

For Victoria this task is done by the Victorian Murray Resource Manager (Goulburn-Murray Water). This volume is calculated to be sufficient to meet stage 4 water restrictions for all urban Victorian needs supplied by the River Murray in an extreme drought.

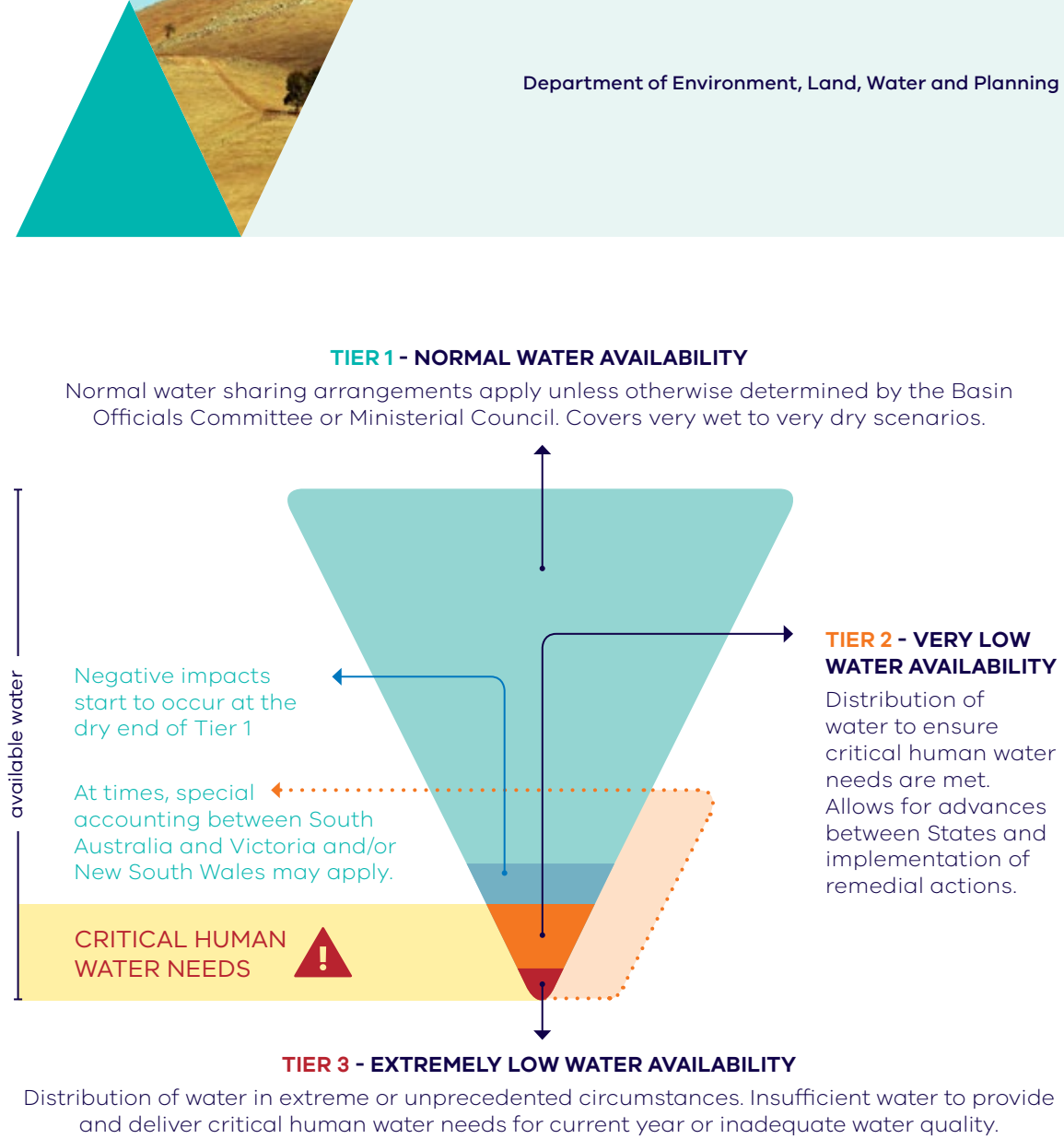


Figure 10-1: Tiered approach to water sharing under the Basin Plan 2012 (Chapter 11) and the Murray–Darling Basin Agreement (Schedule H)

10.3.4 Management of water resources during an extreme water quality event

During an extreme water quality event the water resource may not be suitable for use. Water quality issues include blue–green algae, blackwater, ash and sedimentation following a bushfire or the release of other pollutants. Water quality events can impact rural stock and domestic, rural irrigators and urban water customers.

Strong overarching statewide emergency management framework

- Emergency Management Manual Victoria contains policy and planning documents for emergency management in Victoria and provides details about the roles organisations play in managing emergencies
- Victoria has a statewide coordination plan for water quality incidents which details prevention, response and recovery
- Specific arrangements for blue-green algae management are outlined in the Algal Bloom Response Plan and the Blue-green Algae Circular which is coordinated by the Department of Environment, Land, Water and Planning
 - These arrangements include the roles and responsibilities of state and local government agencies, water managers and catchment management authorities regarding blue-green algal blooms, such as the Department of Health and Human Services advising about the potential health effects of algal blooms and administering the *Victorian Safe Drinking Water Act 2003*
 - Regional emergency arrangements are put into action during a substantial regional blue-green algal bloom

Surface water quality risks from extreme events

The risk assessment found that bushfires, extreme drought, an extreme wet period, flooding and overbank inundation, major asset failure and point source discharges generated medium or high-level risks to the condition of the water resource across some uses in Victoria's North and Murray water resource plan area.

Groundwater quality risks from extreme events

In the Goulburn-Murray water resource plan area for groundwater, bushfires, extreme drought, extreme wet periods, flooding and overbank inundation, major asset failure and point source discharges were found to have medium or higher-level risks to Aboriginal uses because of a lack of knowledge and understanding about these values.

10.3.4.1 Roles and responsibilities

Emergency Management Victoria

Emergency Management Victoria (EMV) is a statutory body established under the *Emergency Management Act 2013*. EMV published the *Emergency Management Manual Victoria* (2018) which identifies how emergencies in Victoria are managed based on the principle of management by prevention, response and recovery activities.

Victoria's *Emergency Management* Manual classifies blue-green algae events as a Class 2 emergency and nominates the Department of Environment, Land, Water and Planning (DELWP) as the agency with the primary responsibility for responding to the emergency.

DELWP has produced a *Blue-Green Algae Circular: Management Plan* to describe how the state responds to incidents in line with the manual. This document applies to all water bodies accessible to the public or wetlands that discharge into publicly accessible water bodies, but excludes the coast, closed water storages and storages and marinas on private land.

DELWP is the control agency for blue-green algae management and it collects data on blue-green algae and monitors trends throughout the state. During an algal bloom DELWP coordinates management activities so that all relevant stakeholders can perform their respective roles and responsibilities at the regional level.

Water corporations

Water corporations are required to comply with the standards in the *Safe Drinking Water Act 2003* for urban town supply, and water quality events may require water corporations to operate differently. Water corporations are required to facilitate regional coordination planning and arrangements for monitoring and managing blue-green algal outbreaks. A regional coordinator is appointed for the area of the incident. Goulburn-Murray Water, Lower Murray Water and Grampians Wimmera Mallee Water are designated regional coordinators for major blue-green algae outbreaks in waterways within their boundaries, as in [Figure 10-2](#). They coordinate the management of major outbreaks across these areas. If the outbreaks are confined to a water body or a section of a waterway, a local water manager is responsible for managing the event.

The regional coordinator or local water manager has the main responsibility of communicating the extent and severity of the blue-green algae bloom and coordinating the response of multiple agencies.

Management of the River Murray falls under New South Wales' jurisdiction. However as the River Murray is the water supply source for many Victorian towns and regional cities and receives flows from Victorian waterways, the New South Wales Murray and Sunraysia regional algal coordinating committees include representatives from regional coordinators in Victoria. Likewise, if a blue-green algae bloom in Victoria poses a risk to the River Murray, the relevant agencies in New South Wales are to be included in the regional response group.

New South Wales has produced Guidelines to Management Response to Harmful Algal Blooms to apply in the Murray Region. When blue-green algae levels in the River Murray are above the trigger level, WaterNSW will inform all stakeholders.

Consequently, management of a blue-green algae bloom in the River Murray in Victoria will be done by declaring an area of operation within the Victorian Emergency Management Arrangements (see item 22 in [Table 4.2.1](#) of [Appendix B](#) and the Murray River Regional Blue-Green Algae Response Arrangements). The lead agency WaterNSW describes the proposed incident management arrangements and how the Victorian water corporations North East Water, Goulburn-Murray Water, Goulburn Valley Water, Coliban Water, Grampians Wimmera Mallee Water and Lower Murray Water will be working with WaterNSW in managing their areas of interest.

If a blue-green algae bloom is likely to impact on South Australian waters the relevant water manager is to notify SA Health.

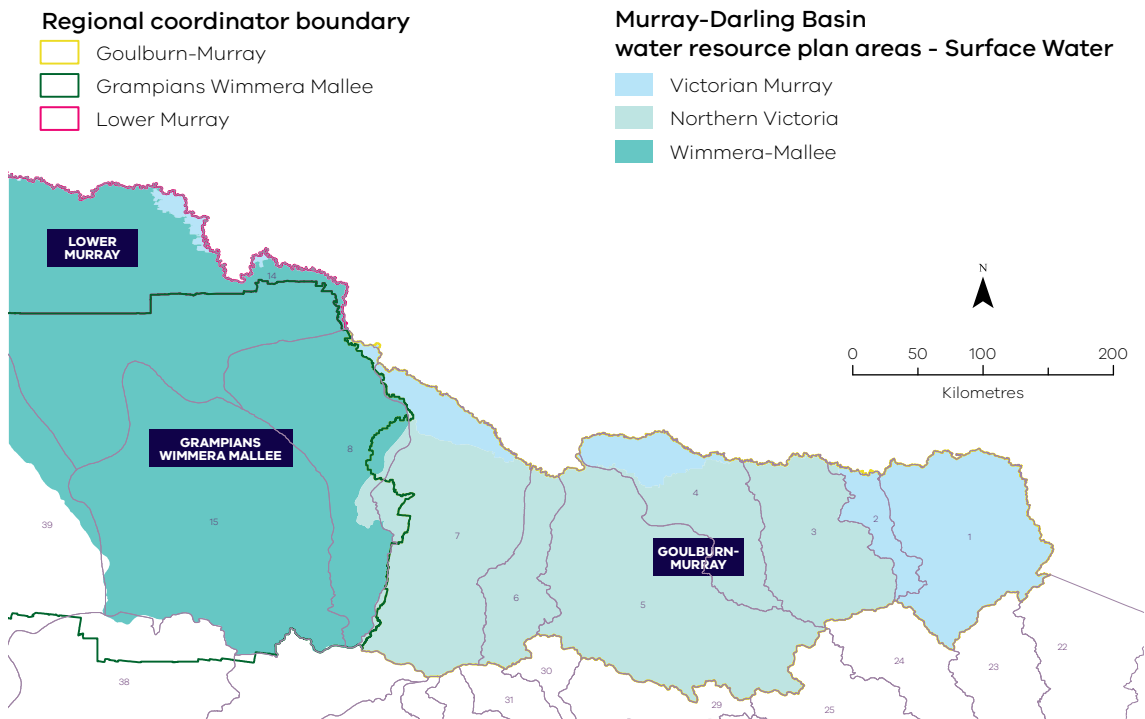


Figure 10-2: Regional coordinator boundaries

Table 10-5: Regional coordinator drainage basins

Regional Coordinator	Drainage Basin or Area
Goulburn-Murray Water	1, 2, 3, 4, 5, 6, 7, Pt* 8
Grampians Wimmera Mallee Water	Pt 8, Pt 14, 15, Pt 38, 39
Lower Murray Urban & Rural Water	Pt 14

Environment Protection Authority

While water corporations have responsibility for maintaining the quality of water in the system to ensure that it is fit for purpose, the role of the Environment Protection Authority (EPA) is to manage pollution-related water quality events. The EPA has powers to issue the following:

- remedial notices that require the recipient to undertake works or activities to remediate the pollution. For example, the direction may be to conduct a clean-up, stop works, install controls or change a process or activity
- pollution abatement notices which aim to prevent further occurrence of pollution or potential environmental risk through installation of risk controls and changes to on-site processes and practices
- clean up notices which aim to prevent further contamination and impact through removal of waste, clean-up activities, ongoing management of pollution and altered handling, storage or location of industrial or prescribed industrial waste
- verbal or written directions to immediately stop an activity, address an incident or undertake an activity to prevent imminent danger to life, limb or the environment

10.3.4.2 Impact on drinking water

Extreme water quality events, including blackwater and blue-green algae blooms can be a risk to drinking water and public health. The *Safe Drinking Water Act 2003* identifies that the Department of Health and Human Services must be immediately notified when a blue-green bloom occurs, or if water contains other substances that may pose a health risk to the public.

Urban water corporations may need to restrict demand as a result of a water quality event because water treatment plants can have reduced output, and clear water storages may be depleted if demand is not restricted. Demand is unlikely to be restricted during a blackwater event, however, water treatment plants may need to slow down operationally to closely monitor water quality.

The powers relating to restricting, reducing and discontinuing water supply can also be used in response to a water quality event to protect the security of urban town supplies. Modifying supply allows water corporations to support longer-term availability of urban town supplies to meet critical human needs.

10.3.4.3 Impacts on other uses

Chapter 13 outlines the recreational water values in Victoria's North and Murray water resource plan area and identifies how water is made available for recreational uses and how risks to recreational users are addressed. Improving understanding of Aboriginal values and uses of water will increase our capacity to plan and manage the impacts of extreme events on those values and uses. There is more detail on how this will be done in **Chapter 8**.

10.3.4.4 Impact on the environment

Chapter 12 outlines how environmental water is used to improve the environmental health of rivers and wetlands in Victoria's North and Murray water resource plan area. This includes how environmental water can be used to mitigate against the impact of water quality events. Extreme water quality events including blue-green algae and blackwater events can have negative impacts on the environmental health of rivers and wetlands. Catchment management authorities and environmental water holders may have a role to play in mitigating the impacts of water quality events through providing dilution flows. However this may not always be possible due to the volume of water needed particularly in the larger systems. Catchment management authorities work with the water corporations and the water holders to identify and implement feasible options to limit the impact of water quality events on the environment. This includes: reducing organic material load on the floodplain through regular wetland flooding; timing environmental flows to reduce risks such of poor water quality events; maintaining healthy refuges, or using small freshening flows to provide refuges during extreme events; restoring fish passage to allow movement away from poor water quality events; and if possible, containing poor water quality by closing regulators.

Basin Plans s10.51(1)(b)

1. Where water is no longer fit for purpose due to a water quality event, some of the powers outlined for extreme dry events may also be used to respond to water quality events in order to protect the availability of water for critical human need.
2. Water corporations may reduce or restrict the delivery of water to rural customers where there is insufficient capacity in the system (water shortage). Water corporations may reduce, restrict or discontinue the supply of water to towns where the quality of the water does not meet the standards for authorised use.
3. In addition, the Environment Protection Authority Victoria has powers to issue remedial notices, pollution abatement notices, clean-up notices and directions for pollution-related events.

4. There is insufficient data relating to the impact of water quality events on a variety of users. Blue-green algae is the predominant water quality event and it is unclear what impact that has on domestic and stock use and irrigation. As identified in Victoria's North and Murray Risk Assessment there is insufficient information regarding Aboriginal values and uses of water to have an adequate strategy for management of the impacts of water quality events on their values and uses. As information about the impacts on these values improves, management strategies to respond to water quality events will be developed.
5. Water corporations develop management plans to manage risks to water resources. Throughout the region there are several reservoirs which offer access for recreational use. These are monitored for water quality by the respective managers who undertake monthly sampling for algal analysis over the summer period when these lakes are in high use. Where risks to the water quality are identified the public is immediately notified of the risks and restrictions on access may occur to prevent harm to individuals as a result of contact with contaminated water.

Cyanobacteria (also known as blue-green algae) is the predominant water quality event that can occur in Victoria. Responses to cyanobacteria events relate to recreational use and public health and safety. Emergency response roles and responsibilities are set out in the *Blue-Green Algae Circular: Management Plan 2016-17* (2015) and relate to establishing a process to ensure appropriate communications and planning for cyanobacteria events. Water corporations coordinate the management of major outbreaks while local water managers (water corporations, catchment management authorities, local councils, Parks Victoria, Alpine Resort Management Boards and private companies) monitor and manage local blooms under their own emergency plans.

Section 10.3.3 of Victoria's North and Murray Comprehensive Report outlines the arrangements for managing extreme dry events in the River Murray under the Murray-Darling Basin Agreement.

<<end of accredited text for s10.51(1)(b) of the Basin Plan>>

10.3.5 Measures to meet critical human needs

Section 10.51(2) of the Basin Plan requires Victoria's North and Murray Water Resource Plan to set out measures to meet critical human water needs during the extreme events listed in this chapter where such events would compromise Victoria's ability to meet critical human water needs.

Given the arrangements outlined here and the powers in place to manage the ongoing supply of drinking water to cities and towns, Victoria does not consider that an extreme dry period or a water quality event such as those already outlined would compromise Victoria's ability to meet critical human water needs.

Basin Plan s10.51(2)

The response to section 10.51(1)(a) and 10.51(1)(b) of the Basin Plan in Column 3 of Victoria's North and Murray Index Table sets out the existing measures within the Victorian water management framework which serve to protect critical human water needs in Victoria's North and Murray water resource plan area. As these existing measures are sufficient, it is not necessary to specify additional measures in this WRP in response to this section. The situation described in section 10.51(1)(c) of the Basin Plan is not relevant to Victoria's North and Murray water resource plan area.

<<end of accredited text for s10.51(2) of the Basin Plan>>

10.4 New scientific information

Section 10.51 (3) of the Basin Plan requires that Victoria's North and Murray Water Resource Plan must provide that, if new scientific information suggests a change in the likelihood of an event of a type listed in 10.51(1) occurring (for example, due to climate change), consideration must be given whether, as a result of this new information, the water resources should be managed differently.

Water for Victoria is the Victorian Government's adaptation response to the impacts of climate change on water resources and on the availability of water in the future. Victoria's temperature has steadily increased since the 1970s and overall streamflows have decreased by around 50 percent or more over the past 20 years.

The Millennium Drought was characterised by a seasonal shift towards less rainfall during the cooler months of April to October when runoff was greatest and storages usually filled. Climate science predicts this is the new reality, with more extreme events such as floods, droughts and bushfires also likely to happen and affect water availability and condition.

In Australia we accept that drought is part of life and many parts of Victoria have experienced drought conditions over the past decade. The Millennium Drought's severity has been linked to human-induced climate change. That drought was a wake-up call for many Victorians about taking water for granted, the importance of water security and the need to build resilience to drought.

Water for Victoria recognises that government has a key role in applying research to water management policy, planning and practice. The Victorian Climate Initiative, in partnership with the Bureau of Meteorology and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) has invested in developing an understanding of climate change and its impacts on water resources in Victoria.

Through *Water for Victoria*, the state has committed to build on this understanding by continuing to invest in research and working with partners including community groups, local government, Traditional Owners, research organisations and the water sector.

Water for Victoria aims to improve Victoria's ability to apply this research to water management policy, planning and practice. Tools for modelling and scenario planning help inform decisions about options for action in a future with climate change and periods of reduced water availability. DELWP will continue to assess and report on changes in water resources, including changes in rainfall, streamflow and groundwater, to inform adaptation and evaluation of actions. This is reflected in strategy 8 of the risk assessment, which ties to action 2.2 in *Water for Victoria*. See [Table 4.2.1](#) of [Appendix B](#).

Basin Plan s10.51(3)

If new scientific information suggests a change in the likelihood of an event of a type listed in 10.51(1) occurring, consideration will be given as to whether, as a result of this new information, the water resources should be managed differently.

<<end of accredited text for s10.51(3) of the Basin Plan>>

Chapter 11. Interception





11. Interception

This Chapter discusses the interception activities that may pose a risk to Basin water resources as identified by the Basin Plan. No interception activities were identified as posing a significant risk to the water resources in Victoria's North and Murray water resource plan area. This Chapter meets the requirements of Part 5 of Chapter 10 of the Basin Plan.

11.1 Basin Plan requirements

The Basin Plan requires that:

A water resource plan must, having regard to the risk identification and assessment conducted for section 10.41 of the Basin Plan, specify whether any types of interception activity in the water resource plan area have the potential to significantly affect:

- a. the water resources of the water resource plan area; or
- b. water resources which are hydrologically connected to the water resources of the water resource plan area;

whether on an activity-by-activity basis, or cumulatively.

A water resource plan is required to:

- list interception activities that are identified as having the potential to have a significant impact on the water resources of the water resource plan area
- monitor the impact of these significant interception activities
- identify actions that will be taken in the event that monitoring indicates that the listed activities compromise environmental watering requirements or there is an increase in the quantity of water being intercepted

Actions are not required if increases in the quantity of water intercepted are included in the method used for determining the maximum quantity of water the water resource plan permits to be taken each year (see section 10.10(1) of the Basin Plan). Where volumes intercepted do increase above the SDL, action must be taken in accordance with section 10.13 of the Basin Plan, explained in [Section 9.4](#).

The Basin Plan (section 10.23) identifies the following interception activities that may have a significant impact on water resources in a water resource plan area:

- interception by runoff dams
- interception by commercial plantations
- interception by mining activities, including coal seam gas mining
- interception by floodplain harvesting

The Basin Plan defines a runoff dam as a dam that collects surface water flowing over land.

11.2 Interception in the risk assessment

The interception activities listed in the Basin Plan (section 10.23) were included in the risk assessment ([Appendix B](#)) conducted as part of the development of Victoria's North and Murray Water Resource Plan.

Table 11-1: Types of interception in the Basin Plan and their related cause in the risk assessment

Types of interception in the Basin Plan	Related cause and scenario in Victorian risk assessment
a) runoff dams	Farm dams
b) commercial plantations	Land use change (affecting availability)
c) interception by mining activities, including coal seam gas mining	Earth resource development
d) interception by floodplain harvesting	N/A (does not occur in Victoria)

The risk assessment found that the interception activities listed below, in [Table 11-2](#), [Table 11-3](#), and [Table 11-4](#), pose a medium or higher risk to water availability and/or condition to environment, consumptive, social and Aboriginal/Indigenous uses.

Table 11-2: Identified medium or higher risks to the availability and condition of surface water from interception of surface water in the Northern Victoria water resource plan area

Cause	Availability				Priority environmental assets		Condition			
	Environment	Consumptive	Social	Aboriginal/ Indigenous	Environment	Aboriginal/ Indigenous	Environment	Consumptive	Social	Aboriginal/ Indigenous
Increase in farm dams										
Land use changes which affect availability										
Earth resources development⁵										
Legend	5				4		3			
	Very high risk				High risk		Medium risk			

5. Earth resource development was found to be a cause of risk in the Northern Victoria water resource plan area for surface water. This risk was associated with sand and gravel extractions from the floodplain of the mid-Goulburn River.

Table 11-3: Identified medium or higher risks to the availability and condition of surface water from interception of surface water in the Victorian Murray water resource plan area

Cause	Availability				Priority environmental assets		Condition			
	Environment	Consumptive	Social	Aboriginal	Environment	Aboriginal/ Indigenous	Environment	Consumptive	Social	Aboriginal
Increase in farm dams										
Land use changes which affect availability										
Earth resources development										

Legend	5	4	3
	Very high risk	High risk	Medium risk

Table 11-4: Identified medium or higher risks to the availability and condition of surface water from groundwater interception in the Goulburn-Murray water resource plan area

Cause	Availability				Priority environmental assets		Condition	
	Environment	Consumptive	Social	Aboriginal	Environment	Aboriginal/ Indigenous	Consumptive	Aboriginal
Increase in farm dams								
Land use changes which affect availability								
Earth resources development⁶								

Legend	5	4	3
	Very high risk	High risk	Medium risk

6. The risk assessment for the cessation of mining and associated groundwater pumping (e.g. in the Bendigo area) was found to be a localised risk in the Goulburn-Murray Groundwater water resource plan area.

11.3 Addressing risks to water resources from interception

The Basin Plan requires states to identify strategies to address medium, high and very high risks. These are described in detail in Victoria's North and Murray Water Resource Plan Risk Assessment (see [Appendix B](#)). These strategies and their application are described in [Chapter 5](#).

The Victorian Water Act prohibits the take and use of water for mining and by floodplain harvesting without a water entitlement. The take and use of water for these activities is accounted for in sustainable diversion limits as a formal entitlement, not an interception activity, and is not considered further here.

Water for Victoria (DELWP, 2016) recognised that there may be a number of water uses that are not accurately accounted for, monitored and reported and these may affect efficient water allocation as water becomes more scarce.

Two areas identified in the risk assessment that require closer monitoring are:

- the future increase in the use of rights under Section 8 of the Victorian Water Act to take water for domestic and stock use without a licence
- large scale changes to land use that affect catchment water balance

Both these risks were identified in the *Northern Region Sustainable Water Strategy* (DSE, 2009). The growth in farm dams and domestic and stock groundwater bores and the potential future conversion of pasture land to commercial wood plantations were identified as having potential to affect runoff and groundwater recharge.

More specifically, risks to Aboriginal values and uses of water from interception were identified as high risk and discussed in [Chapter 8](#). Victoria's Aboriginal water policy provides a framework for water planners and managers to better understand, recognise, incorporate and manage for Aboriginal values.

Risks to recreational/social values and uses of water from interception were also identified. They will be addressed through a strategy that aims to better understand, recognise, incorporate and manage for recreational values and which is discussed in detail in [Chapter 13](#).

11.3.1 Runoff dams

The Victorian Water Act permits landholders to build runoff dams without a licence if the dam is not located on a waterway and the water is not used for irrigation or commercial purposes. These two conditions significantly restrict the amount of water that can be taken by these runoff dams.

The first condition prohibiting the construction of runoff dams on waterways, including floodplains, limits the size of the local catchment above the dam site and consequently the runoff available to be captured. Dam sites with potential to reliably harvest significant volumes of runoff will be on waterways and will always require a licence.

The second condition that requires a licence for dams supplying irrigation and commercial uses removes the financial incentive to make runoff dams bigger than what is required for domestic and stock use.

11.3.2 Land use changes

Land use changes happen constantly and can include changes between:

- annual and perennial pastures
- grazing and cropping
- till cropping and no-till cropping
- pasture and plantations
- rural and urban land use

Runoff and groundwater recharge can increase or decrease, depending on the direction of the change in land use.

Statutory land use planning powers reside in the *Planning and Environment Act 1987* rather than the Victorian Water Act. Planning provisions are usually general in nature and not typically used to regulate land use activities on farms on how those activities might affect the catchment's water balance.

11.3.3 Earth resources development

Medium or higher risks were identified in the Northern Victoria Water Resource Plan Area due to sand and gravel extractions from the floodplain of the mid-Goulburn River and in the Goulburn-Murray Water Resource Plan Area from the cessation of mining and associated groundwater pumping around Bendigo.

As these risks are localised, they are not considered to present a significant risk to water resources in Victoria's North and Murray water resource plan area or connected water resource plan areas.

11.3.4 Monitoring potential interception activities

Victoria has established two processes to periodically assess the risks of interception activities on water resources in Victoria's North and Murray water resource plan area, and across the state more generally. These include actions that can be initiated once the Minister determines it is necessary to address those issues.

- Division 1B of Part 3 of the Victorian Water Act sets out the process for the Minister to prepare sustainable water strategies for regions of the State. Sustainable water strategies are used to identify risks to water resources and the actions intended to mitigate those risks. The Act requires the Minister to review sustainable water strategies every 10 years
- Division 1C of Part 3 of the Victorian Water Act requires the Minister to carry out long-term water resource assessments to identify if there has been:
 - any decline in the long-term availability of surface water or groundwater and whether the decline has fallen disproportionately on the environmental water reserve or on the allocation of water for consumptive purposes, and
 - any deterioration in waterway health for reasons related to flow

The Minister must determine what actions need to be taken if the assessment finds there has been a decline in the availability of surface water or groundwater that has disproportionately affected water for the environment or for consumptive use.

Action 8.4 of *Water for Victoria* (DELWP, 2016) commits to better monitoring and reporting on the effects of emerging water uses on other uses in the Victorian Water Accounts and to periodically review these emerging uses in sustainable water strategies and long-term water resource assessments.

11.4 Potential interception in Victoria's North and Murray water resource plan area

The catchment water balance of Victoria's North and Murray water resource plan area is monitored in sufficient detail to determine the impacts of licenced and regulated users on environmental watering requirements.

However, interception activities usually involve a range of natural landscape processes that are not well understood and difficult to monitor. As a result, there is not enough detail on the catchment water balance of Victoria's North and Murray water resource plan area to determine whether interception activities have a perceptible/substantial effect that would compromise environmental watering requirements. Data to empirically monitor the effects of interception activities is not available.

Types of potential interception activities in Victoria's North and Murray water resource plan area are summarised in **Table 11-5** and discussed in later sections.

Table 11-5: Catchment activities that may increase or decrease the quantity of water being intercepted

Activity	Comments
Activities that increase runoff or recharge (decrease interception)	
Urbanisation increases impermeable areas and increases runoff	1 ha of impermeable area in an area with 500 mm of rainfall per year will produce 5 ML of runoff per year.
Decommissioning farm dams in areas supplied by new piped supply systems, including the: - West Loddon system (proposed) - Mitiamo system (proposed)	Will reduce the amount of water captured by farm dams. Some dams in areas now served by piped systems have not been decommissioned, but these will deteriorate over time unless maintained. Decommissioning of farm dams in new piped supply areas is not always feasible without clear incentives.
Shift from grazing enterprises to cropping enterprises	Will reduce consumption of water from stock dams by an unknown amount, but likely to be significant volume. No data available. Conversion from deep-rooted native perennial pasture to shallow-rooted annual crops is likely to increase recharge and runoff. Over time, many farmers have adapted cropping practices to retain more soil moisture. Effect in aggregate could be significant because of large areas involved, but no estimates are available.

Activity	Comments
Reduction in area of plantations	It is estimated that the area of plantations in Victoria's North and Murray water resource plan area have remained stable. The estimated total area was 671 km² in 2009 and 668 km² in 2015 (a reduction of 3 km²). This small reduction is not detectable at a regional scale. At small local scales, increases in runoff and recharge, and therefore reduced interception, might be detectable where plantations have been removed, depending on what replaces the plantation.
Reduction in use from runoff dams	In a drying climate, water use from farm dams is likely to decrease where the yield and reliability of supply from dams fall and self-supply irrigation activities are less feasible. However, the overall impact on interception volumes may be marginal because evaporation from existing dams is expected to be higher in a drying climate.
Activities that decrease runoff or recharge (increase interception)	
Revegetation projects for waterway protection, dryland salinity control and biodiversity No estimate is available of the area revegetated, likely to be quite small in Victoria's North and Murray water resource plan area	Planted for environmental benefits and should be excluded from calculation of interception. In part replacing remnant vegetation that is deteriorating.
Establishment of new commercial plantations	Current trend is for the area of plantations to remain stable. Future changes in State and Commonwealth policy and legislation about carbon sequestration may see an increase in plantation area. No trend has been observed between 2009 and 2016.



Activity	Comments
Growth in number of runoff dams. The runoff dams are the primary source of domestic and stock water in the unregulated parts of Victoria's North and Murray water resource plan area	Growth in number of runoff dams is expected in all parts of Victoria's North and Murray water resource plan area, except for irrigation districts and forested areas. Many of these dams are upstream of the regulated parts of the water resource plan area. Any increase in interception will reduce water availability, directly affecting above cap water and the volume available for consumptive allocation. In a drying climate at first the net take by runoff dams will remain similar. Higher evaporation will tend to increase take, but this is likely to be balanced by a reduction in the availability of local catchment inflows. But as the climate dries more, long-term average dam inflows will be significantly reduced with dams staying dry for long periods. Take from runoff dams will be significantly reduced on average if there are no inflows to intercept. This reduction is expected to be very pronounced in the western parts of the WRP region. A similar effect happens in individual drought years with less water available to intercept if dam inflows are very low. There is an extra impact in a drying climate where partly empty dams will intercept small rainfall/flow events. This has potential to significantly affect downstream ecology. Net growth in the number and volume of runoff dams in Victoria's North and Murray water resource plan area is expected to continue at a low rate.
Interception by mining activities, including coal seam gas mining	There is a range of mining activities in Victoria's Northern and Murray water resource plan area. The risk assessment done for the water resource plan indicates that some of these activities have a significant risk of affecting <i>water quality</i> but none has a major risk of affecting <i>water quantity</i>. There is no coal seam gas mining in Victoria's North and Murray water resource plan area.
Floodplain harvesting	No floodplain harvesting is permitted in Victoria's North and Murray water resource plan area.

In summary none of the four specific types of interception noted under the Basin Plan (section 10.23) is expected to have a significant impact on the water resources of Victoria's North and Murray water resource plan area.

- Interception by runoff dams: modest growth is expected over the period of the water resource plan, but any additional take as a result of growth is expected to be small and is unlikely to have a significant impact on water resources.
 - Take by runoff dams, excluding take under basic rights = 84 GL
 - Take by runoff dams under basic rights = 85 GL
- Interception by commercial plantations: no growth is expected over the period of the water resource plan, indicating that there will be no extra impact on water resources.
 - Take by plantations = 108 GL
- Interception by mining activities, including coal seam gas mining: there are currently no mining activities in the water resource plan area that intercept significant volumes of water
- Interception by floodplain harvesting: no floodplain harvesting is permitted in the water resource plan area

11.4.1 Farm dams in Victoria's North and Murray water resource plan area

11.4.1.1 Number and capacity of runoff dams

For the purposes of interception requirements under Chapter 10, Part 5 of the Basin Plan, runoff dams in Victoria's North and Murray water resource plan area are farm dams that:

- intercept catchment runoff, or overland flow
- are not filled using a water entitlement from another water source

Dams of this type are found throughout Victoria's North and Murray water resource plan area, but there are relatively few in the upland forested catchments and in the irrigation districts, as shown in [Figure 11-1](#).

For the purposes of Victoria's North and Murray Water Resource Plan, it will be assumed that no runoff dams occur in these areas. The total capacity of runoff dams in Victoria's North and Murray water resource plan area is estimated to be 261,000 ML (for more information see [Appendix C](#)). Note that the estimated capacity of the dam is not the same as the volume of take.

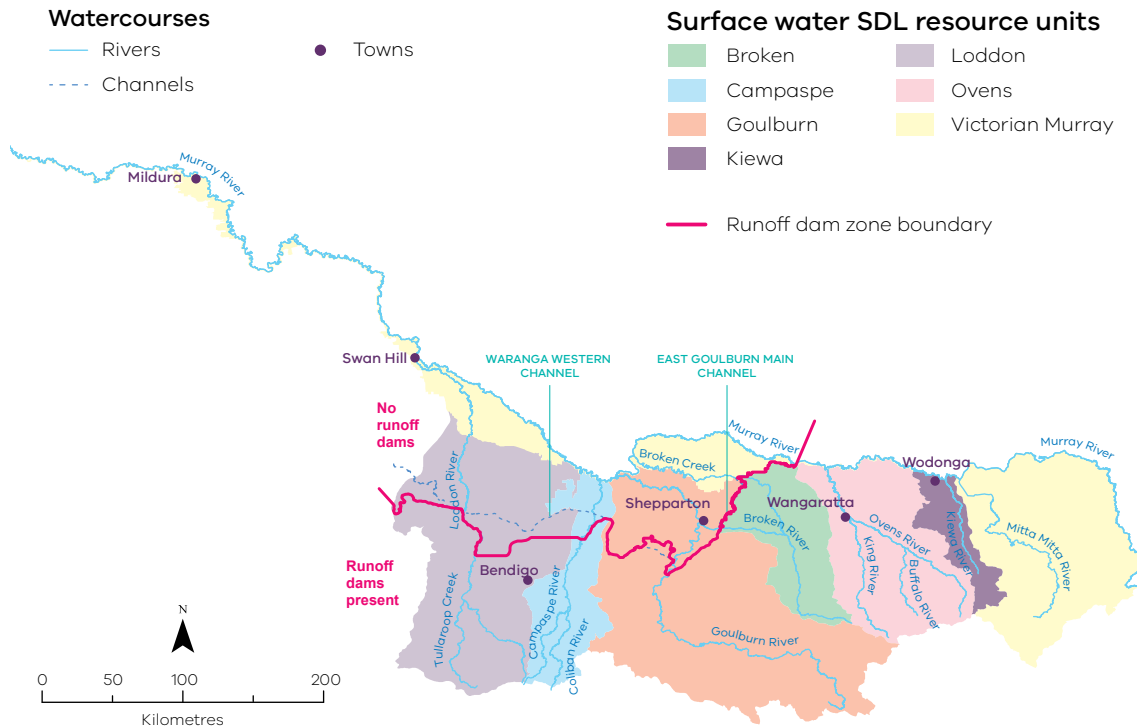


Figure 11-1: Locations of runoff dams across Victoria's North and Murray water resource plan area

Note: The Victorian Murray and Kiewa SDL resource units are located within the Victorian Murray water resource plan area and the Goulburn, Broken, Campaspe, Loddon and Ovens SDL resource units are located in the Northern Victoria water resource plan area.

The estimated capacity of dams in each valley is shown in [Table 11-6](#). This information has been compiled from the Victorian farm dams spatial layer. This layer was originally compiled based on Geoscience Australia waterbodies data using aerial imagery from 2005, with some updates in the Campaspe and Goulburn basins using imagery from 2010. For the purposes of Victoria's North and the Murray Water Resource Plan, this data is assumed to represent levels of development in 2009.

Table 11-6: Volumes of types of dams (ML) across each zone in Victoria's North and Murray water resource plan area

Valley	Dams in irrigation areas (ML) ^a	Other dams (ML) ^b	Total runoff dams (ML)
Victorian Murray (upstream of Hume Weir)	-	16,341	16,341
Kiewa	-	10,559	10,559
Ovens	-	38,196	38,196
Broken	-	25,125	25,125
Goulburn	34,145	73,677	73,677
Campaspe	7,711	36,231	36,231
Loddon	17,707	61,006	61,006
Victorian Murray (downstream of Hume Weir) ^c	22,482	-	-
Total	82,045	261,135	261,135

a. in the irrigation districts, all dams are assumed to have been constructed to be supplied from an external source and do not intercept surface runoff. This means that there are no runoff dams

b. outside of irrigation districts, all dams are assumed to be runoff dams

c. in the Victorian Murray SDL resource unit, downstream of Hume Weir, it is assumed that there are no runoff dams

Many of the dams in this table have an associated licence. The total volume of all licensed and registered runoff dams in Victoria's North and Murray water resource plan area is 83,500 ML, leaving 177,500 ML of unlicensed runoff dams used for domestic and stock purposes.

11.4.1.2 Take by runoff dams

It is relatively straightforward to estimate the capacity of runoff dams using available data. However, it is complex to estimate the take by runoff dams as it involves a high degree of uncertainty. The reasons for this are:

- estimates of on-farm demands: average volumes of water extracted from domestic and stock dams cannot be accurately estimated because very few of these dams are metered. Current estimates of annual extraction from domestic and stock dams are uncertain and range up to ± 50 percent. This directly translates to a degree of uncertainty in overall take
- estimates of inflows to dams: the volume of inflows to each dam has a major impact on take, but observed data at this scale is not available and estimates of inflows at a local scale are uncertain. Data products estimating local surface runoff across Australia have been developed recently by various research institutions but are still in their infancy and cannot provide locally accurate data
- changes in on-farm demands over time: in the future it is possible that on-farm demands may change based on climate or agricultural economic drivers. In a drying climate landholders may attempt to increase their reliability of supply by increasing the capacity of their dams. If on-farm demands remain the same, this may or may not increase the long-term take
- losses and level of hydrologic connection: seepage rates from dams and each dam's location in the landscape are major elements in understanding take by runoff dams. It is difficult to generalise dam characteristics across a region and some levels of hydrologic connection to downstream waterways are low.



This means that take by runoff dams estimated at each dam site may be very different to the take by the same dams estimated at a major downstream waterway

- Interaction with other users: increased take by runoff dams in future is likely to reduce system inflows and cause lower allocations in the regulated system. This will reduce the take in the regulated system, making the net effect on take across the whole system uncertain. The likely magnitude of this effect is not clear

Victoria recently developed a new method for estimating annual take by runoff dams (Morden, 2017). It relies on hydrologic modelling of each individual dam in an area, taking into account rainfall, evaporation, dam inflows and on-farm demands. This modelling indicates that the long-term average annual take by runoff dams in Victoria's North and Murray water resource plan area can be estimated with an uncertainty range of about ± 50 percent to ± 100 percent.

11.4.1.3 Future growth in runoff dams

DELWP estimates that the number of unlicensed farm dams across Victoria grew by 0.25 percent to 0.55 percent a year between 2010 and 2015, with each new dam having a capacity of about 1.7 ML on average. This is the best available information on which to estimate growth into the near future.

Assuming a conservatively high growth rate of 0.55 percent a year, the capacity of runoff dams across Victoria's North and Murray water resource plan area is estimated to increase by 11.3 GL over 10 years. However, the inherent uncertainty in estimating take could mean that current long-term average take from existing runoff dams can be estimated only to within ± 60 GL to 120 GL.

Also, any estimates of take may alter if patterns of on-farm demands change because of climate or agricultural economic drivers. More runoff dams could lead to increased take, but a drying climate and changing patterns of on-farm demand could reduce take.

Given the high uncertainty associated with estimating take from runoff dams, it is not clear whether increased numbers and capacity of runoff dams will necessarily lead to increased take. Estimating take as a result of future growth is not practical because the uncertainty in estimated take is significantly greater than forecast growth.

This reasoning leads to two important assumptions which have been adopted for reporting take from runoff dams:

- estimating take as a result of future growth is not practical and so Victoria will assume no growth in runoff dams unless spatial data is updated to allow that growth to be measured directly
- if growth is not to be considered, then the best available information on which to base estimates of take is the spatial data from around 2005. This data could be adjusted to represent growth up to 2009, but this is not suitable as it would introduce more uncertainty, with little practical benefit

11.4.1.4 Future monitoring

The Water Resource Plan Risk Assessment (see [Appendix B](#)) indicates that runoff dams are not considered a significant risk for Victoria's North and Murray water resource plan area. It recognises that future growth may elevate this risk, which cannot currently be quantified. On this basis, Victoria proposes to focus effort on improving hydrological understanding of runoff dams.

Collection of data on numbers and volumes of dams will remain a lower priority until hydrological uncertainties are reduced.

Victoria will review the impacts of runoff dams and the risks they pose to water resources as part of:

- the *Northern Region Sustainable Water Strategy* (DSE, 2009) outlined in the Victorian Water Act
- the Long-Term Water Resource Assessment outlined in the Victorian Water Act
- action 8.4 of *Water for Victoria* (DELWP, 2016) which commits to better monitoring and reporting on the effects of emerging water uses on other uses in the Victorian Water Accounts

These processes will provide opportunities to review and improve hydrological understanding of runoff dams in Victoria's North and Murray water resource plan area, and to consult stakeholders and communities about risks posed by runoff dams and possible mitigation measures.

11.4.1.5 Comparison with risk assessment

The Water Resource Plan Risk Assessment (see [Appendix B](#)) concluded that the risk associated with growth in runoff dams during the water resource plan period to 2029 was rated medium to very low, depending on the specific end-use of the water. Closer examination of the results indicated that runoff dams were a low to very low risk in almost all cases.

The risk to low-reliability consumptive water shares was slightly elevated, but still only rated as a medium risk. However, this risk rating was based on:

- a scenario of an additional 26.5 GL of domestic and stock dams in the water resource plan area within 10 years. This was largely based on farm dam growth assessments undertaken by the MDBA in 2008
- an assumption that the 26.5 GL of extra dams will have a total additional take of 26.5 GL/yr - that is, long-term average annual take = 100 percent of dam capacity. This "rule-of-thumb" was known to be a conservatively high assumption and was adopted in the absence of any comprehensive modelling to confirm the true figure

While these assumptions were based on the best information available at the time, more recent studies have shown that both assumptions are conservatively high. More appropriate assumptions would be:

- a scenario of an additional 0.55 percent of domestic and stock dams per year (by number) in the water resource plan area giving a total of approximately 11 GL of dams over 10 years. This is based on detailed assessment of growth in farm dams over selected areas in Victoria between 2000 and 2016, and more accurate assessment of dam numbers and volumes to each WRP region
- long-term average annual take from runoff dams in Victoria's North and Murray water resource plan area could vary from less than 20 percent of dam capacity to more than 60 percent, based on recent modelling developed by DELWP (Morden, 2017). This modelling produced estimates of take which were lower than expected, primarily due to smaller than expected catchment areas upstream of each dam

On this basis, the additional take from 11 GL of extra runoff dams could be 2.2 GL/yr or less, or 6.6 GL/yr or more. It is clear that the additional take due to growth in runoff dams appears to be a small fraction of that suggested in the risk assessment. The risk assessment used concepts of impact magnitude, duration, and extent to determine how a threat such as growth of farm dams might affect the availability or quality of water. One of the key factors leading to the "medium" risk rating in some cases was the potential magnitude of impact. Given that this magnitude has now been revised down, the "medium" risk rating is no longer appropriate for any risks relating to farm dams. In effect, this means that farm dams do not present a significant risk to water resources. All the numbers described above are provided in [Table 11-7](#) and [Table 11-8](#) for clarity.

Table 11-7: Victorian Murray water resource plan area

	Risk assessment figures	Revised WRP figures
Current number of dams (number)	10,000	14,259
Current capacity of dams (ML)	-	26,900
Future growth rate (% per year)	1%	0.55%
Future growth over 10 years (number)	1,000	804
Future growth over 10 years (GL)	1.5	1.4
Future additional take over 10 years (GL/yr)	1.5	0.3 to 0.8

Table 11-8: Northern Victorian water resource plan area

	Risk assessment figures	Revised WRP figures
Current number of dams (number)	166,660	103,895
Current capacity of dams (ML)	-	234,235
Future growth rate (% per year)	1%	0.55%
Future growth over 10 years (number)	16,666	5,858
Future growth over 10 years (GL)	25	10
Future additional take over 10 years (GL/yr)	25	2 to 6

Strategy number 1 (see [Table 4.2.1](#) in [Appendix B](#)) for addressing risk involves better recording, monitoring and accounting for significant uses of water and will ensure Victoria's understanding and management of interception continues to improve.

Victoria will update the risk assessment for farm dams when the uncertainty associated with estimates of take can be reduced.

11.4.1.6 Methods for estimating take

The long-term average annual take is the net change in streamflow caused by each dam. It includes the combined effect of storage, on-farm demands and rainfall and evaporation from the dam surface.

Victoria has developed a new method for estimating annual take by farm dams based on the best available data (Morden, 2017). The method itself is defensible but as many of the inputs are uncertain, it is not possible to estimate long-term average annual take by runoff dams with a reasonable degree of confidence.

Overall, the capacity of all runoff dams in Victoria's North and Murray water resource plan area is about 261 GL based on aerial imagery from 2005. This includes dams for irrigation as well as those for domestic and stock use. As a result of uncertainty in modelling inputs, long-term average annual take could vary between 55 GL or less, and 155 GL or more, with a 'best estimate' of approximately 126 GL.

Note that this figure of 126 GL includes take by all dams including irrigation, commercial or basic rights. The method for calculating take for different types of dams is defined below.

11.4.1.7 Take by runoff dams excluding basic rights

The Basin Plan Schedule 3 item 17(d), 18(d), 19(d), 20(d), 21(d), 22(d) and 23(d) requires that the sustainable diversion limit (SDL) includes the 'long-term annual average limit on the quantity of water that can be taken by runoff dams (excluding take under basic rights) calculated on the basis of the quantity of water that could be taken under state water management law as at 30 June 2009'.

On this basis, the long-term annual average take by runoff dams excluding basic rights is estimated as 83.5 GL, which is the total volume of entitlements recorded in the Victorian Water Register associated with runoff dams as at July 2016. This volume of entitlements is equal to the maximum quantity of water which licensees could extract each year.

Data from the Victorian Water Register has been extracted as of July 2016. Due to ongoing improvements and data management within the Water Register, obtaining historical data from 2009 is currently not practical. However, Victoria's adherence to the Murray-Darling Basin Cap means that the total entitlements volume in 2016 has remained unchanged since before 2009. As a result, licence information from July 2016 is considered a suitable source of information for this situation.

Permitted and actual take will be calculated using the same method as the SDL (see [Table 6](#) in [Appendix C](#))

11.4.2 Take by runoff dams under basic rights

The Basin Plan Schedule 3 item 17(f), 18(f), 19(f), 20(f), 21(f), 22(f) and 23(f) requires that the SDL includes the 'long-term annual average take of water by runoff dams under basic rights calculated on the basis of the take under the level of development that existed on 30 June 2009'.

Using hydrologic modelling as described in (Morden, 2017), the long-term average annual take by all runoff dams is 126 GL, based on aerial imagery in 2005. This will be adjusted proportionally based on dam volumes to represent only take by runoff dams under basic rights, excluding take by runoff dams which are licensed under section 51 of the Water Act. This adjusted figure for take is 85 GL, as described in [Table 11-9](#).

Permitted and actual take will be calculated using the same method as the SDL (see [Table 6](#) in [Appendix C](#))

Table 11-9: Calculating take from runoff dams in Victoria's North and Murray water resource plan area

Component	Volume	Method
Capacity of runoff dams	261 GL (A)	Source: <i>spatial data</i>
Total long-term average annual take	126 GL (B)	Source: <i>hydrological modelling</i>
Volume of section 51 licences associated with runoff dams	84 GL (C)	Source: <i>Victorian Water Register</i>
Capacity of runoff dams under basic rights	178 GL (D = A - C)	Calculation

Component	Volume	Method
Take by runoff dams (excluding take under basic rights)	84 GL (= C)	Calculation
Take by runoff dams under basic rights	85 GL (= B / A x D)	Calculation

11.4.3 Land use change

Net changes in interception associated with land use changes, excluding commercial plantations, are not expected to have a significant effect on the water resources of Victoria's North and Murray water resource plan area.

In recent decades, Victorian land use mapping indicates that there has been a shift from grazing activities on perennial and annual pasture to cropping activities in the Loddon and Avoca basins. In other areas, land uses have remained largely unchanged, despite some key difference in methods of attributing land use types in the available spatial data. The net effect of these changes on the catchment water balance is negligible.

Continuing higher density urbanisation around regional centres such as Bendigo and Shepparton will increase runoff and decrease groundwater recharge, although the impact is unlikely to be significant because the areas involved are expected to be relatively small. Lower density urbanisation will tend to increase numbers of runoff dams for domestic and stock purposes, which tends to decrease surface water runoff.

11.4.3.1 Commercial plantations

Commercial plantations are a significant industry in the Upper Murray, Kiewa and Ovens catchments, but less so in other catchments in Victoria's North and Murray water resource plan area. Plantations depend on rainfall and typically occur in regions with more than 600–800 mm of annual rainfall. Sufficient rainfall for commercial timber plantations occurs only in the eastern parts of the water resource plan area.

Based on spatial data from 2009 and 2016 sourced from plantation owners, and interpretation of aerial imagery from those periods, commercial plantations cover an area of 667 km² of Victoria's North and Murray water resource plan area (see [Table 11-10](#)). The area of plantations has remained stable since 2009, decreasing by only 0.4 percent and only in the Goulburn catchment. There are no indications within the plantation industry that the current stable trend will change in the near future. On this basis, little or no growth is expected to occur over the next decade, so interception by commercial plantations is expected to remain equal to 2009 levels.

Assessment of trends in plantation growth for years between 2009 and 2016 has not been undertaken. However, it is noted that all 2016 plantation areas were also present in 2009. This indicates that no new areas were planted in this period, suggesting that the years between 2009 and 2016 are unlikely to have shown any alternative trends.

The risk assessment considered a scenario of 5 percent increase in plantation area during the life of the Water Resource Plan. In general, this scenario was found to represent a low risk. The only exception was some low reliability water entitlements, where the risk was found to be moderate. As discussed above, more recent evidence suggests that there has been no growth in plantation areas and that this trend is expected to continue. On this basis, growth in plantations is expected to represent zero risk for the foreseeable future.

Table 11-10: Area of commercial plantations in Victoria’s North and Murray water resource plan area

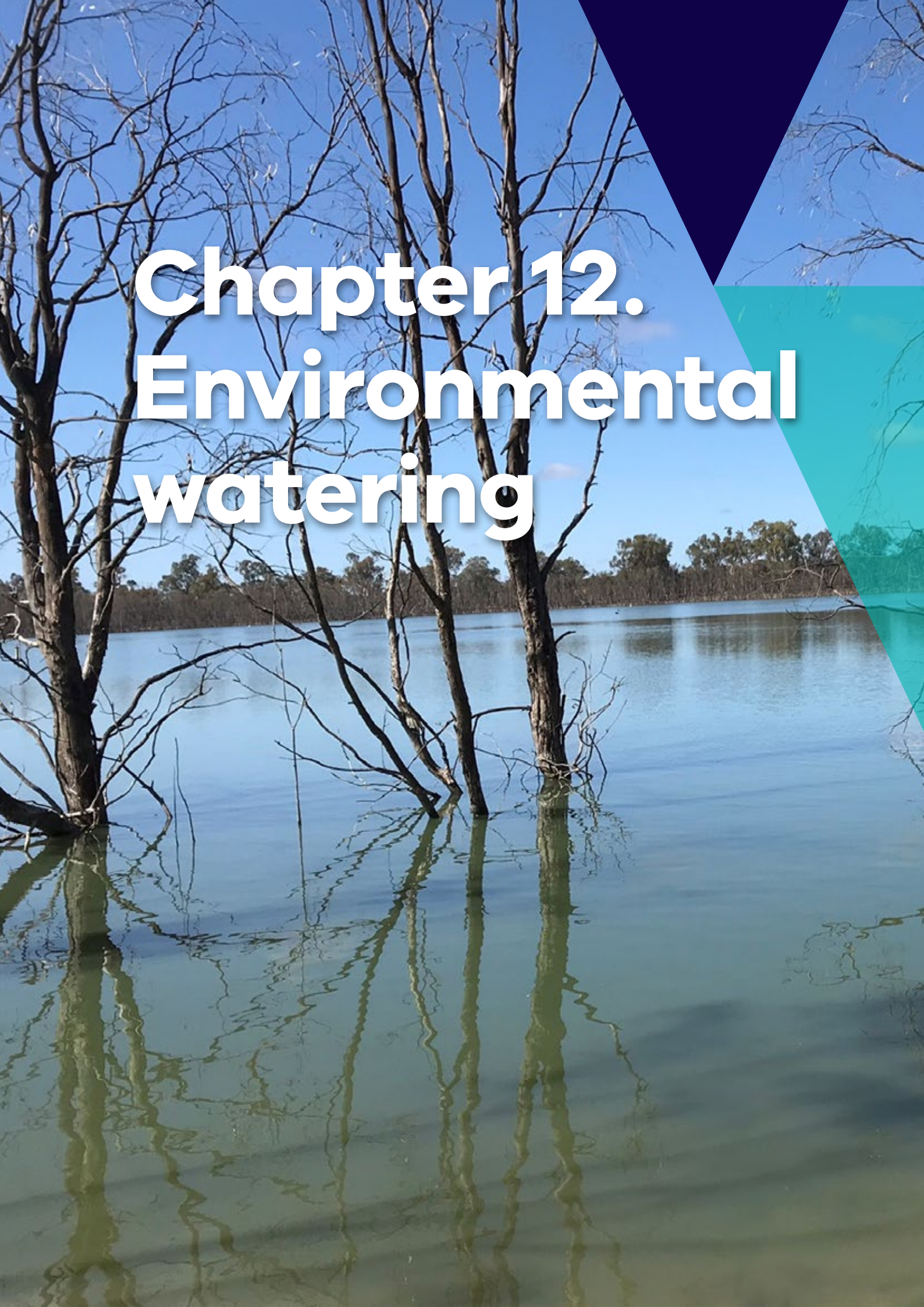
Plantation type	2009	2015
Softwood plantations (km²)	595	592
Hardwood plantations (km²)	75	75
Total (km²)	670	667

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No interception activity has been identified to have a significant impact, nor to have the potential to have a significant impact, on water resources that are in or are hydrologically connected to the Victoria’s North and Murray water resource plan area.

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Chapter 12. Environmental watering



12. Environmental watering

This Chapter outlines how Victoria undertakes its environmental watering to achieve the environmental objectives and outcomes under Chapter 8 of the Basin Plan.

The Chapter also outlines how Victoria will manage resources to ensure environmental watering is not compromised by Victoria's North and Murray Water Resource Plan. It outlines how Victoria will comply with Parts 4 and 6 of Chapter 10 of the Basin Plan.

12.1 Basin Plan requirements for environmental watering

The Basin Plan sets objectives and targets to guide the use of water for the environment. Victoria's environmental water planning and management framework ensures these targets and objectives will be met. Victorian legislation and subordinate legislative instruments provide catchment management authorities and the Victorian Environmental Water Holder with the functions and powers to manage environmental water in Victoria. State and Commonwealth governments' monitoring and evaluation programs are used to report progress towards meeting the Basin Plan environmental objectives. Basin Plan requirements for environmental watering have three key components:

- Identification of water available for the environment (under section 10.09 of the Basin Plan), being either held environmental water (entitlements) or planned environmental water (water protected for the environment by rules) (see [Section 12.4](#))
- Management of environmental watering (under Part 6 of Chapter 10 of the Basin Plan) in a way that is
 - consistent with Chapter 8 of the Basin Plan (see [Section 12.3](#))
 - coordinated (see [Section 12.7.4](#)) and
 - does not reduce the protection of planned environmental water (see [Section 12.4.2.3](#))
- Management of the resource (under Part 4 of Chapter 10 of Basin Plan) to ensure that the meeting of environmental watering requirements is not compromised (see [Section 12.8](#)).

12.2 Victoria's environmental water planning and management framework

Environmental water management in Victoria's North and Murray water resource plan area is managed under Victorian and Commonwealth legislation. The Victorian Water Act established the Victorian water entitlement framework which provides the basis for management of Victoria's water resources (see [Chapter 7](#)).

The Victorian Water Act provides for the following key foundations that supports the management of water resources and sets up protections for the environment. These key foundations are:

- limits on authorisation for the take and use of water within resource conditions limits
- consideration of environmental impacts and water quality impacts before authorising extraction
- consideration of the impact that additional proposed extraction will have on other users, including environmental water holders
- requirements to maintain the environmental water reserve
- consultation between water corporations and catchment management authorities in management of water across Victoria

Victoria's environmental water planning and management framework coordinates and defers responsibility for different tasks to different partners (see [Section 12.3](#)) to bring about positive environmental results for waterways (rivers, wetlands and floodplains). A key element of the environmental water planning and management framework is effective monitoring and evaluation which allows for adaptive management of environmental water (see [Figure 12-7](#)).

The Victorian Water Act and the Commonwealth Water Act, including the Basin Plan, set out the objectives for environmental water management in Victoria.

The Victorian Water Act provides a strong foundation for considering and mitigating environmental impacts of the take and use of water from a system and construction of works related to the take and use of water. Therefore, while the Victorian Water Act pre-dates the Basin Plan, the arrangements for managing environmental water entitlements in the Victorian Water Act closely align with Basin Plan requirements.

The Victorian Water Act establishes the Environmental Water Reserve (EWR) in Victoria. The reserve comprises water that is set aside for the environment as an environmental entitlement or bulk entitlement, and through conditions on bulk entitlements, licences, permits or management plans. The Environmental Water Reserve's objective is to preserve the environmental values and health of water ecosystems, including their biodiversity, ecological functioning, quality of water and other uses that depend on environmental condition. The EWR must be maintained through the management of the take and use of water for consumptive purposes. Additionally, the Victorian Environmental Water Holder must use its water holdings consistent with the EWR objective.

The Victorian water planning framework is supported by key policy documents which sit beneath the legislation. These documents, among other things, detail how water resources are shared, provide guidance on integrated waterway health management, emphasise shared or multiple benefits of environmental water, and support resource management under climate change.

In the Murray-Darling Basin, environmental watering is further supported by the Basin-wide environmental watering strategy (see [Section 12.6.4.1](#)) and the long-term watering plans (see [Section 12.6.4.2](#)), developed in accordance with Basin Plan requirements.

Planning, delivery and monitoring of environmental watering is carried out by a range of environmental water partners in Victoria and interstate. These are outlined in [Section 12.3](#) and [Section 12.7](#) and explained further in the long-term watering plans.

12.3 How does environmental watering happen?

Water for the environment is managed and delivered through key partnerships and actions:

- DELWP oversees legislation, policy and investment for water resources, waterway health and environmental water across the state
- catchment management authorities (CMAs) are designated waterway managers, and set regional priorities and objectives for waterway health with their local communities, including environmental water
- water corporations manage water storage and delivery to meet entitlements and as a delegate of the Minister manage licences and set local management rules for take in unregulated systems
- the environmental water holders —VEWH and CEWH —manage environmental water holdings
- these Victorian agencies work with upstream and downstream states to plan and deliver coordinated environmental objectives across state borders

The roles of the DELWP, CMAs, water corporations, VEW and CEWH as the principal managers of environmental water in Victoria are explained further below.

In Victoria the Department of Environment, Land, Water and Planning, catchment management authorities, water corporations, the Victorian Environmental Water Holder and the Commonwealth Environmental Water Holder all play an important role in the delivery of environmental water and supporting environmental outcomes in Victoria's wetlands and rivers. Long-term planning is critical to achieving environmental outcomes and the Victorian environmental management framework ensures the relevant parties contribute to the long-term planning processes.

Under section 10.26 of the Basin Plan Victoria's North and Murray Water Resource Plan must ensure environmental watering occurs consistent with Chapter 8 of Basin Plan and long-term watering plans. The accredited text below outlines how Victoria will meet this requirement.

12.3.1 Department of Environment, Land, Water and Planning

The Department of Environment, Land, Water and Planning (DELWP) is responsible for overseeing waterway health and environmental water programs in Victoria, including legislation, policy and investment to ensure on-ground outcomes are achieved. DELWP secures the protection of held environmental water, planned environmental water and other forms of water that add environmental benefit, but are not exclusively committed to the environment, by ensuring there are caps on surface diversions and where required on groundwater allocations.

DELWP prepares long-term watering plans (see [Section 12.6.4.2](#)) in accordance with Basin Plan. These documents set out the ecological objectives and targets for priority environmental assets and priority ecosystem functions for each water resource plan area. Long-term watering plans build on the environmental water planning work undertaken at the regional and asset scale catchment management authorities Regional Catchment Strategies, regional waterway strategies and environmental water management plans.

DELWP invests in staff and projects at catchment management authorities to enable local management and delivery of waterway health and environmental water outcomes, including prioritisation of waterways and objective-setting with local communities. DELWP also invests in staff at the Victorian Environmental Water Holder to manage Victoria's held environmental water.

DELWP and the Arthur Rylah Institute also do long-term monitoring of held environmental water in rivers and wetlands under the Victorian Environmental Flows Monitoring and Assessment Program and Wetlands Monitoring and Assessment Program. This monitoring is vital for reporting on outcomes of environmental water use and will be used significantly for Victoria's first Schedule 12 Matter 8 reporting on environmental outcomes at the asset scale (see [Section 15.7.1](#))

12.3.2 Catchment management authorities

Catchment management authorities (CMAs) are statutory bodies established by the *Catchment and Land Protection Act 1994* (Vic), and have functions and powers under Part 10 of the Victorian Water Act for waterway management (see [Section 6.4](#)).

CMAs are responsible for the integrated planning and coordination of land, water and biodiversity management in each catchment and land protection region. CMAs are responsible for:

- identifying key environmental assets and related ecosystem functions (known as priority environmental assets and priority ecosystem functions under Basin Plan) (see [Section 12.5](#))
- setting environmental watering objectives for those key environmental sites through Environmental Water Management Plans (see [Section 12.6.4](#))
- develop seasonal watering plans based on regional catchment strategies, waterway strategies and environmental water management plans

See [Figure 12-6](#) for a summary of how Victorian planning instruments align with Basin Plan environmental watering requirements.

Catchment management authorities are designated waterway managers and have operational responsibility for delivering of environmental water in line with direction given by the Victorian Environmental Water Holder. CMAs are responsible for developing seasonal watering proposals to support environmental outcomes for priority environmental assets and priority ecosystem functions. See [Section 12.3.4](#) for discussion of VEWH's role in the use of its environmental entitlements (held environmental water).

CMAs also work with water corporations and the Victorian Environmental Water Holder to identify how the system can be managed to deliver water to consumptive users and where possible meet some environmental requirements as well.

12.3.3 Rural water corporations

Rural water corporations operate the major water storage and supply infrastructure to provide rural water services such as water supply, irrigation drainage and salinity mitigation services for irrigation and supply water for the environment.

Rural water corporations are regularly the storage manager or operator and/or resource manager for declared systems. This means they have additional responsibilities for managing the system for all entitlement holders, including water accounting, directing releases, reporting obligations and input to or preparation of operating arrangements, metering programs and reviews of entitlements.

12.3.4 Victorian Environmental Water Holder

The Victorian Water Act was amended to establish the Victorian Environmental Water Holder (VEWH) on 1 July 2011 as a statutory body responsible for holding and managing water entitlements used for environmental purposes. Bulk entitlements, environmental entitlements and water shares have been assigned to the VEWH. Collectively these entitlements are called the VEWH water holdings.

The objectives of the VEWH set out in section 33DC of the Victorian Water Act are to:

manage the Water Holdings for the purposes of:

- a) *maintaining the environmental water reserve in accordance with the environmental water reserve objective*
- b) *improving the environmental values of water ecosystems, including their biodiversity, ecological functioning and water quality, and other uses that depend on environmental condition*

The functions of the VEWH described in section 33DD of the Victorian Water Act are to:

- a) *apply and use water in the Water Holdings and otherwise exercise rights in the Water Holdings in accordance with the Water Act*
- b) *acquire and purchase rights and entitlements for the Water Holdings and dispose of and otherwise deal in rights and entitlements in the Water Holdings in accordance with the Water Act*
- c) *plan for the purposes of paragraphs (a) and (b)*
- d) *enter into any agreements for the purposes of paragraphs (a) and (b)*
- e) *enter into any agreements for the purposes of the coordination of the exercise of rights under any water right or entitlement held by another person, including the Commonwealth Environmental Water Holder*
- f) *enter into any agreements with any person for the provision of works by that person to enable the efficient application or use of water in the Water Holdings*

The Victorian Water Act also describes the planning and reporting framework in which the VEWH is required to operate.

This includes the requirement to develop:

- a four-year corporate plan
- an annual seasonal watering plan (see [Section 12.6.5.2](#))
- seasonal watering statements as required
- an annual report which is required under the *Financial Management Act 1994* (Vic).

The Government's expectations of the VEWH are outlined in the statutory Ministerial rules relating to the Victorian Environmental Water Resource Holder 2014, issued by the Minister for the Environment. Clause 12.1(c) requires the VEWH to have regard to objectives and requirements of the Basin Plan and any instruments made under it, including Victoria's North and Murray Water Resource Plan.

12.3.5 Commonwealth Environmental Water Holder

The Commonwealth Environmental Water Holder (CEWH) was established under the Commonwealth Water Act. The CEWH must use the Commonwealth Holdings to protect or restore the environmental assets of the Murray-Darling Basin to give effect to relevant international agreements. The CEWH is obliged to manage holdings to deliver environmental water objectives set through the Basin Plan's environmental watering plan.

One of the Victorian Environmental Water Holder's roles is to coordinate with the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority to authorise use of held environmental water in water resource plan areas and to optimise the benefits of all water for the environment in Victorian waterways. Each year the CEWH transfers water allocations to the VEWH to be used in Victoria and the VEWH takes responsibility for delivering that water in Victoria. However, the responsibility for decision-making and

accountability for how the water is used remains vested with the CEWH.

The Victorian Environmental Water Holder works closely with the Commonwealth Environmental Water Holder in areas where Commonwealth water holdings may be used in Victoria. The VEWH and CEWH have an agreement to collaborate and coordinate their activities.

CEWH carries out the long-term intervention monitoring program across the Murray-Darling Basin, including in the Goulburn River in Victoria. This monitoring will be used in reporting on outcomes of environmental water use for Victoria's first Schedule 12 Matter 8 reporting on environmental outcomes at the asset scale. (see [Section 15.7](#) for more information on reporting under Schedule 12 of the Basin Plan)

12.4 Water that achieves or contributes to environmental outcomes

Across all water resource plan areas, there are three key ways that Victorian water management meets environmental objectives:

1. Environmental water entitlements (bulk entitlements and environmental entitlements) and water shares that are held or managed by the Victorian Environmental Water Holder or Commonwealth Environmental Water Holder (CEWH) (see [Section 12.4.2.1](#)).
2. Passing flow requirements specified for environmental purposes under bulk entitlements or water supply protection area water management plans (see [Section 12.4.2.2](#)).
3. Other water managed through water system management rules, including passing flows not specified as having an environmental purpose, and unregulated river diversion rules. This includes water which remains in the system after consumptive and environmental entitlements are taken out - referred to as 'above cap' water - and water used primarily for consumptive purposes, but which can also have a benefit for the environment (see [Section 12.4.3](#)).

12.4.1 How water is managed differently in regulated and unregulated systems and declared and undeclared systems

The management of environmental objectives in Victoria's surface water systems depends on whether the water resources are unregulated or regulated and whether the system is declared or undeclared. For more information about water resource management in regulated and unregulated and declared and undeclared systems (see [Section 4.1](#)).

In northern Victoria, the unregulated systems are tributaries of the larger regulated rivers, or are the sections of the regulated rivers upstream of the reservoirs. There are many unregulated rivers and streams that are important for the environment in the water resource plan areas. As there are no major storages on these rivers and streams, flows in these unregulated systems are largely unmodified.

In unregulated surface water systems there is no held environmental water that can be stored and released from storage to manage for specific and measurable environmental objectives. Environmental objectives in unregulated systems are to protect the existing conditions (habitat), rather than provide a specific flow to meet an environmental objective for example, fish, vegetation or connectivity. No priority environmental assets or priority ecosystem functions have been identified in unregulated surface water systems.

In unregulated surface water systems, the impact on the environment is managed by specifying limitations on the timing and the rate of take in bulk entitlements and take and use licences. The volume of water which can be extracted by consumptive users can be further limited by restricting or banning take for take and use licence holders during times of low flow (see [Section 7.2.2.5](#)). Note that the domestic and stock take is still permitted even during bans which apply to use for irrigation and industry (see [Section 7.2.1](#)).

All unregulated surface water systems are undeclared, but not all undeclared systems are unregulated. Regulated systems that are undeclared include, among others, the Coliban system which is regulated to supply water to Bendigo and surrounding towns and rural customers, and the North East Water Benalla system which includes several small urban storages - Loombah and McCall Say reservoirs - which regulate Ryans Creek to supply drinking water to Benalla. In these systems, the impact on the environment is managed by limiting the volume of take from the system through the relevant urban water corporation bulk entitlements (which may include obligations to provide passing flows which have multiple purposes) and conditions on take and use licences (see [Section 7.2.2.2](#)).

In undeclared systems, if it is deemed that the current sharing arrangements are not providing sufficient protection for the environment or the consumptive users, then the Minister may declare a water supply protection area for the protection of surface water, groundwater or both in a defined area. This is not the same as 'declaring' a system for the purpose of managing water resources under section 6A of the Victorian Water Act. A legally enforceable Streamflow Management Plan must then be developed for Ministerial release. The aim of these plans is to manage the surface water or groundwater or both resources of the water supply protection area equitably and to ensure the long-term sustainability of the resources. An extensive consultative process is required to prepare the plan.

Improvements and changes to water resource management are possible under the Victorian Water Act and the water entitlement framework provides the processes to protect other users and the environment (see [Chapter 7](#) for more detail).

Regulated systems contain structures such as dams or major diversion weirs which exert significant control over the flow of water in the river for consumptive users. The impact of regulation on the environment will depend upon the size and number of storages and weirs, the level of consumptive use, and the overall volume of flow the river receives. For example, the Ovens system has two relatively small reservoirs, and receives relatively high annual river flows and is sometimes called semi-regulated, while the Goulburn River has two large storages and high consumptive demand, so the impact on the environment from regulation is much less in the Ovens River than in the Goulburn River.

Regulation of river systems has a significant impact on the environmental values of the system. Storages capture water during naturally high flow periods and deliver unnaturally high flow down the river during summer for consumptive use. Storages create barriers to flow connectivity and biota migration. Environmental water is used to lessen the impact of regulation and consumptive uses of water by providing flows for priority environmental assets and priority ecosystem functions (see [Section 12.5](#)).

In declared and regulated systems in the water resource plan area, environmental water requirements are met with held environmental water and can also be met through planned environmental water (see [Section 12.4.2](#)) and other water (see [Section 12.4.3](#)). Other water in the system also supports environmental water outcomes. This includes passing flows requirements that meet multiple objectives, and delivery of water from reservoirs to downstream users, delivery of water from inter-valley trade accounts, or transfers from storages.

Environmental water in both declared and undeclared systems is protected by the Victorian entitlement framework (see [Section 7.2.3](#)).

12.4.2 Held and planned environmental water

The Commonwealth Water Act provides for two types of environmental water: held and planned environmental water.

Held environmental water is defined under section 4 of the Commonwealth Water Act to mean water available under a water access right, water delivery right or irrigation right for the purposes of achieving environmental outcomes, including water that is specified in a water access right to be for environmental use.

Planned environmental water is defined by section 6 of the Commonwealth Water Act and has three components:

- water committed or preserved by an instrument
- water committed or preserved for the purpose of achieving an environmental outcome or other environmental purposes as specified in an instrument
- water that cannot, to the extent it is committed or preserved, be taken for any other purpose

12.4.2.1 Held environmental water in Victoria

In the Victorian context, held environmental water is any water held under an entitlement for an environmental purpose. This water includes:

- environmental entitlements or bulk entitlements issued to the Victorian Environmental Water Holder (VEWH) to provide water to be used for environmental purposes
- entitlements such as take and use licences or water shares held by the VEWH or CEWH
- a passing flow specifically allocated to the holder in an environmental entitlement for environmental benefit or purpose

This water is considered held environmental water under the Commonwealth definition because it is water specifically committed to environmental purposes under a water access right.

Held environmental water is protected by Victoria's water entitlement framework which provides security to all entitlement holders, regardless of use. Held environmental water can be equivalent to high-reliability entitlement or low-reliability entitlement, or it can be provisional and have reliability as described in the bulk or environmental entitlements.

Held environmental water is protected by the Victorian entitlement framework (see [Section 7.2.2](#)) which provides for:

- secure and enduring entitlements
- the limits on take through sustainable diversion limits and permissible consumptive volumes
- the clear consultative process for changing entitlements
- the annual process to allocate water to entitlements
- the ability to trade
- Ministerial intervention only during extreme events to ensure supplies for critical human water needs
- a regime for compliance and enforcement

All entitlements in Victoria are recorded on the Victorian Water Register (see [Section 7.3.2](#) and [Section 15.3.4](#)). Information about the holder of the entitlement, where the water may be taken and used, and the volumes authorised by the entitlement, are described in this register.

[Section 12.3](#) outlines how environmental watering objectives are achieved through the use of held environmental water and supported by planned environmental water or water not otherwise allocated in the system, including minimum passing flows for system water. Protection and rules for passing or minimum flow obligations are outlined in the respective bulk or environmental entitlement instrument for each system.

The use of held environmental water is often closely integrated with other types of water use. The VEWH works closely with catchment management authorities and storage managers and, where practical, seeks opportunities to adjust the timing and route for delivering consumptive water to achieve environmental objectives efficiently. This can include 'piggy-backing' delivery of environmental water on the delivery of consumptive water or passing flow obligations to maximise ecological outcomes (see [Section 12.4.3](#)).

Held environmental water in the Victorian Murray and Northern Victoria water resource plan areas, including water held for the Snowy River, is listed here in ([Table 12-1](#)) and in more detail in [Table 3](#) in [Appendix E](#).

Table 12-1: Summary of environmental water holding as at 30 April 2019 excluding any entitlement volumes for NVIRP entitlements

Water Resource Plan area	Volume (ML)	Reliability	Holder
Victorian Murray	89,395	High	VEWH
	112,167	Low	VEWH
	149,300	Provisional ^(a)	VEWH
	362,307	High	CEWH
	35,413	Low	CEWH
Northern Victoria	131,534	High	VEWH
	196,166	Low	VEWH
	100	Provisional ^(a)	VEWH
	328,060	High	CEWH
	43,393	Low	CEWH

a. Provisional entitlements have special rules about when they are made available and where they can be used. For more detail see relevant bulk and environmental entitlements on the Victorian Water Register

12.4.2.2 Planned environmental water in Victoria

Section 10.09(1) of the Basin Plan requires the identification of planned environmental water. A review of Victoria's bulk entitlements and statutory management plans in Victoria's North and Murray water resource plan area was undertaken to determine where planned environmental water was in northern Victoria. The review looked for water which had the following conditions:

- water is committed or preserved
- the commitment or preservation is specifically set aside for achieving environmental outcomes either for a specific environmental purpose or environmental purposes more generally
- the water that is committed or preserved cannot be taken for another purpose because it is protected from other forms of take or use

It is difficult to align Victoria's arrangements to the Commonwealth definition of planned environmental water with its exclusive preservation requirements because:

- minimum passing flows that appear in some bulk entitlements are generally not preserved exclusively for an environmental purpose or outcomes as specified in section 6 of the Commonwealth Water Act. Passing flow requirements tend to serve multiple outcomes as shared benefits and are rarely identified as being for an environmental purpose
- where water is committed or preserved, or required to exist within the system such as a minimum passing flow, for a specified environmental purpose or to meet a specific environmental outcome, the Commonwealth definition deems that committed or preserved water cannot be taken for any other purpose. In Victoria, this requirement cannot be met where a person has a right to take water for domestic and stock purposes and it is not accounted for in measuring for passing flow

There are instances in Victoria's North and Murray water resource plan area where instruments meet the Basin Plan definition of planned environmental water as described here. These are:

- minimum passing flows available under the Bulk Entitlement (Broken System – Goulburn-Murray Water) Conversion Order 2004
- minimum passing flows available under the Bulk Entitlement (Ovens System – Goulburn-Murray Water) Order 2004
- minimum passing flows available under the Upper Ovens River water supply protection area
- Water management plan (GMW 2011)

Planned environmental water in Victoria's North and Murray water resource plan area is protected in two ways. Planned environmental water is protected through the instruments that establish planned environmental water and the instruments that regulate water resource management in Victoria under the Victorian Water Act. Also the provision of planned environmental water is also supported by measures under the Victorian Water Act such as the Environmental Water Reserve and offences for taking water without authorisation. These are considered 'rules and arrangements' relating to the planned environmental water and are identified in [Table 2](#) of [Appendix E](#) for the purposes of section 10.09(1) of the Basin Plan.

12.4.2.3 No net reduction of planned environmental water

Section 10.28 of the Basin Plan requires that there is no net reduction in the protection of planned environmental water from the protection provided under state law immediately before the commencement of the Basin Plan.

Of the three identified cases of planned environmental water identified in Victoria's North and Murray water resource plan area, there have been no changes to instruments or rules for the water in the Ovens system.

There was a change to the instrument Bulk Entitlement (Broken System – Goulburn-Murray Water) Conversion Order 2004 (Broken BE) for the Broken system in 2017 which altered the arrangements to provide flexibility to manage extreme events. The provision provides the ability for the Authority (Goulburn-Murray Water) and the waterway manager (Goulburn-Broken CMA) to agree to a reduction in minimum flows or an increase in maximum passing flows. The two parties would also need to consider the period required for the change and any necessary monitoring or mitigation. This could occur because of extreme dry conditions, or because of maintenance works or other unforeseen events. A change to reduce the passing flows in a period of extreme dry conditions would have the positive impact of enabling the Authority to run the system for longer.

The change to the rule relating to planned environmental water in the Broken system has not had an effect of causing a net reduction in the protection of the planned environmental water.

As there has been no net reduction in the protection of PEW on the following basis:

- while the change introduces an additional discretion as to how the requirement for a minimum passing flow is implemented, the discretion does not reduce the obligation to provide for the passing flow
- the long-term average volume of the planned environmental water is maintained as any change that causes a reduction in the passing flow will result in the environmental passing flow to be delivered over a longer period of time during extreme dry events
- the rule maintains the requirement to meet the environmental objectives through the requirement to mitigate any impact of the exercise

Further the rule below adds additional protections as it requires Goulburn-Murray Water to:

- a) keep a record of the modifications made to the volume of water passed as environmental flows in accordance with clause 12.4 of the Broken BE;
- b) keep a record of the total volume of water which would have been passed in accordance with the rules in the bulk entitlement (which constitutes the planned environmental water) over a rolling 2-year period;
- c) calculate the difference between the modified volume that is passed and the volume of water that would otherwise have been passed in accordance with the rules in the Broken BE;
- d) make the volume calculated as set out in paragraph c) available for release as agreed with the waterway manager

This means the volume forgone in extreme dry conditions is made available to the catchment management authority to release when conditions improve and mitigate the impact of the reduction. If extreme dry conditions extend beyond two years then the accumulated flow also extends beyond the two year period, but the Authority must continue to account for the reduction and must make the water available when the extreme dry conditions end.

**Basin Plan
s10.28**

1. The protection of the planned environmental water identified in this Index in response to section 10.09(1) of the Basin Plan is provided by the relevant bulk entitlement or management plan that specifically provides for the commitment or preservation of that water for environmental purposes. There has been no change to the rules relating to planned environmental water since 2012 in the following instruments:
 - a) Bulk Entitlement (Ovens System - Goulburn-Murray Water) Order 2004
 - b) Upper Ovens River Water Supply Protection Area Water Management Plan (2011)
2. As there has been no change to the instruments that protect the identified planned environmental water there has been no net reduction in the protection of planned environmental water. Nothing in Victoria's North and Murray Water Resource Plan lessens the protection of planned environmental water.
3. The Bulk Entitlement (Broken System-Goulburn-Murray Water) Conversion Order 2004 was amended in 2017 to provide for an extreme events measure under clause 12.4 of that Order in accordance with requirements under Part 13 of Chapter 10 of the Basin Plan. To temporarily reduce minimum environmental flows, the entitlement holder (Goulburn-Murray Water) must first agree with the waterway manager (Goulburn Broken Catchment Management Authority): the reduction sought; the period to which it will apply; monitoring; and any mitigation which is required. This is not considered to be a reduction in the protection of planned

environmental water as the total long-term average volume of the planned environmental water would be maintained.

4. To ensure there is no net reduction in the protection of planned environmental water, in exercising its discretion under clause 12.4 of the Bulk Entitlement (Broken System–Goulburn–Murray Water) Conversion Order 2004 (Broken BE) Goulburn–Murray Water must
 - a) keep a record of the modifications made to the volume of water passed as environmental flows in accordance with clause 12.4 of the Broken BE;
 - b) keep a record of the total volume of water which would have been passed in accordance with the rules in the bulk entitlement (which constitutes the planned environmental water) over a rolling two-year period;
 - c) calculate the difference between the modified volume that is passed and the volume of water that would otherwise have been passed in accordance with the rules in the Broken BE;
 - d) make the volume calculated as set out in paragraph available for release as agreed with the waterway manager.
5. The waterway manager, in agreeing to the volume and timing of release in accordance with (4)(d) must do so in accordance with the relevant Environmental Water Management Plan that establishes the long-term environmental objectives that will be supported by the planned environmental water.
6. The two-year period under (4)(b) does not apply where extreme dry conditions, which prohibit the ability to deliver accumulated flows, exist beyond the two-year period. Goulburn–Murray Water must account for the reduction during the extreme dry period and make the volume calculated in accordance with (4)(c) above for that period available as per (4)(d) and (5) above.
7. For the purposes of (6) above the extreme dry period ends when water availability increases so that passing flows can be restored, and the accumulated amount calculated under (4)(c) above can be made available.

<<end of accredited text for s10.28 of the Basin Plan>>

12.4.3 Other water that contributes to the environment

Under the Basin Plan it was expected by the MDBA that a large portion of system water and/or above cap water would be identified as planned environmental water. [Section 12.4.2.2](#) explains what planned environmental water is, and is not, and why not all above cap or system water can be identified as planned environmental water under Victoria’s framework (see [Figure 12-1](#)).

In Victoria this water is considered to have ‘shared benefits’ and can contribute to environmental objectives for priority environmental assets and ecosystem functions, and other environmental values in Victoria’s North and Murray water resource plan area. *Water for Victoria* (2016) outlines Victoria’s position on achieving shared benefits to meet a maximum amount of uses from limited water resources. Victoria aims to use water to maximise the benefit achieved from environmental water and to meet the objectives of key groups in the community, including Traditional Owners, recreational users, domestic and stock users, and the environment.

Environmental water managers work with river operators to identify how all types of water can be best utilised to meet multiple objectives, including those for the environment. They coordinate the delivery of held environmental water with above cap and system water, as well as planned environmental water and consumptive water en route, to meet environmental objectives (see

[Section 12.4.3](#) and [Section 12.3](#)). For example, sometimes the timing and route for delivery of consumptive water can be altered to achieve environmental objectives without using environmental water.

Note that the most effective use of all water in the system is being explored through the combined New South Wales-Victoria-South Australia sustainable diversion limit adjustment project, Enhancing Environmental Water Delivery. This is to be completed in 2024.

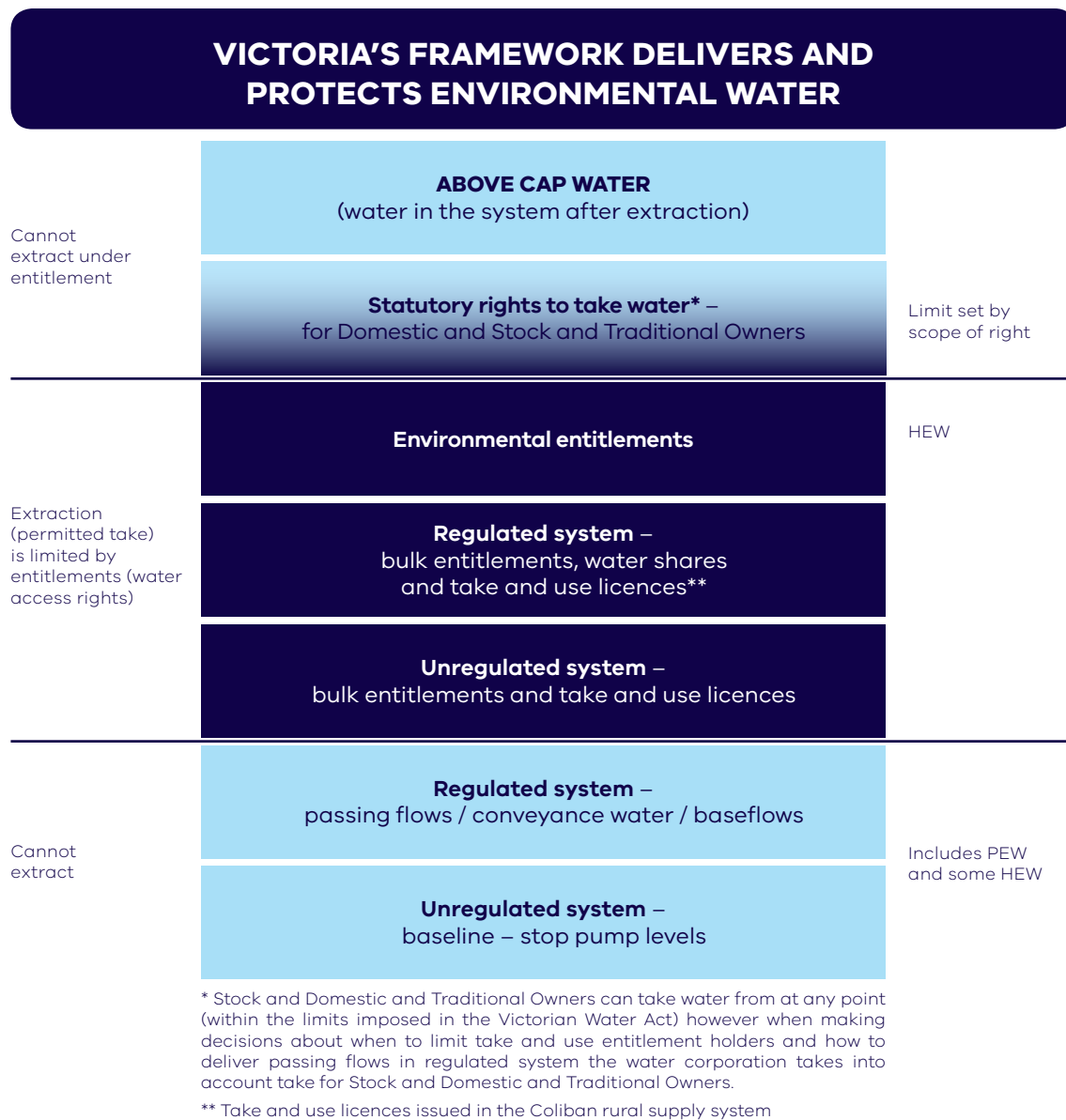


Figure 12-1: Victorian entitlement framework protects environmental water

12.4.3.1 Above cap

Above cap water is described in [Section 7.2.2.4](#). Environmental water managers will consider how much above cap water is in the system before requesting release of held environmental water from storage. This includes considering unregulated flows below the storage such as tributary inflows or spills, unregulated flows above the storage, and upcoming weather conditions.

Unregulated flows occur naturally in a waterway, generally after heavy rainfall and when storages spill. Heavy rainfall resulting in unregulated flows may naturally meet an environmental objective, so delivery of held environmental water is not needed. Held environmental water may also be used to extend the length of natural unregulated flow. Above cap water can contribute to environmental objectives for priority environmental assets (see [Section 12.5.1](#)) and priority ecosystem functions (see [Section 12.5.2](#)) by requiring the use of less held environmental water than would otherwise be needed if the above cap water was not present.

12.4.3.2 System water

System water is all the water that is described in the bulk entitlements which is not for environmental or consumptive use (see [Section 7.2.2.4](#)). It is managed through obligations on the instruments, in particular entitlement holders' compliance with the conditions of their entitlements.

Environmental water managers consider what system water is in the system when requesting the release of held environmental water from storage. Environmental water managers work together with system operators to identify opportunities to use system water to achieve environmental outcomes. System water can contribute to environmental objectives for priority environmental assets and priority ecosystem functions by requiring the use of less held environmental water than would otherwise be needed if the system water was not present.

12.4.3.3 Consumptive water en route

Where possible, environmental water managers work with storage managers to seek environmental outcomes from the delivery of consumptive water. This includes timing delivery of consumptive water en route to provide an environmental benefit, or piggybacking held environmental water on consumptive water to increase the flow for an environmental benefit.

For example, in 2018, the Victorian Environmental Water Holder traded 1,000 ML into the Broken system and worked with Goulburn Broken Catchment Management Authority and the storage operator to release an autumn fresh to improve habitat for waterbugs, aquatic plants and to provide fish passage. The held environmental water (from the trade) was combined with system water in the form of a delivery of water from the inter valley trade account. By working with the storage managers, environment water managers were able to align the timing of environmental releases with the normal of delivery of the inter valley trade account which meant that less environmental water needed to be used to achieve the environmental flow objectives of the autumn fresh.

12.4.4 Protection of water that contributes to environmental objectives

While above cap water and system water, including many passing flows in the bulk entitlements, are not identified as planned environmental water for the purposes of the Basin Plan, these forms of water are protected under Victoria's entitlement framework. See [Section 7.2.2.4](#).

They are protected by:

- limiting the volume of water that may be taken from the system through entitlements such as water access rights, and setting permissible consumptive volumes and the sustainable diversion limit to make sure decision makers do not authorise the take of water above a sustainable volume
- establishing clear rules about when a person can and cannot take water from the system, including the time, place and rate of take to ensure passing flows in the system are maintained. This is particularly important in unregulated systems
- passing flows being described in bulk and environmental entitlements

In the Murray and Goulburn systems, early reserve rules mean that system operations water is very secure in these systems. This was recognised in the Risk Assessment ([Appendix B](#)) for Victoria's North and Murray water resource plan area which identified this system water as having high reliability and being less susceptible to variations in availability.

In undeclared systems, if the existing water resource management rules offer insufficient protection, the Minister may declare a water supply protection area under section 27 of the Victorian Water Act to address local risks to a water resource or the environment. The declaration of a water supply protection area requires the development of a management plan to establish additional rules to manage the resources in the declared area to address the local risks. For example, the Upper Ovens River water supply protection area water management plan (GMW, 2012) provides for environmental minimum flows to address risks to the environment. The water management plan provides for restrictions on take and rules for trade.

Water supply protection areas are also used to manage risks to the structural integrity of aquifers or impacts on water resources where there are significant hydrological connections between surface water and groundwater. This is discussed further in [Section 4.4](#).

12.4.5 Shared cultural and social benefits of environmental water

Environmental water can provide benefits beyond the ecological objectives for native fish, vegetation, waterbirds, amphibians and hydrological connectivity. The strategy *Water for Victoria* (DELWP, 2016) states that all water management agencies, including catchment management authorities and the Victorian Environmental Water Holder, will consider achieving shared benefits in environmental watering decisions, with the caveat that needs of the environment must not be compromised. Environmental watering in Victoria provides shared benefits through improving the condition of a waterway which benefits other uses of the waterway, for instance cultural outcomes, recreation and amenity. Through considering and planning for shared benefits, water management agencies are able to optimise a limited resource and help meet some objectives of key groups such as Traditional Owners and recreational users (see [Chapter 8](#) and [Chapter 13](#)).

Traditional Owner values and uses of water and cultural knowledge are increasingly being recognised in Victoria's water planning and management frameworks, including regional waterway strategies and sustainable water strategies. Most recently, Chapter 6 of *Water for Victoria* (DELWP, 2016) outlined actions to improve how the water sector recognises and manages for Aboriginal values and involves Traditional Owners in water management, including environmental watering. For details about how this is being done in northern Victoria, see [Chapter 8](#).

Traditional Owner objectives for water may overlap with environmental water objectives at times, but not in all cases. Consideration of Aboriginal objectives are made in environmental water planning and delivery.

Traditional Owners are increasingly involved in the setting of environmental water objectives through the Victorian environmental water planning process, and through engagement with Victoria's water resource plans, and are expressing a clear desire for stronger involvement in the future. Until now Traditional Owner involvement in environmental water planning has mainly been through consultation on the environmental objectives set in the planning documents: catchment management authorities have consulted on the watering objectives for priority environmental assets at long-term and annual scales (through Environmental Water Management Plans and Seasonal Watering Proposals respectively), and DELWP has consulted on the collated objectives and targets set for the water resource plan area in the long-term watering plan. Opportunities for greater involvement in the environmental watering objectives will continue to be developed for yearly and long-term planning by catchment management authorities, the Victorian Environmental Water Holder and the Department of Environment, Land, Water and Planning by working with Traditional Owners.

12.5 Priority environmental assets and ecosystem functions

Under the Basin Plan Victoria is required to identify priority environmental assets and priority ecosystem functions. Under the Victorian environmental management framework, environmental assets are described by the catchment management authorities in the regional waterway strategies and the seasonal watering proposals.

There is a wide range of aquatic native plants, wildlife and ecosystem processes in Northern Victoria and the Victorian Murray water resource plan areas which rely on healthy wetlands and rivers. Ecosystem functions that support these ecological values include geomorphological condition and hydrological connectivity. For the purposes of Basin Plan, a set of priority ecosystem functions have been identified.

Priority environmental assets and priority ecosystem functions have been identified in accordance with Chapter 8 and Schedule 8 of the Basin Plan. Victoria's approach to identifying priority environmental assets and priority ecosystem functions has been to focus on wetlands and rivers that can be receive held environmental water, because these are the systems which can be actively managed. Rivers and wetlands which cannot receive environmental water are still managed via land based management actions.

The priority environmental assets and priority ecosystem functions which benefit from environmental water planning and management arrangements are detailed in the Victorian Murray and the Northern Victoria long-term watering plans. These plans set out the ecological objectives and targets for priority environmental assets and the corresponding environmental watering requirement for these objectives. They are available on line at <https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/environmental-water/long-term-watering-plans>.

12.5.1 Priority environmental assets

The priority environmental assets for the Northern Victoria and Victorian Murray water resource plan areas are water-dependent ecosystems (rivers, wetlands, or floodplains) that support ecological values⁷ that are significant at Commonwealth and state level, and meet criteria in Schedule 8 of Basin Plan, as outlined in the long-term watering plan.

Under section 8.18 of the Basin Plan basin states must prepare a long-term environmental watering plans for each water resource plan area that contain surface water (see [Section 12.6.4.2](#)). These identify the priority environmental assets and priority environmental functions within each water resource plan area. A list of the priority environmental assets is in [Table 4](#) and [Table 5](#) of [Appendix E](#). These assets are also identified in [Figure 12-2](#) and [Figure 12-3](#) in this section. Note that minor updates have been made to the list of priority environmental assets since the 2015 long-term watering plans were completed, including the removal of several assets that cannot be managed with held environmental water. These changes are purely editorial, and do not reflect a change to Victoria's policy.

In the future, however, the priority environmental assets may change to reflect the latest technical information and prioritisation by catchment management authorities. Some existing assets that currently receive environmental water may not be deemed a priority in the future, or new assets may be identified if they have the potential to be connected to a water source and receive held environmental water. The priority environmental assets will be reviewed and potentially updated further when long-term watering plans are reviewed. The long-term watering plans are due for review in 2020, or when Victoria's North and Murray Water Resource Plan is accredited.

⁷ Ecological value is the worth attributed to an organism, ecosystem, product, resource or activity in terms of benefits to the environment.

Many more waterways in the Northern Victoria and Victorian Murray water resource plan areas, such as unregulated rivers noted in the long-term watering plans, are not connected to regulated water supply systems and cannot receive held environmental water. For this reason, these environmental assets are not identified by Victoria as priority environmental assets for the purposes of Basin Plan.

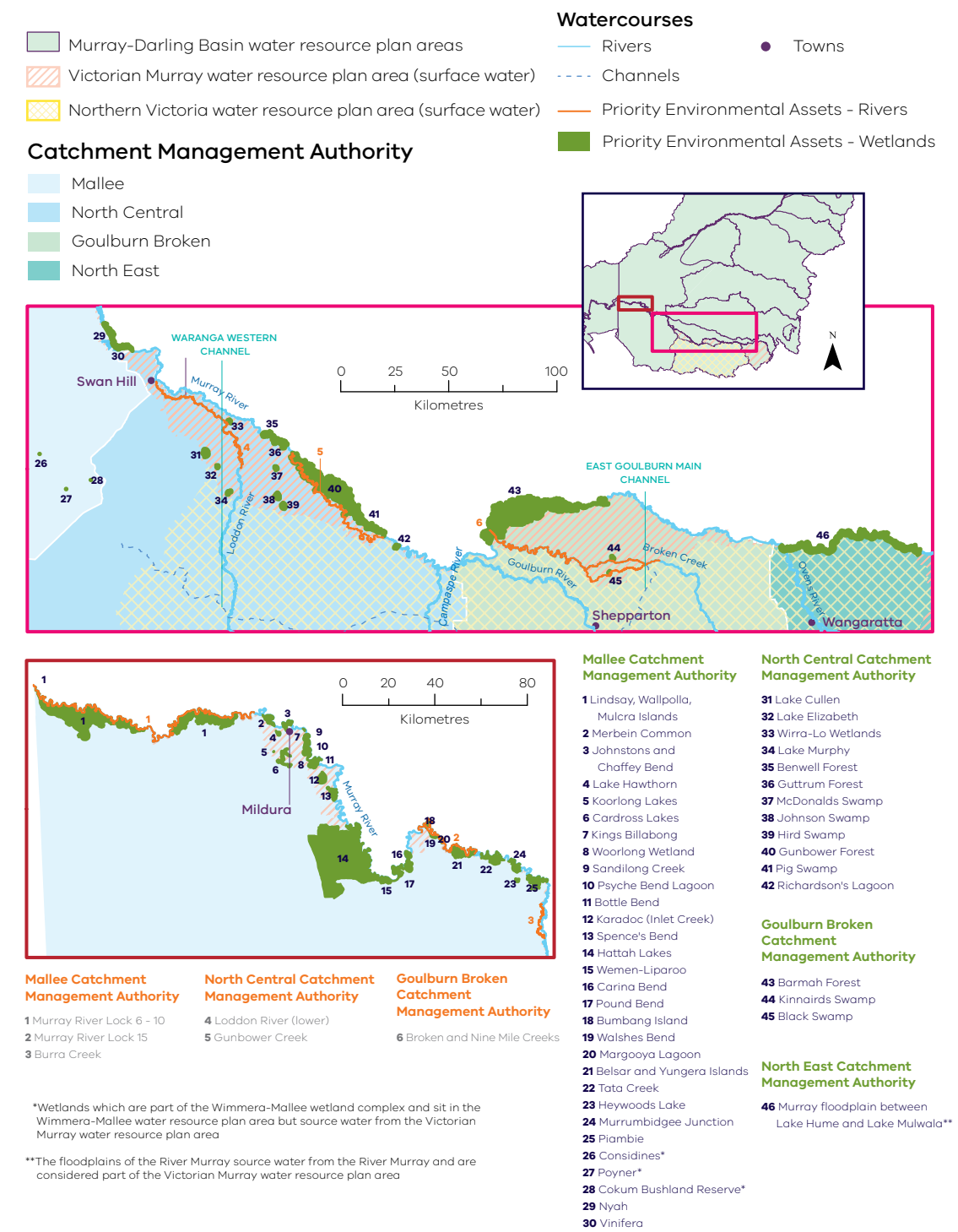
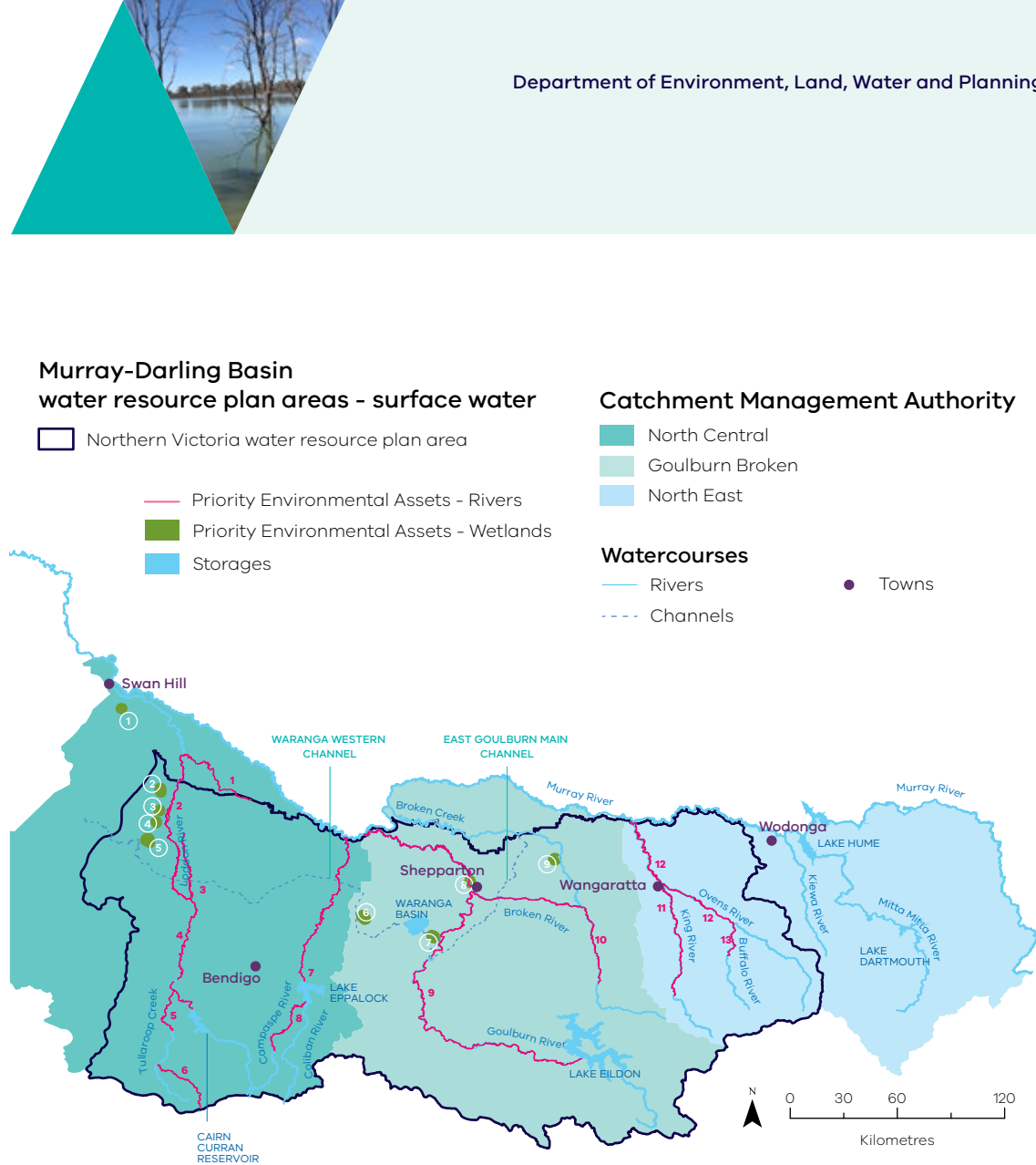


Figure 12-2: Priority environmental assets in the Victorian Murray water resource plan area



Priority Environmental Assets

North Central Catchment Management Authority

- 1 Round Lake
- 2 Meran Lakes Complex
- 3 Lake Leaghur
- 4 Lake Yando
- 5 Lake Boort

Goulburn Broken Catchment Management Authority

- 6 Gaynor Swamp
- 7 Doctors Swamp
- 8 Reedy Swamp
- 9 Moodies Swamp

North Central Catchment Management Authority

- 1 Pyramid Creek
- 2 Twelve Mile Creek
- 3 Serpentine Creek
- 4 Loddon River (Middle and Upper)
- 5 Tullaroop Creek
- 6 Birch's (Bullarook) Creek
- 7 Campaspe River
- 8 Coliban River

Goulburn Broken Catchment Management Authority

- 9 Goulburn River
- 10 Broken River

North East Catchment Management Authority

- 11 King River
- 12 Ovens River
- 13 Buffalo River

Figure 12-3: Priority environmental assets in the Northern Victoria water resource plan area

12.5.2 Priority ecosystem functions

Ecosystem functions are the fundamental physical, chemical and biological processes that support environmental assets. These can include the transport of nutrients, organic matter and sediment in rivers, wetting and drying cycles, provision for migration and re-colonisation by plants and animals along rivers and across floodplains (Alluvium, 2010).

The long-term watering plan identified two priority ecosystem functions for the Victorian Murray water resource plan area (see [Table 12-2](#)) and three for the Northern Victoria water resource plan area (see [Table 12-3](#)). The priority ecosystem functions meet criteria in Schedule 9 of Basin Plan, as outlined in the long-term watering plan. The priority ecosystem functions are important

in all waterways and can be supported by all water types including held environmental water, planned environmental water and unregulated flows. For example, planned environmental water in the Ovens system supports longitudinal hydrological connectivity and geomorphic habitat. Priority ecosystem functions were taken into account during the risk assessment. See [Appendix B](#) and [Appendix E](#) for more information.

Table 12-2: Priority ecosystem functions in the Victorian Murray water resource plan area

Ecosystem Function	Schedule 9 criteria	Function characteristics
Lateral hydrological connectivity (between floodplains, anabranches and wetlands)	2	Supports the transportation and dilution of nutrients, organic matter and sediment
	4	Provides connections across floodplains, adjacent wetlands and billabongs (lateral connections)
Water quality (that allows for ecosystem processes)	1	Supports the creation and maintenance of vital habitats and populations
	2	Supports the dilution of carbon and nutrients from the floodplain to the river system

Source: Long-term watering plan Victorian Murray (DELWP, 2015)

Table 12-3: Priority ecosystem functions in the Northern Victoria water resource plan area

Ecosystem Function	Schedule 9 criteria	Function characteristics
Longitudinal hydrological connectivity (between river reaches and the River Murray)	2	Supports the transportation and dilution of nutrients, organic matter and sediment
	3	Provides connections along a watercourse (longitudinal connections)
Water quality (that allows for ecosystem processes)	1	Supports the creation and maintenance of vital habitats
	2	Supports the dilution of carbon and nutrients from the floodplain to the river system
Geomorphic habitat	1	Supports the creation and maintenance of vital habitats

Source: Northern Victoria Long-term Watering Plan (DELWP, 2015)

12.5.3 Ramsar-listed priority environmental assets

Ramsar sites are recognised for containing representative, rare or unique wetlands, or wetlands that are important for conserving biodiversity. A wetland must satisfy one or more of the criteria for identifying wetlands of international importance to be designated to this list.

The Victorian Murray and Northern Victoria water resource plan areas support four of the Murray-Darling Basin's Ramsar sites. These are all priority environmental assets and are supported by priority ecosystem functions. Three of the four Ramsar sites are Living Murray Icon sites.

National guidelines are being developed to provide clear guidance on how Ramsar sites must be managed, under both the Ramsar Convention and Commonwealth *Environment Protection and*

Biodiversity Conservation Act 1999. A key component includes monitoring of a site's ecological character description, which is a baseline of wetland condition at the time of its listing as a wetland of international importance. The ecological character descriptions of all Australia's Ramsar-listed wetlands are at <http://www.environment.gov.au/water/wetlands/publications>.

The Basin Plan requirements for states in regard to their Ramsar sites are that:

- declared Ramsar wetlands that depend on Basin water resources maintain their ecological character (section 8.05(2)(a) of the Basin Plan)
- a declared Ramsar wetland is an environmental asset that requires environmental watering (Schedule 8 Criteria for identifying an environmental asset)
- declared Ramsar wetlands have sufficient water quality to maintain the ecological character of those wetlands (section 9.04(1) of the Basin Plan)

There are also water quality targets for declared Ramsar wetlands under Schedule 11 to the Basin Plan – Target values for target application zones. These requirements are fulfilled in Victoria's North and Murray Water Quality Management Plan (see [Appendix A](#)).

Implementation of the Basin Plan contributes to maintaining the ecological character of Ramsar wetlands. Section 5.02 of the Basin Plan is to give effect to international agreements such as the Ramsar Convention; and section 8.05 further specifies Basin States to protect and restore environment assets by ensuring that declared Ramsar wetlands maintain their ecological character. There are various management interventions other than environmental water that contribute to the ecological character of Ramsar wetlands. It is the responsibility of jurisdictions to maintain the ecological character of Ramsar wetlands through various strategies, legislation, investment, partnerships and on-ground actions.

12.5.4 The Living Murray

An intergovernmental program which holds an average of 500,000 ML of environmental water a year for use at six iconic sites along the River Murray. In Victoria the water is held by the VEWH. Annual priorities for use of the Living Murray water portfolio are agreed by representatives of the Victorian, NSW, SA and Commonwealth governments, reflecting the joint nature of the program. The Living Murray program has also invested in works on the ground which help the efficient delivery of environmental water. All or part of four of the six Living Murray icon sites are located in Victoria, including Barmah Forest, Gunbower Forest, Hattah Lakes and Lindsay-Wallpolla Islands.

12.5.5 Snowy Water Initiative

The Snowy Water Initiative was formally established in 2002 to achieve significant improvements in river health by releasing environmental water into the Snowy, upper Murrumbidgee, and upper Murray river systems. The Water for Rivers joint government enterprise recovered water for the environment by water efficiency projects and water purchases in Victoria and New South Wales. These were converted into entitlement or are held as water shares by environmental water holders. On an annual bases these entitlements and water shares receive water allocation which then offsets the volume of water that needs to be released from the Snowy Scheme to the River Murray and can therefore be released to the Snowy River, upper Murrumbidgee, and upper Murray river systems as environmental releases.

12.5.6 Groundwater dependent ecosystems

Groundwater-dependent ecosystems are important environmental features of the Goulburn-Murray water resource plan area. They rely on groundwater for some of their water needs, and include river reaches that receive groundwater discharge ('gaining reaches'), and wetlands that connect to shallow aquifers.

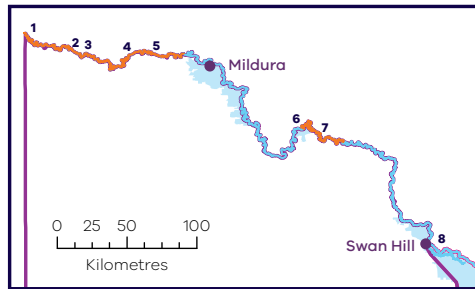
For the purposes of Victoria's North and the Murray Water Resource Plan, the priority environmental assets known to have a groundwater connection are listed in [Appendix E Table 7](#) to [Table 10](#). While these priority environmental assets rely on groundwater for part of their water needs, their environmental watering requirements are managed with held environmental (surface) water. Protection of the groundwater at these sites is outlined in [Section 3.3](#).

The potential groundwater-dependence of the priority environmental assets across northern Victoria are shown in [Figure 12-4](#) and [Figure 12-5](#). This information is based on the Bureau of Meteorology GDE Atlas (BOM, 2012) and, where in existence, individual river reach assessments. The confidence levels of groundwater-dependency of each priority environmental asset is listed in [Table 7](#) to [Table 10](#) of [Appendix E](#).

For more information about how groundwater-dependent ecosystems are protected see [Section 12.8](#).

Groundwater Dependent Features (confidence) - Priority Environmental Assets - Rivers

- High (field proof)
- Moderate
- Low
- Non-GDE (losing)



Murray-Darling Basin water resource plan areas - groundwater

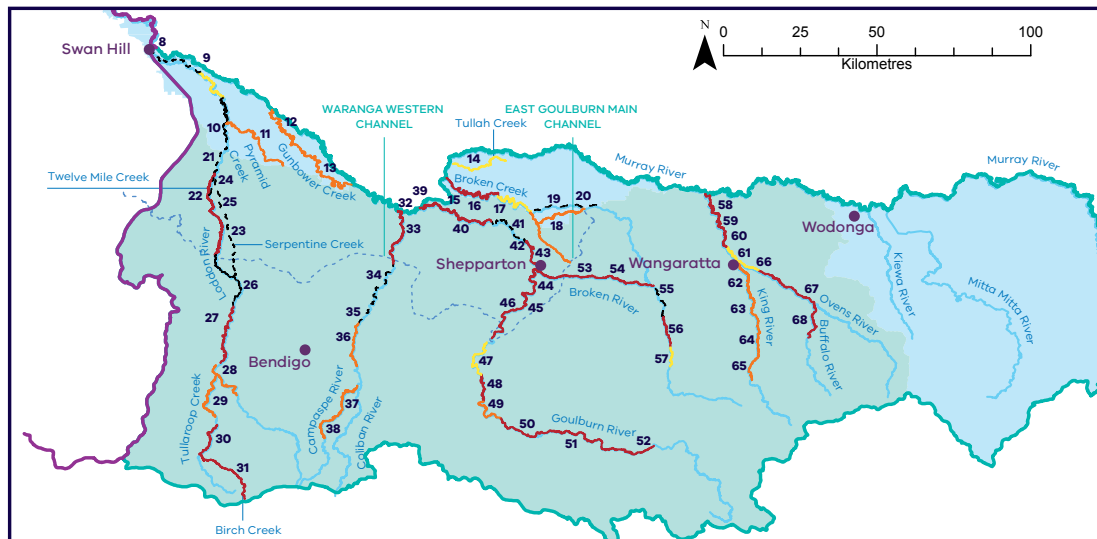
- Goulburn-Murray
- Wimmera-Mallee

Murray-Darling Basin water resource plan areas - surface water

- Victorian Murray
- Northern Victoria

Watercourses

- Rivers
- Channels
- Towns



Priority Environmental Assets - Rivers assessed for groundwater dependency (including confidence)

Victorian Murray WRPA

- 1 Murray River Lock 6 - 10 R17
- 2 Murray River Lock 6 - 10 R16
- 3 Murray River Lock 6 - 10 R15
- 4 Murray River Lock 6 - 10 R14
- 5 Murray River Lock 6 - 10 R13
- 6 Murray River US of Lock 15 R7
- 7 Murray River US of Lock 15 R6
- 8 Loddon River Lower R50
- 9 Loddon River Lower R1
- 10 Loddon River Lower R2
- 11 Pyramid Creek R51
- 12 Gunbower Creek R38
- 13 Gunbower Creek R39
- 14 Tullah Creek R36
- 15 Broken and Nine Mile R21

Northern Victoria WRPA

- 16 Broken and Nine Mile R22
- 17 Broken and Nine Mile R23
- 18 Broken and Nine Mile R30
- 19 Broken and Nine Mile R28
- 20 Broken and Nine Mile R24
- 21 Loddon River Middle R3
- 22 Loddon River Middle R4
- 23 Loddon River Middle R5
- 24 Twelve Mile Creek
- 25 Serpentine Creek R11
- 26 Loddon River Upper R6
- 27 Loddon River Upper R7
- 28 Loddon River Upper R8

- 29 Tullaroop Creek R18
- 30 Tullaroop Creek R19
- 31 Birch Creek R21
- 32 Campaspe River R1
- 33 Campaspe River R2
- 34 Campaspe River R3
- 35 Campaspe River R4
- 36 Campaspe River R5
- 37 Coliban River R18
- 38 Coliban River R19
- 39 Goulburn River R1
- 40 Goulburn River R2
- 41 Goulburn River R3
- 42 Goulburn River R4
- 43 Goulburn River R5
- 44 Goulburn River R6

- 45 Goulburn River R7
- 46 Goulburn River R8
- 47 Goulburn River R9
- 48 Goulburn River R10
- 49 Goulburn River R11
- 50 Goulburn River R12
- 51 Goulburn River R13
- 52 Goulburn River R14
- 53 Broken River R1
- 54 Broken River R2
- 55 Broken River R3
- 56 Broken River R4
- 57 Broken River R4
- 58 Ovens River R1
- 59 Ovens River R2
- 60 Ovens lower R3

- 61 Ovens River R3
- 62 King River R21
- 63 King River R22
- 64 King River R23
- 65 King River R24
- 66 Ovens River R4
- 67 Ovens River R4
- 68 Buffalo River R33

Figure 12-4: Confidence levels of groundwater dependence in river priority environmental assets

Source: (Groundwater Logic, 2018)

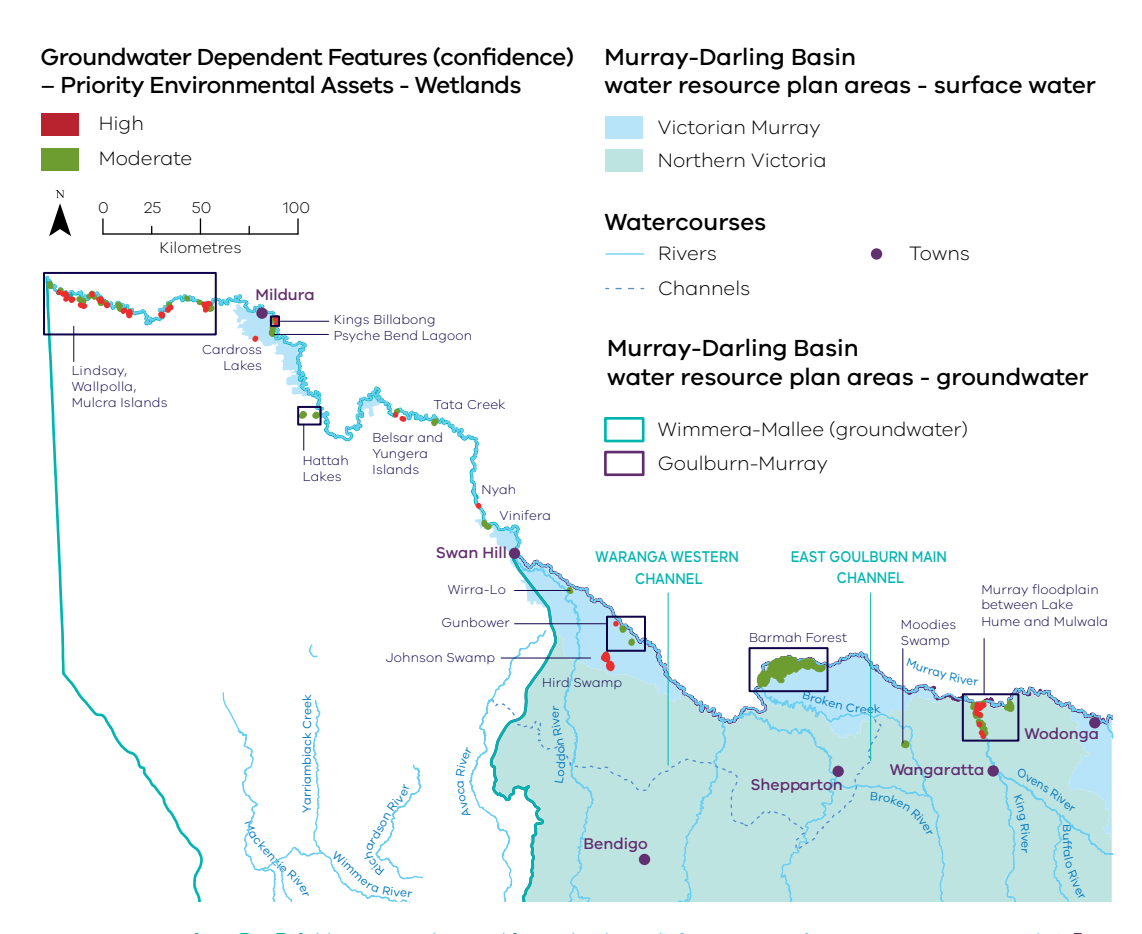


Figure 12-5: Confidence levels of groundwater dependence in wetland priority environmental assets

Source: (Groundwater Logic, 2018)

Source: (Groundwater Logic, 2018)

12.6 State environmental water planning

12.6.1 Overview

This section outlines how environmental water planning occurs in Victoria, and specifically provides context for section 10.26 of the Basin Plan.

Environmental watering is defined under the Commonwealth Water Act as the delivery or use of environmental water to achieve environmental watering outcomes. Environmental water under the Commonwealth Water Act is either held environmental water or planned environmental water. The effect of applying these definitions to Victoria's framework for determining the content of Victoria's North and Murray Water Resource Plan is:

- held environmental water (refer to **Table 3** of **Appendix E**) is present only in regulated systems (see **Section 12.4.2.1**)
- planned environmental water (refer to **Table 1** to **Table 2** of **Appendix E**) is present only in the Broken River, the Ovens River, and the Upper Ovens River systems

Other water that supports environmental outcomes, such as above cap and system water, but which does not meet the definition of held environmental water or planned environmental water, is not considered environmental water under the Commonwealth Water Act. These other types of water are therefore not covered by the obligation under section 10.26 of the Basin Plan.

Under the Victorian Water Act there are a range of instruments that inform environmental watering objectives and requirements across Victoria's catchments. [Section 12.6](#) identifies how Victoria's State based planning integrates with Basin Plan requirements.

12.6.2 Victorian Waterway Management Strategy

The Victorian Waterway Management Strategy (DEPI, 2013) describes the Government's state-wide objectives and policies for managing waterways. It also outlines the Government's policies for maintaining and improving the condition of the state's rivers, estuaries and wetlands to provide environmental, social, cultural and economic value for all Victorians.

The strategy references and makes explicit links to the Basin Plan. Chapter 4 of the strategy sets out the state policies, principles and processes to be followed by catchment management authorities when preparing regional waterway strategies and building Basin Plan considerations into Victoria's regional waterway strategies.

Water for Victoria policy reiterates actions in the Victorian Waterway Management Strategy and further emphasises Traditional Owner roles and engagement in waterway management.

The strategy outlines the key environmental water planning documents:

- regional waterway strategies
- long-term watering plans
- environmental water management plans
- seasonal watering proposals
- seasonal watering plans

These are explained in this section.

12.6.2.1 Regional catchment strategies

Regional catchment strategies are the primary integrated planning framework for the management of land, water and biodiversity resources in each of the ten catchment and land protection regions in Victoria ([Figure 6-4](#)). They seek to integrate community values and regional priorities with state and federal legislation and policies.

Each catchment management authority prepares a regional catchment strategy in partnership with local communities and partners involved in integrated catchment management.

The strategy identifies:

- the region's land, water and biodiversity resources and how they are used;
- the nature, causes, extent and severity of land degradation of catchments;
- a long-term vision for the region;
- regionally significant land, water and biodiversity assets and landscapes;
- catchment condition objectives; and
- a program of management measures for the life of the strategy.

Regional catchment strategies seek to integrate community values and regional priorities with State and Federal legislation and policies and program priorities. Catchment management authorities are responsible for the coordination of the regional catchment strategies, including the ongoing review and monitoring of their implementation, and identification of priority activities and work programs. Regional catchment strategies are often implemented through regional sub-strategies and action plans that are thematic, issue and/or landscape based.

12.6.2.2 Regional waterway strategies

The catchment management authorities use a risk-based approach to identify high value waterways and priority management activities. The regional waterway strategies are required to integrate on-ground works with environmental water management in regulated and unregulated systems and make sure environmental water is managed efficiently and effectively.

For each management unit such as a river reach or wetland these strategies:

- describe the environmental values of waterways
- identify threats to these values
- establish management objectives for the waterways after consultation
- determine priorities for management
- establish targets
- identify activities to achieve targets
- estimate the costs of the activities

The North East, Goulburn Broken, North Central and Mallee regional waterway strategies apply to the Victoria's North and Murray Water resource plan.

Infrastructure can be used to improve the watering system and environmental watering outcomes. These can enable more efficient use of the water holdings and overcome barriers to the migration of plants and animals. Other on-ground works are also used to improve the biophysical condition of rivers, such as reinstating in-stream woody vegetation habitat or fencing out livestock. These works are considered complementary measures to environmental watering and are as vital as flows to environmental outcomes and condition.

12.6.2.3 Environmental water management plans

Environmental water management plans outline how waterway managers will meet long-term ecological objectives and required watering regimes at each priority environmental asset identified in Long-term watering plans.

Plans are prepared for rivers and wetlands that can be watered from held environmental water. The plans set out:

- long-term environmental flow objectives for held environmental water
- water regimes required to meet these objectives
- constraints on managing flows
- measures to use available water efficiently
- management arrangements and risks to meeting objectives

The plans draw on watering requirements for rivers detailed in environmental flow studies and are prepared using the best available expert information. Flow studies have been prepared for regulated and some unregulated rivers throughout Victoria and are updated regularly. Flow studies for rivers in the Northern Victoria water resource area can be found on the VEWH's website at <http://www.vewh.vic.gov.au/news-and-publications/technical-reports2>.

Catchment management authorities prepare environmental water management plans using the best available information. They use a collaborative process involving community members, water holders, Traditional Owners, the Department of Environment, Land, Water and Planning, storage managers, experts and a scientific expert review panel.



An environmental water management plan has been prepared for each river and wetland in the Victorian Murray and the Northern Victoria water resource plan areas that receives held environmental water and the plans for these priority environmental assets have been collated in developing the Victorian Murray and Northern Victoria long-term watering plans. Environmental water management plans provide the detailed analysis used by CMAs to prepare seasonal watering proposals each year. All EWMPs can be found at <http://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/environmental-water>.

12.6.3 Integration of state environmental water planning and Basin Plan requirements

The objectives and targets of the Basin Plan have been integrated into Victoria's environmental water planning in the annual and long-term processes. The Victorian Waterway Management Strategy commits all environmental water managers in the Victorian Murray and Northern Victoria water resource plan areas must comply with Victorian and Basin Plan environmental water planning under state policy and investment.

Each year, Victoria must also demonstrate through annual Basin Plan reporting (Matter 19 of Schedule 12) how its environmental watering is consistent with the environmental watering plan and the Basin-wide environmental watering strategy, including a contribution to the objectives in Part 2 of the environmental watering plan. See [Section 15.7](#) for more information on reporting under Basin Plan.

Figure 12-6 illustrates how planning works at the Basin and state levels.

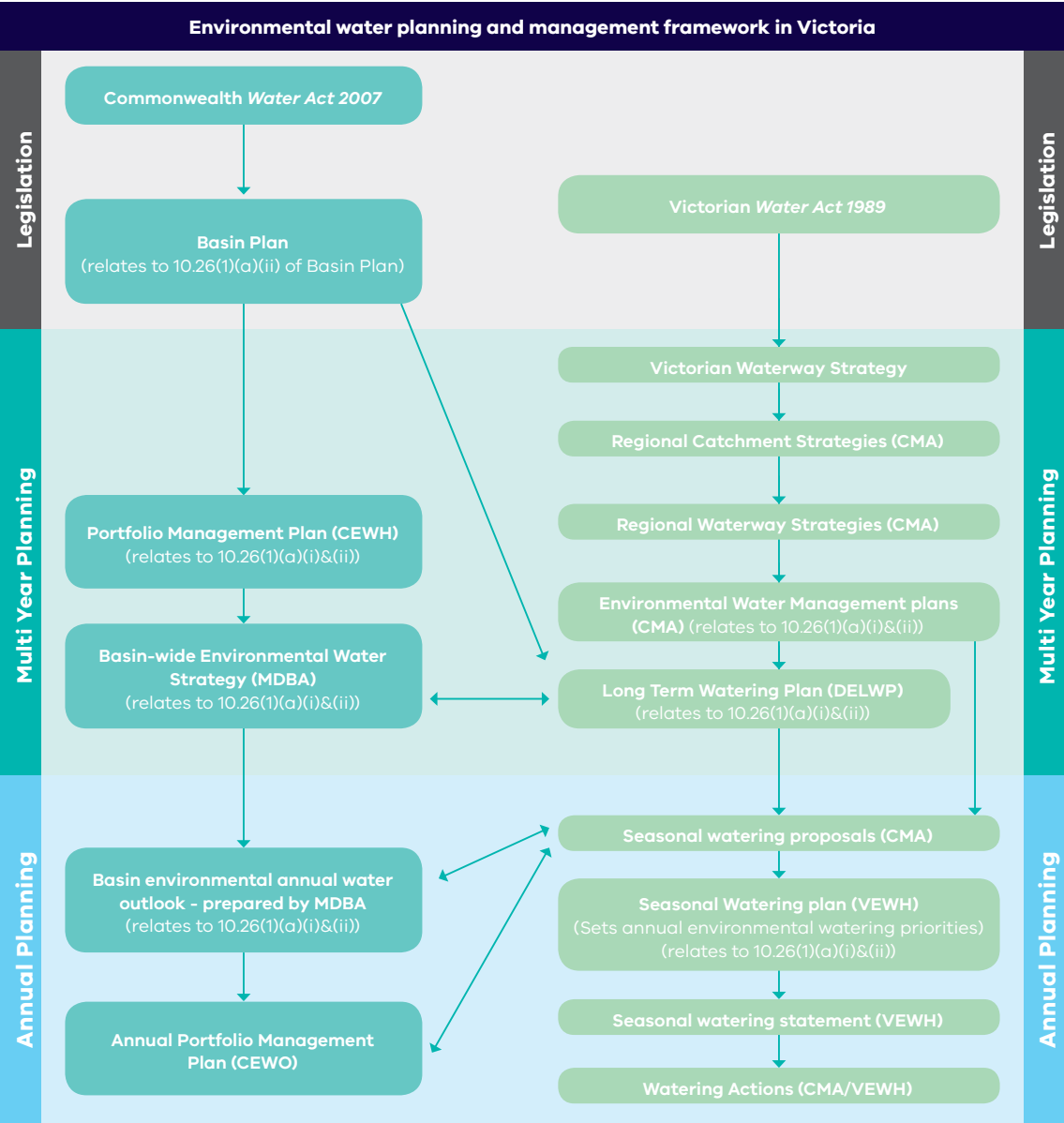


Figure 12-6: Environmental water planning and management framework in Victoria at Basin, state and regional scales

12.6.4 Environmental watering planning under Basin Plan

Part 8 of the Basin Plan sets out the environmental watering plan for the Basin. The objectives of this framework are stated in section 8.11 of the Basin Plan:

- a) *coordinate the planning, prioritisation and use of environmental water on both a long-term and an annual basis; and*
- b) *enable adaptive management to be applied to the planning, prioritisation and use of environmental water; and*
- c) *facilitate consultation, coordination and cooperative arrangements between the Authority, the Commonwealth Environmental Water Holder and Basin states*

Basin Plan section 8.04 provides that:

The overall environmental objectives for the water-dependent ecosystems of the Murray-Darling Basin are, within the context of a working Murray-Darling Basin:

- a) *to protect and restore water-dependent ecosystems of the Murray-Darling Basin; and*
- b) *to protect and restore the ecosystem functions of water-dependent ecosystems; and*
- c) *to ensure that water-dependent ecosystems are resilient to climate change and other risks and threats*

For water resource plans, section 10.26 of the Basin Plan requires that:

A water resource plan must provide for environmental watering to occur in a way that:

- a) *is consistent with:*
 - i) *the environmental watering plan; and*
 - ii) *the Basin-wide environmental watering strategy; and*
- b) *contributes to the achievement of the objectives in Part 2 of Chapter 8*

The accredited text below outlines how Victoria will meet this requirement in Victoria's North and Murray Water Resource Plan.

Basin Plan s10.26(1)

1. Environmental watering under Water Act 2007 (Cth) is the delivery or use of environmental water to achieve environmental outcomes.
2. Under the *Water Act 1989* (Vic) environmental objectives – including contributing to the objectives of Chapter 8 of the Basin Plan – are supported in Victorian regulated and unregulated systems through a whole of system management approach (being more than the use of held environmental water and planned environmental water) which includes:
 - a) prohibiting the take of water that is “above cap” as it is an offence to take water without authorisation;
 - b) the issue of entitlements below a resource condition limit or extraction cap that includes consideration of the volume of water to be taken under basic rights;
 - c) using environmental entitlements held by the Victorian Environmental Water Holder to ensure water is delivered to identified priority environmental assets or for priority ecosystem functions and to support specified flows;
 - d) waterway management by the relevant catchment management authority in accordance with its functions under Part 10 of the *Water Act 1989* (Vic);

- e) management of all entitlements in the system including managing the flow of water and timing of delivery and take of water in systems by water corporations.
- 3. Under the Victorian environmental framework, environmental benefits are achieved through held environmental water, planned environmental water and other water in the system (including 'above cap'). Under existing definitions of Basin Plan, it is difficult to align Victoria's framework with the definition for planned environmental water.
- 4. The use of held and planned environmental water in Victoria is enhanced through the existence and protection of water in the system otherwise known as "above cap water".
- 5. For the purposes of Victoria's North and Murray Water Resource Plan, "above cap water" is considered to be:
 - a) water that remains in the system after water is taken under a water access right (excluding basic rights)
 - b) water that remains in the system by virtue of setting minimum passing flows or establishing baseflows through conditions on a water access right or rules in statutory management plans
 - c) water that is subject to extraction under a basic right (despite this extraction being considered when determining resource conditions limits for setting caps on other entitlements)
 - d) water that is subject to extraction for a range of emergency purposes such as firefighting even where it does not meet the definition of "emergency" under statute
 - e) water that may be subject to other instream uses such as recreational or hydro-generation, but which contributes to the environment including supporting the meeting of environmental objectives under the Basin Plan.
- 6. This "above cap water" in regulated and unregulated systems provides multiple benefits under Victoria's framework and includes the following (see also Notes 1 and 6):
 - a) provides base flows for delivery of water (consumptive and environment) including for instream use by fish farms or electricity generators for example; and
 - b) provides support for ongoing river health (including managing any water quality issues); and
 - c) supports environmental values and health of water ecosystems; and
 - d) provides a baseline which informs the setting of environmental watering objectives and watering requirements which are determined by the catchment management authorities. The availability of this water informs Victorian and Commonwealth environmental water holders' decisions as to how held environmental water is utilised to meet objectives and requirements in Victoria's North and Murray water resource plan area; and
 - e) support for instream use (does not include diversions from the system) by Traditional Owners (in support of outcomes identified in response to Part 14 of the Basin Plan) and recreational users.

7. The “above cap water” is protected by Victoria’s water resource management framework in the following way (see also Note 2):
 - a) the setting of resource condition limits under a permissible consumptive volume (PCV) under section 22A of the *Water Act 1989* (Vic) which limits the volume of water that can be issued under entitlements for consumptive use (can apply in regulated and unregulated systems). In Victoria’s North and Murray Water Resource Plan area this process is largely overtaken by the SDLs prescribed under the Basin Plan except where catchment specific limits need to be specified; and
 - b) requirements to impose conditions relating to the time, place and rate of take on authorisations to take water (applies in regulated and unregulated systems) (see Note 3);
 - c) requirements under sections 33J (water shares), 40 (bulk entitlements), 53 (take and use licences), of the *Water Act 1989* (Vic) to consider the following before issuing a water access right:
 - i) the permissible consumptive volume, if any;
 - ii) the existing and projected quality of water;
 - iii) any adverse effect the allocation or use of water will have on other users or a waterway or aquifer;
 - iv) the maintenance of the environmental water reserve in accordance with the environmental water reserve objective
 - v) the need to protect the environment, including the riverine and riparian environment;
 - vi) the proper management of the waterway and its surrounds or of the aquifer. (See Notes 4 and 7)
 - d) the setting and protection of minimum passing flows
 - i) in regulated systems, through requirements to deliver minimum passing flows as a condition of a bulk entitlement under section 43 of the *Water Act 1989* (Vic) or through a restriction on the take of water in a statutory management plan approved under section 32A of the *Water Act 1989* (Vic) for a water supply protection area declared under section 27 of the *Water Act 1989* (Vic)
 - ii) in unregulated systems, through restrictions on the take of water applied under a take and use licence or a condition of a bulk entitlement or through a restriction on the take of water in a statutory management plan approved under section 32A of the *Water Act 1989* (Vic) for a water supply protection area declared under section 27 of the *Water Act 1989* (Vic)
 - e) the establishment of the environmental water reserve under section 4A of the *Water Act 1989* (Vic) to ensure that water (including any above cap water identified as part of the environmental water reserve, planned environmental water or any held environmental water) within the reserve is managed to meet the long-term environmental objectives under section 4B of the *Water Act 1989* (Vic) (see Note 5);
 - f) the declaration of a water supply protection area under section 27 of the *Water Act 1989* (Vic) where there is an identified risk to surface water or groundwater,

- the area is then managed through prescriptions under a statutory management plan approved under section 32A of the *Water Act 1989* (Vic).
8. To meet the requirements of section 10.26(1) of the Basin Plan, Victoria commits to the following obligations, column 4 of this row identifies the party responsible for meeting the relevant obligation outlined below:
 - a) the Victorian Environmental Water Holder (VEWH) must, in the performance of its functions and the exercise of its powers, ensure that environmental watering occurs in a way that is consistent with the environmental watering plan and the Basin-wide environmental watering strategy and contributes to the achievement of the objectives in Part 2 of Chapter 8 of the Basin Plan. This does not prevent the VEWH from causing additional environmental watering to occur to meet local and Basin Plan environmental watering objectives.
 - b) in performance of its functions and the exercise of its powers, the VEWH must have regard the relevant Long-Term Watering Plan for the water resource plan area.
 - c) the Department must develop or amend the Long-Term Watering Plan for the relevant surface water plan area including establishing or updating environmental watering requirements for identified priority environmental assets and priority ecosystem functions in accordance with Chapter 8 of the Basin Plan and considering both regulated and unregulated surface water systems.
 9. In the management of minimum passing flows water corporations consider the take and use of water for domestic and stock purposes under section 8 of the *Water Act 1989* (Vic) by:
 - a) in a regulated system, establishing monitoring points along the system to measure passing flows and adjusting delivery of water to ensure passing flows are maintained after domestic and stock use is extracted;
 - b) in unregulated systems, assessing the volume of water that might be taken under section 8 of the *Water Act 1989* (Vic) in considering any trigger levels for restricting take under a take and use licence;
 - c) managing authorisations to install works on a waterway under section 67 of the *Water Act 1989* (Vic) which may include conditions that pumps are not constructed at a level that would allow extraction below the minimum baseflows required for the system.
 10. References to sections of the *Water Act 1989* (Vic) provided in response to section 10.26(1) of the Basin Plan do not have the effect of importing the sections referenced into the accredited material.

Note 1: reference to “above cap water” for the purposes of responding to the Basin Plan in Victoria’s North and Murray Index Table refers to water that includes water that remains in the system after meeting entitlements, flows specified in bulk entitlements or environmental entitlements as minimum passing flows which may also be identified as “systems water” and water that remains in the system where water users (see Table A Victoria’s North and Murray Index Table for a list of water access rights relevant to this Plan) have not taken their full volume from the system. It should be noted that risks to “system water” were identified as being lower than the risks to other types of water see Part 2.1 (Northern Victoria water resource plan area) and Part 2.3 (Victorian Murray

water resource plan area) of Victoria's North and Murray Risk Assessment at Appendix B of Victoria's North and Murray Comprehensive Report.

Note 2: the tools identified in paragraph (5) above are tools that may be utilised under the Victorian framework but are not necessarily used in each catchment or for each resource in Victoria's North and Murray water resource plan area.

Note 3: see response to section 10.08(2) of the Basin Plan above which requires holders of a water access right (entitlement) to comply with the conditions of that right. See also response to section 10.11(1) of the Basin Plan which sets out rules to prevent actual take does not exceed permitted take.

Note 4: for the process relating to the amendment under the *Water Act 1989* (Vic) of bulk entitlements see Figure 7-3 and for environmental entitlements see Figure 7-4, note the conditions on a take and use licence relating to restrictions – must be complied with – note the interaction with the section 10.08(2) of the Basin Plan obligation.

Note 5: the environmental water reserve under 4A of the *Water Act 1989* (Vic) and the environmental water reserve objective under section 4B of the *Water Act 1989* (Vic) do not have the effect of defining above cap water as planned environmental water for the purposes of section 6 of the *Water Act 2007* (Cth) or section 10.09(1) of the Basin Plan. Water may be part of the environmental water reserve for the purposes of the *Water Act 1989* (Vic) and will support the environmental objective however, it cannot be characterised as 'planned environmental water' as more narrowly defined in section 6 of the *Water Act 2007* (Cth) which specifies that planned environmental water is water that cannot be taken or used for any other purpose. Above cap water may be taken and used for multiple purposes, including for example, providing base flows (not just for environmental benefit but for system management reasons) and domestic and stock use. See Section 12.4.2.2 of Victoria's North and Murray Comprehensive Report for more information about planned environmental water under Victoria's water resource management framework.

Note 6: for the purposes of paragraph (4) above, sections 33J and section 40 of the *Water Act 1989* (Vic) apply to regulated systems and section 40 and section 53 of the *Water Act 1989* (Vic) apply to unregulated systems.

Note 7: section 53 of the *Water Act 1989* (Vic) as referred to in paragraph (5)(c) above includes the requirement to have regard to the matters in paragraphs (b) to (m) of section 40 of that Act.

The delivery or use of planned environmental water identified in this Index in response to section 10.09(1) of the Basin Plan is consistent with the environmental watering plan and the Basin-wide environmental watering strategy and relates to the objectives outlined in the Basin-wide environmental watering strategy as outlined in Table 1 of Appendix E to Victoria's North and Murray Comprehensive Report.

The existence of this planned environmental water is protected under section 10.28 of the Basin Plan.

<<end of accredited text for s10.26(1) of the Basin Plan>>

12.6.4.1 Basin-wide environmental watering strategy

The Murray-Darling Basin Authority has published the Basin-wide environmental watering strategy to achieve the environmental objectives of the environmental watering plan. These objectives also inform Victoria's environmental water planning at an asset scale.

The strategy outlines key actions to achieve the objectives of environmental watering in the Basin including:

- harnessing local community land and water knowledge
- managing all water to benefit the environment where possible, such as cooperating to divert consumptive water deliveries through a wetland en route
- managing in harmony with biological cues, including responses to flow, to restore elements of a more natural flow regime—for example, high river flows or flow release into a wetland at times when it would have occurred naturally before river regulation to trigger vegetation, fish or bird reproduction
- coordinating between stakeholders to achieve the best outcomes and target multiple sites with deliveries of water in and between rivers where possible
- managing any risks associated with the delivery of environmental water
- applying the learning from previous experience and learning when planning and prioritising use of environmental water

The strategy also sets out expected outcomes for native fish, vegetation, waterbirds and hydrological connectivity.

The strategy's actions and expected outcomes are consistent with the requirements of the Victorian Water Act, key state policy and Victoria's environmental water planning in northern Victoria, as detailed in the long-term watering plans.

12.6.4.2 Long-term watering plans

Long-term watering plans are a state responsibility under the Basin Plan Chapter 8 Environmental watering plan.

Basin states must prepare a long-term watering plan for each water resource plan area that contains surface water and be consistent with the Basin-wide environmental watering strategy. Victoria has developed its long-term watering plans based on existing regional catchment strategies, waterway strategies and environmental water management plans which set out objectives and watering requirements for specific environmental sites. The most significant difference between Victoria's instruments and Basin Plan requirements is the requirement to identify environmental outcomes and watering requirements in terms of priority environmental assets and priority ecosystem functions.

Victoria has prepared one for the Victorian Murray water resource plan area (DELWP, 2015) and one for the Northern Victorian water resource plan area (DELWP, 2015). The long-term watering plans for the Victorian Murray and Northern Victoria water resource plan areas are available online.

The Victorian Murray and Northern Victoria long-term watering plans collate environmental objectives under the environmental water management plans for the relevant rivers, wetlands and ecosystem functions identified as priority environmental assets for the purposes of Basin Plan

They inform:

- Victoria's annual watering priorities
- the Basin-wide environmental watering strategy and Basin annual watering priorities

- Victoria's North and Murray Water Resource Plan, particularly environmental watering requirements

Appendix 1 to the long-term watering plans shows how they meet the requirements of the Basin Plan environmental watering plan, including:

- using methods specified for identifying priority environmental assets and ecosystem functions and their water requirements
- having regard to the Basin-wide environmental watering strategy
- being consistent with relevant international agreements

The development of long-term watering plans consistent with Chapter 8 of the Basin Plan forms a component of Victoria's response to the obligation under section 10.26(1) of the Basin Plan (see accredited text for 10.26(1) above). The requirement outlined as accredited text in [Section 12.3](#) requires the Department to develop its long-term watering plans in a way that is consistent with Chapter 8 of the Basin Plan and also considers regulated and unregulated surface water to ensure that all water that contributes to meeting environmental benefits is considered when setting long term environmental watering requirements in Victoria's North and Murray water resource plan area.

12.6.5 Annual basin and state watering priorities

Basin states must identify annual priorities for use of environmental water for surface water in each water resource plan area.

Obligations for annual watering priorities are met by Victoria's seasonal watering plan, which is consistent with the Basin Plan's environmental watering plan, long-term watering plans and the Basin-wide environmental watering strategy.

12.6.5.1 Seasonal watering proposals

Catchment management authorities prepare seasonal watering proposals each year using the objectives and flow regimes identified in environmental water management plans and through annual community consultation, in line with the VEW's guidelines. This ensures that the actions taken are in line with objectives and support outcomes outlined in Chapter 8 of the Basin Plan.

The proposals describe desired watering regimes for different climate-based scenarios and take into account:

- the objectives and flow regimes identified in environmental water management plans
- the actual watering regimes of waterways in recent years and their current condition
- the likely amount of water available at the start of the year
- scenarios for seasonal conditions and water availability over the coming year
- a risk assessment for any proposed watering

CMAs consult with key local stakeholders including storage managers, public land managers, Traditional Owners and local representatives of interest groups such as Environment Victoria, Victorian Recreational Fishing and Field, Game Management Australia and local community members from environmental water advisory groups when preparing seasonal watering proposals. These proposals form the basis for the state-wide seasonal watering plan the VEWH prepares each year.

Seasonal watering proposals for priority environmental assets in the Victorian Murray and Northern Victoria water resource plan areas are available on the relevant CMA websites.

12.6.5.2 Seasonal watering plan

The seasonal watering plan prepared by the VEWH previews the potential environmental watering that could be implemented using water available under the water holdings and water held by other environmental water holders. The VEWH in line with requirements of section 10.26(1) of the Basin Plan are required to perform its function to ensure that environmental watering occurs in a way that is consistent with the Basin-wide environmental watering strategy and considers the relevant long-term watering plans.

The catchment management authorities' seasonal watering proposals inform the seasonal watering plans, along with the MDBA's annual environmental watering priorities and the CEWH's portfolio management priorities.

The objectives of the seasonal watering plan are set out in the Victorian Water Act. The plan aims to achieve the objectives by making sure that decisions to use the water holdings are based on a systematic, science-based approach to identify environmental values and desired flow regimes. The plan also sets out the operational priorities for using environmental water allocations.

The VEWH's seasonal watering plan is prepared for the different water availability scenarios of drought, dry, average and wet. Environmental watering actions are developed for each scenario. The plan informs the real-time operational decisions that are made as the season progresses.

Actions identified in the scenarios are converted to firm environmental watering commitments based on actual conditions and water allocations.

The conditions that emerge over the year can be dynamic and are influenced by:

- weather conditions and forecasts
- catchment conditions
- water availability
- river and system operations such as unregulated flows, catchment inflows, storage levels, other water users' needs and potential delivery constraints
- ecological or biological factors and triggers such as plant and animal responses to natural flows or temperature
- risks to the environment such as deteriorating water quality

The VEWH engages with state stakeholder representatives when preparing Victoria's seasonal watering plan.

The current seasonal watering plan is available on the VEWH website at <http://www.vewh.vic.gov.au/watering-program/seasonal-watering-plan>.

12.7 How are Basin Plan environmental watering outcomes achieved?

12.7.1 Overview

As already explained, Basin Plan environmental watering outcomes are achieved through long-term and annual planning, and the delivery of held environmental water combined with other water such as consumptive, above cap, passing flows and system water. Monitoring of environmental watering outcomes informs adaptive management and potential revision of

watering objectives in the planning stage. Complementing this are critical measures, also known as complementary measures, that are necessary to achieve an environmental objective alongside water delivery.

The delivery of environmental water outcomes is managed through the state environmental water planning framework outlined in [Section 12.6](#). Environmental watering in Victoria's North and Murray water resource plan area is linked to the Basin Plan long-term environmental objectives to:

- protect and restore water-dependent ecosystems of the Murray-Darling Basin
- protect and restore the ecosystem functions of water-dependent ecosystems
- ensure that water-dependent ecosystems are resilient to climate change and other risks and threats
- ensure that environmental watering is coordinated between managers of planned environmental water, owners and managers of environmental assets and holders of held environmental water

Targeted objectives for priority environmental assets and how they relate to Basin Plan objectives are outlined in [Table 11](#) and [Table 12](#) of [Appendix E](#).

When the VEWB is preparing the seasonal watering plan (see [Section 12.6.5.2](#)) to ensure it can achieve Basin Plan objectives for connectivity, native vegetation, waterbirds and native fish, it is guided by the CMA's seasonal watering proposals (see [Section 12.6.5.1](#)). These are directed by the long-term objectives in environmental water management plans and long-term watering plans, and influenced by the Basin Annual Environmental Watering Priorities developed by the MDBA.

The VEWB coordinates its activities with other environmental water holders in northern Victoria, New South Wales and South Australia to achieve environmental outcomes at the southern-connected Murray-Darling Basin scale (see [Section 12.7.4](#)).

The VEWB uses trade and carryover to support environmental outcomes (see [Section 12.7.6](#)) and uses return flows and piggybacking on system water to get the most efficient and effective use from held environmental water, in line with Victorian policy (see [Section 12.7.5](#)).

12.7.2 Monitoring, evaluation, reporting and adaptive management

Victoria has two main environmental water monitoring programs, the Victorian Environmental Flows Monitoring and Assessment Program, and the Wetland Monitoring and Assessment Program for environmental water. Both programs include monitoring that relates to the objectives and targets outlined in Victoria's long-term watering plans, which have direct links to objectives outlined in Victoria's asset-scale environmental water management plans prepared by Victoria's CMAs, as well as the objectives listed in both the Basin-wide Environmental Water Strategy and in the Murray-Darling Basin Plan in Chapters 5 and 8, Schedules 7 and 8.

Other programs with monitoring relevant to Basin Plan outcomes include the Living Murray program, Victoria's Native Fish Report Card, and Commonwealth Long-Term Intervention Monitoring sites located on the Goulburn River.

These monitoring programs will be used by Victoria to report on Schedule 12 Matter 8, 'achievement of environmental outcomes at the asset scale'. DELWP will draft a monitoring, evaluation and reporting strategy to outline how Victoria will report on Matter 8 (see [Section 15.7](#)).

The Victorian Environmental Flows Monitoring and Assessment Program was established by the Victorian Government in 2005 to monitor and assess ecosystem responses to environmental watering in priority rivers across Victoria. Results from the program help inform decisions for environmental watering by catchment management authorities and Melbourne Water. Over the past 13 years, the information collected through the assessment program has provided valuable data and informed significant changes to the program. The Victorian Environmental Flows Monitoring and Assessment Program is now in its sixth stage of delivery and includes a strong focus on 'intervention' or 'flow event' questions for vegetation and fish. The current stage is funded to 2020.

The Wetland Monitoring and Assessment Program for environmental water is a state-wide monitoring program designed to assess ecological responses of vegetation, waterbirds, frogs and fish to water for the environment delivered in Victorian wetlands. Monitoring for this program started in 2017 and the current stage is funded to 2020.

The broad objectives for both monitoring and assessment programs are to:

- build on current knowledge and conceptual models to improve our understanding of the relationship between the delivery of environmental water and ecological responses in Victorian rivers and wetlands
- determine whether current ecological objectives for environmental watering are being met
- inform the management of environmental water
- communicate the ecological outcomes of environmental water delivery to stakeholders
- contribute to Victoria's reporting requirements for the Basin Plan

The results and learning from the Victorian Environmental Flows Monitoring and Assessment Program and Wetland Monitoring and Assessment Program for environmental water are fed into decisions and management of Victoria's Basin waterways. Results from monitoring at each site are communicated immediately after surveys to the CMAs' environmental water reserve managers. Managers can then adjust their planning for the delivery of environmental water as necessary. This cycle is shown in [Figure 12-7](#).

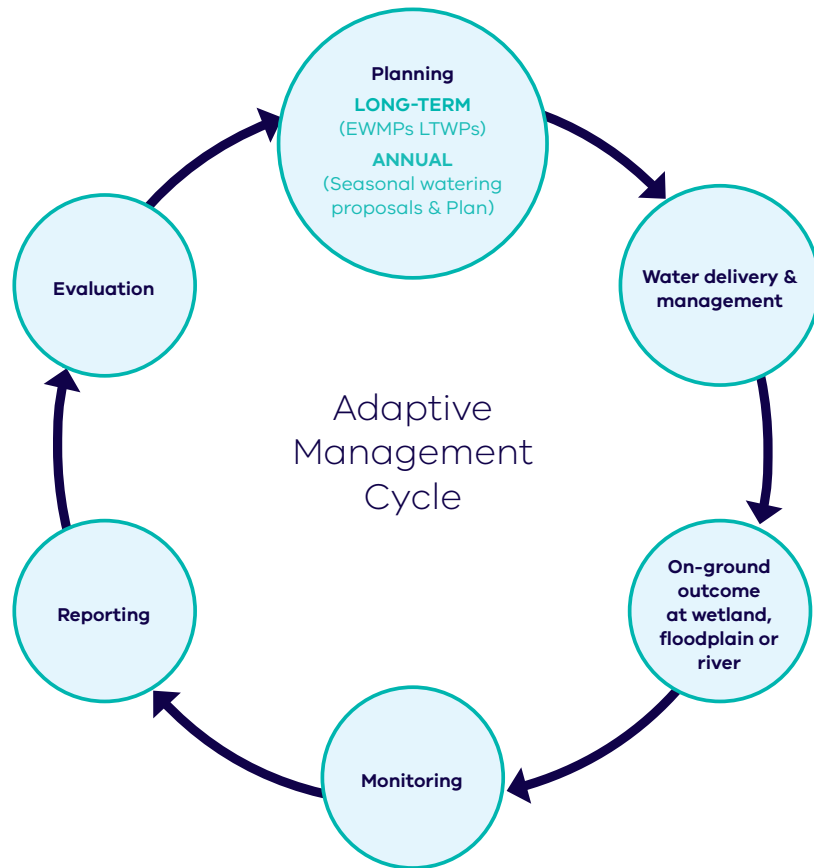


Figure 12-7: Adaptive management cycle for environmental water

Above cap water is reported annually in the Victorian Water Accounts. Victoria will continue to look at ways to improve the monitoring and reporting of above cap water including to identify how it supports Victoria in achieving environmental objectives.

12.7.3 Critical measures - also known as complementary measures

Environmental water is only one component of the activities necessary to achieve the long-term watering plan's ecological objectives and targets. Critical measures, also known as complementary measures, are vital to support priority environmental assets and priority ecological functions and meet environmental watering objectives. These measures include invasive species management and enhancing fish passage through instream obstructions.

Victoria is currently developing a Critical Measures (Complementary Measures) Business Case to prioritise activities based on cost, critical waterway management actions and risks to meeting environmental watering objectives.

12.7.4 Coordination

Coordination of environmental watering in the surface water systems in Victoria's North and Murray water resource plan area, and across Victoria's state borders, is done through cooperative arrangements.

The Victorian Environmental Water Holder leads environmental water planning and coordination for Victorian waterways at a water resource plan area scale, in close consultation with catchment management authorities as the local site managers. The VEWL represents the

Victorian priorities and objectives at interstate and Commonwealth environmental watering coordination forums to help align and coordinate objectives and outcomes at the broader Murray-Darling Basin scale.

The Basin Plan environmental management framework objectives (section 8.11) are intended to:

- coordinate the planning, prioritisation and use of environmental water in the Southern Connected Murray-Darling Basin on both a long-term and an annual basis
- enable adaptive management to be applied to the planning, prioritisation and use of environmental water, and
- facilitate consultation, coordination and cooperative arrangements between the Authority, the Commonwealth Environmental Water Holder and Basin states

The *Intergovernmental Agreement on Implementing Water Reform in Murray-Darling Basin 2013* states:

- clause 5.1 - The parties agree that their environmental water holders and managers will work collaboratively, in close consultation and where appropriate by Agreement, in exercising their responsibility in accordance with the Basin Plan Environmental Watering Plan and have regard to the Basin annual environmental watering priorities, as prepared by the MDBA
- clause 5.5 - The parties agree to establish mechanisms to coordinate planning, delivery and monitoring of environmental water

The *Murray-Darling Basin Plan Implementation Agreement* (7 August 2013) is established with Basin states under section 1.12 of the Basin Plan. This establishes the Environmental Water Working Group under the Basin Plan Implementation Committee. The Environmental Water Working Group undertakes advice on policy and planning issues relating to the environmental watering plans, including the Basin-wide watering strategy, long-term watering plans, Basin state annual environmental watering priorities, local engagement, accounting for environmental water use and environmental water delivery.

The Implementation Agreement also states the parties agree to establish an Environmental Water Holders and River Operators Coordination Forum. This forum is now known as the Southern Connected Basin Environmental Watering Committee (SCBEWC), and has these features:

- Purpose: To support the operational coordination of environmental water delivery in the southern-connected Basin in line with the environmental watering plan, the water quality and salinity management plan and the annual environmental watering priorities, so as to achieve the best environmental outcomes. The committee will not be a decision-making body but will be a mechanism to coordinate environmental watering activities to ensure decision makers, namely environmental water holders, managers of planned environmental water and river operators, can act on the best information, in accordance with their statutory responsibilities
- Membership: Environmental water holders and managers of planned environmental water, key river operators and waterway managers

The Southern Connected Basin Environmental Watering Committee (for more information on the Southern Connected Basin see [Section 4.1.4](#)) works to coordinate the delivery of all environmental water in the southern-connected Basin and in particular the River Murray system, including the allocation and management of The Living Murray portfolio, consistent with the Basin Plan Environmental Water Plan and its objectives.

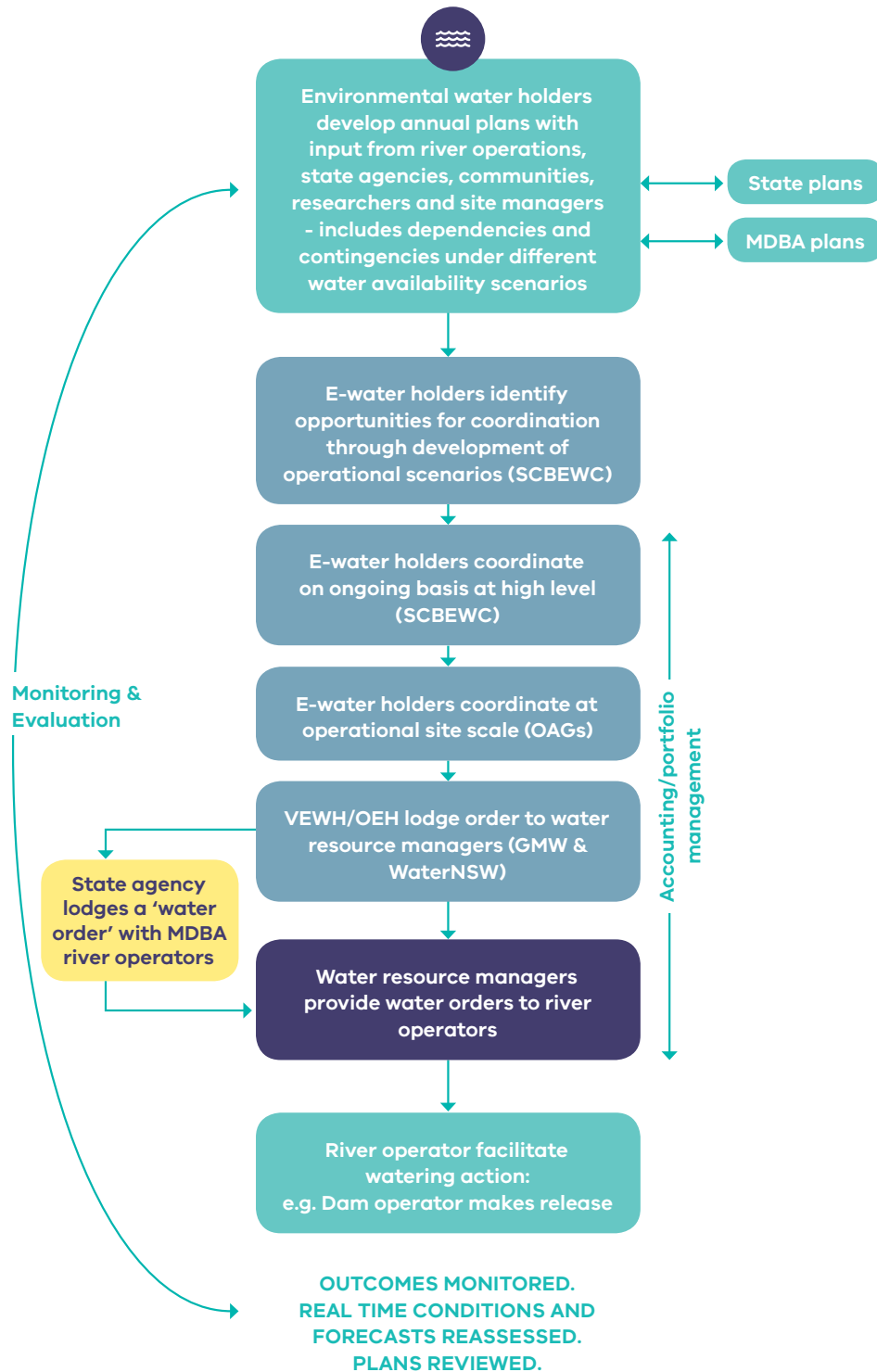


Figure 12-8: Process for coordinating environmental watering in the River Murray system

State plans include Long Term Watering Plans and Regional Annual Priorities. MDBA plans include Basin Annual Priorities (Basin Plan 2012 Chapter 8) and the Annual Operating Plan for River Murray System

Source: Murray-Darling Basin Authority

Key responsibilities of the Southern Connected Basin Environmental Watering Committee include:

- coordination of operational planning for the delivery of environmental water consistent with the Basin Plan Environmental Management Framework (section 8.10 of the Basin Plan)
- prioritisation of River Murray Unregulated Flows
- call on River Murray Increased Flows, if resolved to this effect
- input into the development of large scale multi-site environmental watering events and the deviations to river operations that may be required
- convening an annual planning coordination meeting for river operators, state water authorities and environmental water holders for the southern-connected Murray-Darling Basin system

Membership of the Southern Connected Basin Environmental Watering Committee is:

- Australian Government's Department of Agriculture and Water Resources
- Commonwealth Environmental Water Holder
- Murray-Darling Basin Authority, including River Murray Operations
- NSW Office of Environment and Heritage
- South Australian Department for Environment and Water
- Victorian Department of Environment, Land, Water and Planning
- Victorian Environmental Water Holder
- NSW Department of Industry

The committee's terms of reference include a requirement for an annual report to be provided to the Ministerial Council which reports on the committee's work.

The environmental water holders work together to implement joint watering actions in collaboration with river operators and local communities. The high level of cooperation helps to optimise environmental outcomes within the current water management framework.

Participation in the Southern Connected Basin Environmental Watering Committee ensures an understanding of the broader objectives, planning and context of system-wide environmental water objectives and outcomes and provides for coordination between the relevant states for most the efficient and effective use of e-water across the southern-connected Basin. It also allows for alignment between upstream and downstream watering activities.

At a local level, the Victorian Environmental Water Holder hosts or participates in operational advisory groups (OAG) which focus on sites but incorporate relevant multi-site objectives.

Participants include the river operators of Goulburn-Murray Water and/or the Murray-Darling Basin Authority, the CEWH, VEWH and The Living Murray as water holders, catchment management authorities and other stakeholders depending on the site, such as environmental water managers from South Australia or New South Wales and land managers.

The purpose of the operational advisory groups is to provide a forum to share technical and operational information between all environmental water holders, site managers and river managers for efficient operational coordination for environmental outcomes or watering actions. The group enables operations to be adjusted as conditions change, risks to be appropriately managed and successful results of water delivery. [Figure 12-9](#) shows an example of environmental watering as agreed by the relevant state agencies.

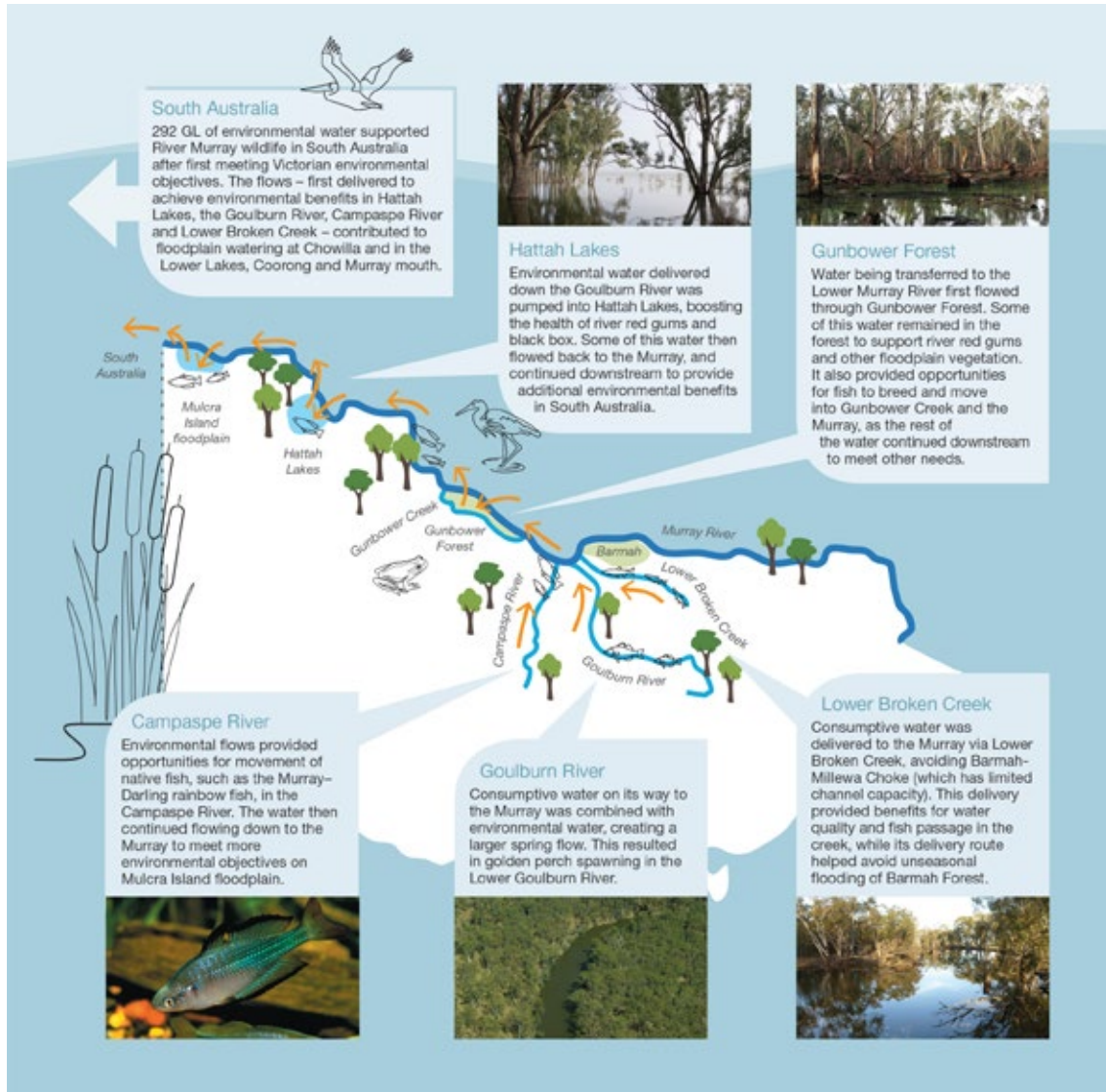


Figure 12-9: Victorian Environmental Water Holder coordinated watering and tools

Source: VEWH

The accredited text below outlines how Victoria will ensure it undertakes environmental watering in a coordinated way under Victoria's North and Murray Water Resource Plan.

**Basin Plan
s10.27(2)**

When the VEWH undertakes environmental watering in accordance with the obligation under section 10.26 of the Basin Plan, VEWH must ensure that environmental watering in the Victorian Murray water resource plan area and the Northern Victoria water resource plan area is coordinated to ensure that the environmental watering objectives of connected plan areas can also be achieved.

Note: the connected water resource plan areas are identified in response to section 10.27(1) of the Basin Plan in Column 3 of Victoria's North and Murray Index Table.

<<end of accredited text for s10.27(2) of the Basin Plan>>

12.7.5 Operational arrangements

The planning outlined in [Section 12.6](#) supports the on-ground delivery of held environmental water.

VEWH issues seasonal watering statements to the catchment management authorities to authorise the use of environmental water holdings. The CMAs have operational management responsibilities for providing the watering regimes determined by the planning processes.

Seasonal watering statements issued to the Goulburn Broken, North Central and Mallee CMAs are available online at <http://www.vewh.vic.gov.au/news-and-publications/seasonal-watering-statements>.

Catchment management authorities coordinate with storage and land managers to deliver the proposed watering regimes over the year. In practice, local watering decisions are made jointly because the environmental water holder, the storage manager and the land manager, in the case of wetlands, can veto proposed watering actions in some circumstances. By working together, they can also identify opportunities to use system water to support the delivery of environmental objectives.

The VEWH tracks the amount of water used and the return flows that can be used at downstream sites to maximise benefits. It also monitors changes to the operational context over the year and revises or issue new seasonal watering statements to maximise environmental outcomes. Management arrangements need to be tailored to the institutional boundaries of the CMAs and the physical boundaries of waterways to be supplied by particular water holdings because these determine basic accountabilities.

The complexity of decisions increases with the number of:

- governments involved in the decision
- water holders involved in the decision
- waterways that can be watered
- waterway managers

Management actions through the year may vary from the seasonal watering plan for unexpected reasons, like changes to water availability. Every effort is made to inform people that may be affected, including the local community.

12.7.6 Tools for managing environmental water

Environmental water managers use trades and carryover to efficiently and effectively manage environmental water. This is in line with Victorian policy for use of environmental water in the Victorian Waterway Management Strategy (DEPI, 2013) and *Water for Victoria*.

Water trading allows the environmental water managers to move water to the system where it is needed most, and to smooth out some of the variability in water availability across systems and years. The VEWH's framework for deciding whether to carry over water is also published in its water allocation trading strategy (VEWH, 2018).

Applications to trade by environmental water holders are subject to the same rules as all other allocation trades. The following types of trades are used to manage the water holdings:

- operational trades of the VEWH, Commonwealth Environmental Water Office (CEWO) and the Living Murray allocations to deliver environmental flows, such as from the Goulburn system to the Murray system
- operational trades to deliver environmental water to South Australia
- operational trades of VEWH Snowy entitlements in the Campaspe, Goulburn and Murray



allocations for environmental flows in the Snowy River

- trades of the VEWH, CEWO and the Living Murray allocations to enable carryover of environmental allocations from one season to the next
- buying and selling water allocations on the market

The delivery of environmental water requires either a bulk entitlement, environmental entitlement or water-use registration, and in Victoria these are held by the Victorian Environmental Water Holder. For more information about individual arrangements for access to water see [Section 7.2.2](#). The Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority cannot hold bulk or environmental entitlements because the Victorian Water Act specifies only certain bodies that can hold these.

The VEWH's bulk and environmental entitlements provide it with a right to a share of water in storage and enable it to:

- Divert water from a waterway – e.g. to water an off-stream wetland
- Use water in-stream – i.e. to deliver in-river and approved overbank environmental benefits.
- Have downstream use offset by authorised re-credits, as a result of environmental return flows from tributaries or sites upstream (see [Section 12.7.6](#))

Water shares provide entitlement holders with a right to a share of the water in storage, but do not provide any right to the delivery of that water. For systems where the VEWH holds a bulk or environmental entitlement water is traded to the VEWH to enable delivery, where there is not a VEWH bulk or environmental delivery is enabled under a water use registration which can be issued to the VEWH in accordance with the *Water (Resource Management) Regulations 2017*.

This legislative arrangement supports coordinated environmental water delivery by requiring environmental water holders to consolidate resources to maximise environmental outcomes.

Some of the largest trades in the system are the Commonwealth environmental water holdings that are traded to the Victorian Environmental Water Holder to deliver water in Victoria, and unused Commonwealth allocations being traded back to the Commonwealth Environmental Water Holder if they are no longer needed in Victoria.

Water trades carried out by the VEWH and other water holders must comply with trading rules that apply to all water entitlements and allocations.

Environmental water managers' carryover decisions are made to maximise benefit to the environment:

- to build a reserve for priority watering actions in future years, for example to meet critical environmental needs if conditions are dry or to deliver a large watering
- to enable early season watering the following year, before the full seasonal allocations for that year are available)
- because there is more than enough water available for high-priority watering actions in the current year

Carryover and trade provide flexibility to manage water availability between seasons, and environmental water managers may trade water if they can get better environmental outcomes from projects supported by funds generated from selling water allocation compared with outcomes from having surplus water.

12.7.7 Prerequisite policy measures

Prerequisite policy measures (PPMs) are policy measures designed to maximise the beneficial outcomes of the water recovered for the environment under the Basin Plan. Previously referred

to as 'unimplemented policy measures', PPMs are defined in section 7.15 of the Basin Plan as measures consisting of a policy to:

- credit environmental return flows for downstream environmental use or
- allow the call of held environmental water from storage during unregulated flow events

PPMs have been enabled for most declared rivers in northern Victoria for close to a decade through provisions in the Victorian Environmental Water Holder's bulk and environmental entitlements and obligations on GMW in its bulk entitlements. The arrangements have been designed to support the use of environmental water to get the best environmental outcomes without impacting on the security of supply to other entitlement holders. The entitlements enable:

- reuse of return flows (the portion of water that returns to the river or water supply system after an environmental water delivery, and which can be reused for further environmental watering downstream)
- use of consumptive water or system water en route to provide environmental benefit from water on its way through the system; an example is Barmah Choke bypass flows being delivered by way of Lower Broken Creek.
- piggybacking environmental water on consumptive water, system water, or above cap water (i.e. environmental water use is accounted as the additional water on top of other water required to meet flow objectives)

Further details about how Victorian prerequisite policy measures are enduring, fully operable and transparent is outlined in Victoria's policy document which has been submitted to the MDBA.

12.7.8 Managing risks to environmental water delivery

Effective management of environmental water requires identification and management of any risks. The Victorian Waterway Management Strategy (see [Section 12.6.2](#)) outlines state principles for managing risk associated with environmental watering.

These include that:

- risks involved with environmental watering will be identified and managed commensurate with the level of risk and environmental outcome sought
- risk management in environmental watering will consider the range of scenarios in which there may be risks
- the role of each relevant body involved in planning, delivery and facilitating delivery of environmental water will be clearly specified and verified to make sure there is due diligence and the best available information is used to manage any risks to third parties

Victoria has existing annual and longer-term processes in place for managing risks. The system operators also assess risk prior to delivering an environmental water event.

- Annual: Specific risks related to environmental watering are identified and assessed in site-based seasonal watering proposals developed annually by catchment management authorities and documented in the VEWH Seasonal Watering Plan. These proposals draw upon the risks outlined in individual environmental water management plans and identify specific actions to mitigate these risks. The categories of risk covered include reputation, compliance, environmental, human, costs, time and non-achievement of objectives. These risks may be specific to that year or require ongoing or long-term management

- Long term: CMAs across Victoria collaborating with communities and agencies identify key risks that may impact on the ability to achieve environmental watering objectives or that may arise in environmental water management plans. Management measures are also identified

The long-term watering plan outlines the types of risks and strategies for management. In addition to the above, Victoria undertook a risk assessment on a water resource plan scale (see [Appendix B](#)) to support development of Victoria's North and Murray Water Resource Plans. These risk are explained in [Chapter 5](#) and summarised in [Section 5.3.4](#) and [Section 5.4.4](#).

12.8 Ensuring environmental watering for priority environmental assets and priority ecosystem functions is not compromised

12.8.1 Overview

Under Basin Plan Victoria is required to ensure that the operation of Victoria's North and Murray Water Resource Plan does not impact on environmental watering where:

- watering relates to groundwater dependent ecosystems or groundwater dependent assets
- watering relates to resources with a significant connection between groundwater and surface water.

Connectivity between groundwater systems and between groundwater and surface water across Victoria's North and Murray water resource plan area is discussed in [Chapter 4](#). A discussion of groundwater dependent priority environmental assets and priority ecosystem functions is outlined in [Section 12.5](#). Basin Plan requires Victoria to show how it considers these connections and dependencies when managing the take and use of water from the system. This is to make sure Victoria has the appropriate mechanisms in place to ensure environmental watering for priority environmental assets and priority ecosystem functions is not compromised.

More specifically, Part 4 of Chapter 10 of the Basin Plan requires that water resource plans set out how states facilitate the sustainable use and management of water resources by:

- operation of the water resource plan not compromise the meeting of environmental watering requirements of priority environmental assets and priority ecosystem functions dependent of surface water (section 10.17 of the Basin Plan)
- operation of the water resource plan does not compromise the meeting of environmental watering requirements of priority environmental assets and priority ecosystem functions that depend on groundwater (section 10.18 of the Basin Plan)
- operation of the water resource plan does not compromise the meeting of environmental watering requirements for groundwater that has a significant hydrological connection to surface water (section 10.19 of the Basin Plan)
- there is no structural damage to an aquifer arising from take within the sustainable diversion limit (SDL), and hydraulic relationships and properties between groundwater systems and within groundwater systems are maintained (section 10.20 of the Basin Plan)

The Basin Plan requires that water resource plans be prepared with regard for whether rules are necessary to make sure that environmental watering requirements are met for priority environmental assets and priority ecosystem functions (surface water), priority environmental assets dependent on groundwater, and where there is a significant hydrological connection between groundwater and surface water.

The relationship between groundwater take and use and priority environmental assets dependent on groundwater is a fundamental consideration in groundwater management across Victoria at all levels, including the Victorian Water Act, Ministerial guidelines, statutory management plans and local management plans (see [Chapter 7](#)). In responding to Part 4 of

Chapter 10 of the Basin Plan regard was had to these existing arrangements.

Any rules included in the Plan in response to Part 4 of Chapter 10 of the Basin Plan must have the effect of ensuring that the operation of Victoria's North and Murray Water Resource Plan does not compromise the meeting of environmental watering requirements. As is outlined below, Victoria's North and Murray Water Resource Plan does not contain requirements, obligations, measures or strategies that would cause environmental watering to be compromised. However, in considering whether the Plan should include rules to support environmental watering consideration was given to management of emerging risks to the environment.

Rules have been included in response to sections 10.17, 10.18, 10.19 and 10.20 of the Basin Plan to address potential emerging risks that may arise during the operation of the Plan to support adaptive water resource management. The rules proposed under Victoria's North and Murray Water Resource Plan in response to sections 10.18, 10.19 and 10.20 are consistent with current arrangements under the Victorian Water Act and relevant statutory management plans approved for declared water supply protection areas in Victoria's North and Murray water resource plan area (see [Section Table 12-4](#) and [Table 12-5](#) for existing and proposed rules).

The rule in response to section 10.17 of the Basin Plan has been included to reflect the role of storage managers under Victoria's water resource management framework to support the achievement of environmental watering requirements in the management of the system where environmental watering occurs. As identified above at Section 12.5 environmental watering requirements for priority environmental assets are set out in the relevant environmental water management plan.

Table 12-4: Existing rules or measures under Victoria's water management framework

Existing rule	Basin Plan requirement applicable to	Groundwater SDL resource unit/s where the rule applies	How is the rule applied?
Victoria's licensing framework - take and use licence conditions (Victorian Water Act)	section 10.18 section 10.19	All SDL resource units in the Goulburn-Murray water resource plan area	This rule is applied to all take and use licences across the Goulburn-Murray water resource plan area in accordance with conditions of licences as outlined in section 56 of the Victorian Water Act. PCV: PCVs have been declared for all groundwater management units under section 22A of the Victorian Water Act except for the Upper Ovens River WSPA where prescriptions 20-21 and 50 describe the rules in place which take the place of the PCV. Trade zone limits: Katunga WSPA: • Prescription 1: Limit of groundwater licences Loddon Highlands WSPA • Prescription 3: Trading between zones Lower Campaspe WSPA: • Prescription 2: Trading rules Upper Ovens River WSPA: • Prescription 22: Restrictions and prohibitions on issuing take and use licences

Existing rule	Basin Plan requirement applicable to	Groundwater SDL resource unit/s where the rule applies	How is the rule applied?
			Monitoring arrangement: Katunga WSPA: • Prescription 5: Groundwater level monitoring • Prescription 6: Groundwater salinity monitoring Loddon Highlands WSPA • Prescription 5: Groundwater monitoring Lower Campaspe WSPA: • Prescription 4: Monitoring groundwater levels • Prescription 5: Monitoring groundwater salinity Upper Ovens River WSPA • Prescription 49: Monitoring
Restrictions on groundwater use based on groundwater trigger levels	section 10.18 section 10.19 section 10.20	Parts of GS8b, GS8c, GS8d	Water supply management plans: Katunga: • Prescription 2: Restrictions on taking groundwater Loddon Highlands: • Prescription 2: Triggers and restriction Lower Campaspe: • Prescription 1: Triggers and restrictions Upper Ovens River: • Prescriptions 2-11: Restrictions on taking water in Management Zone 1

Existing rule	Basin Plan requirement applicable to	Groundwater SDL resource unit/s where the rule applies	How is the rule applied?
Conjunctive management ¹ of surface water and groundwater - groundwater take restricted based on SW availability	section 10.19	Parts of GS8c	Upper Ovens River Water Supply Protection Area Water - Prescriptions 27-28: Transfers within management zone 1 - Prescription 29-30: Transfers between management zones 1 and 2

1: Note that in Victoria conjunctive management means that groundwater and surface water are managed as one unit, that is rules consider both surface water and groundwater availability

Table 12-5: Proposed new rule or measure for Goulburn-Murray water resource plan area

Proposed rule	Basin Plan requirement applicable to	SDL resource unit/s where rule applies	Where the rule applies
Minister must undertake a risk assessment for new licences or transfer of existing licences and consider conditions relating to Part 4 Division 3 of the Basin Plan.	section 10.18 and section 10.19	All SDL resource units in the Goulburn-Murray WRP area	All take and use licences across the Goulburn-Murray water resource plan area.
Minister may prepare guidelines for preparing a draft management plan for new areas declared as water supply protection areas. Guidelines will include considerations for prescriptions relating to Basin Plan Part 4 Division 3 of the Basin Plan.	section 10.18, section 10.19 and section 10.20	All SDL resource units in the Goulburn-Murray WRP area	New areas declared as water supply protection areas and existing areas where new plans are prepared.

12.8.2 Groundwater resources and connectivity with surface water

The Goulburn-Murray water resource plan area forms the southern portion of the large saucer-shaped geological formation that is the Murray geological basin. Similar to the morphology of the Murray-Darling drainage basin, all groundwater flows in a general north and westerly direction from the Victorian highlands and the Great Dividing Range. For more information see [Chapter 2](#).

Across the Goulburn-Murray water resource plan area hydraulic connection between groundwater and surface water and groundwater dependent ecosystems is highly variable. There is significant hydraulic connectivity between those groundwater resource units that contain a shallow water table or are directly connected to the water table. Water table aquifers with connections to surface water are primarily the:

- Goulburn-Murray: Sedimentary Plain SDL resource unit in the Shepparton formation
- Goulburn-Murray: Shepparton Irrigation Region Shepparton SDL resource unit formation

- c) Goulburn-Murray: Highlands SDL resource unit including areas where the Calivil formation is shallow and aquitard layers are absent; areas where fractured rock of the New Volcanics aquifer are present in the south of the Loddon and Campaspe catchments; and in the unconfined fractured rock near waterways. For more information on connectivity see [Section 4.4](#)

12.8.3 Ensuring environmental watering of groundwater dependent environmental assets and ecosystems is protected (section 10.18 of the Basin Plan)

Victoria's entitlement framework supports meeting environmental watering requirements as outlined in (see [Section 12.4](#)). Section 10.18 of the Basin Plan requires consideration to be given as to whether the Victoria's North and Murray Water Resource Plan could compromise the meeting of environmental watering requirements for groundwater dependent priority environmental assets and priority ecosystem functions.

There is nothing in Victoria's North and Murray Water Resource Plan that would have the effect of compromising the ability to meet environmental watering requirements of groundwater dependent priority environmental assets and priority ecosystem functions.

The known groundwater-dependence of priority environmental assets in Victoria's North and Murray water resource plan areas are provided in [Table 7](#) to [Table 10](#) of [Appendix E](#) and [Figure 12-4](#) and [Figure 12-5](#).

In approving a new groundwater licence or a trade regard must be had to the need to protect the riparian and riverine environment under section 40 of the Victorian Water Act. For all licence applications for take and use of groundwater, the Minister or delegate is obliged to have regard to adverse effects on waterways, the environmental water reserve and to protect the environment, and must not approve an application if it is likely to have a significant impact.

To provide guidance to delegates considering these obligations when assessing groundwater take and use licence applications in areas without a management plan the Minister released Guidelines for Groundwater Licensing and the Protection of High-Value Groundwater-Dependent Ecosystems (DELWP, 2015). These guidelines outline the decision-making process when assessing a new groundwater licence or a trade of a groundwater licence to protect groundwater-dependent ecosystems and consider imposing conditions on the groundwater take and use licence to mitigate those impacts. This set out the requirements for assessing the risk posed by a groundwater licence application to high value ecosystems depending on groundwater and takes a risk-based approach to identify where a proposed groundwater take may result in an impact to a groundwater-dependent ecosystem. The application of this policy ensures that the groundwater-dependent ecosystems are not compromised by the taking of groundwater. The Guidelines are outlined below.

Ministerial Guidelines for Groundwater Licensing and the Protection of High Value Groundwater Dependent Ecosystems (DELWP, 2015)

The guidelines are used to determine the likelihood and consequence of any proposed groundwater take impacting on high value ecosystems. The decision maker is required to follow these steps:

- STEP 1. Determine the licence application area and identify any high value ecosystems
 - Determine whether the aquifer is confined or unconfined. Interactions with groundwater-dependent ecosystems mostly occur with unconfined aquifers, so if the aquifer is confined the assessed risk is low
 - Identify any features within that area such as rivers, springs, soaks or terrestrial vegetation containing high value ecosystems
- STEP 2. Determine any likelihood that the proposed groundwater extraction will interact with the feature
- STEP 3. Determine the consequence of the proposed groundwater extraction on the feature
- STEP 4. Determine the risk to the high value ecosystems dependent on groundwater
- STEP 5. Determine how risk will be managed for any groundwater licence applications with a risk assessment of medium or high

Note that these risk mitigations are suggested as examples in the guidelines:

- a) altering the area of impact, such as reducing the entitlement volume, locating the bore in a deeper aquifer, re-siting the bore, undertaking investigations to improve information on the local aquifer
- b) changing the likelihood, such as increasing the set back distances, modifying the pumping schedule
- c) changing the consequence, such as modifying the pumping schedule, developing offsets, developing options for supplementing surface water flows
- d) reducing the risk evaluation through licence conditions
- e) deciding to undertake further analysis to gain better information and improve the risk analysis
- f) providing alternative supply to 'at-risk' areas to maintain the high value ecosystem
- STEP 6. Consult with relevant catchment management authority
- STEP 7. Make final decision

Where there is an approved statutory management plan in place for a declared water supply protection area, the Guidelines for Groundwater Licensing and the Protection of High-Value Groundwater-Dependent Ecosystems are not applied as the prescriptions contained in the relevant management plan apply to all licencing decisions in the water supply protection area to which the management plan applies.

For areas declared under section 27 of the Victorian Water Act as a water supply protection area, a statutory management plan is prepared and approved by the Minister. These plans are prepared to regulate the management of water resources in the declared area. To ensure that statutory management plans meet the requirements of section 10.18 of the Basin Plan, Victoria's North and Murray Water Resource Plan includes a rule that identifies the matters that must be considered when developing prescriptions for a statutory management plan.

In order to understand the relationship between priority environmental assets their groundwater dependencies and the protections provided to priority environmental assets under the Victorian framework the Victorian government commissioned a study by Groundwater Logic. This study identified priority environmental assets which have some groundwater dependency, then looked at protections in place in the existing management arrangements within the statutory groundwater management plans and local area plans to identify if there is sufficient protection.

The analysis concluded that most of the priority environmental assets across the Victorian Murray and Northern Victorian water resource plan areas with known or suspected groundwater dependencies are classified as at low risk from excessive pumping or poor resource management.

The study found that no wetlands were classified above a low risk rating and only four river reaches were classified as being moderate to high risk groundwater-dependent ecosystems. These were two Lower Ovens River reaches and two Broken Creek reaches. However, there are management rules in place for the Lower Ovens River which limit trade adjacent to the river, and the Broken Creek reaches are covered by local arrangements in the Shepparton Irrigation Region groundwater management area plan.

This study concluded that 'no further recommendations for managing effects on groundwater-dependent ecosystems, other than those that are already in place under Victoria's existing water management framework, are considered necessary' (Groundwater Logic, 2018).

Therefore it is not considered that Victoria's North and Murray Water Resource Plan requires would compromise the meeting of environmental watering requirements for groundwater dependent priority environmental assets or priority ecosystem functions. Due to the nature of Victoria's water resource management framework there is nothing in the Plan that would prevent or have adverse impacts on the meeting of environmental watering requirements.

However, rules have been included to address potential emerging risks that may arise during the operation of the Plan to support adaptive water resource management. The rules in response to section 10.18 of the Basin Plan (as outlined below) contained in Victoria's North and Murray Water Resource Plan applies to decisions to issue or transfer (trade) a take and use licence for groundwater in the Goulburn-Murray water resource plan area.

As outlined below the proposed rules require the following:

- where no management plan is in place for a declared water supply protection area, to carry out an assessment to determine the existence of medium or high risk that the take of groundwater in relation to a new licence or the transfer of a licence will have an adverse impact on high value ecosystems dependent on the relevant groundwater and manage that risk; and
- where a management plan is being prepared for a declared water supply protection area, to consider whether prescriptions are necessary in a management plan to address any risks to the meeting of environmental watering requirements for priority environmental assets and priority ecosystem functions

The application of the Guidelines for Groundwater Licensing and the Protection of High Value Groundwater-Dependent Ecosystems (DELWP, 2015) which is outlined above is consistent with the proposed rule outlined. The Upper Ovens Case Study provided below in [Section 12.8.4](#) demonstrates how the rules provided in that Plan are consistent with the proposed rules.

The following rule applies to the Northern Victoria water resource plan area and Victorian Murray water resource plan area under Victoria's North and Murray Water Resource Plan.

**Basin Plan
s10.18(3)**

1. The Minister may prepare guidelines under section 30 of the *Water Act 1989* (Vic) for the preparation of a draft management plan for an area declared under section 27 of the *Water Act 1989* (Vic) to require the consultative committee to consider the matters in paragraph (4) when developing a draft statutory management under section 31 of the *Water Act 1989* (Vic).
2. The guidelines may require the consultative committee to consider whether the draft statutory management plan should include prescriptions for groundwater management having regard to:
 - a) groundwater dependent priority environmental assets and priority ecosystem functions as identified in the Northern Victoria Long-Term Watering Plan and the Victorian Murray Long-Term Watering Plan;
 - b) any risks to meeting environmental watering requirements for those groundwater dependent priority environmental assets and priority ecosystem functions as a result of groundwater take in the area.
3. Prescriptions identified in accordance with paragraph (4) may include:
 - a) a requirement to undertake monitoring;
 - b) the period and frequency over which the monitoring should occur;
 - c) the locations at which monitoring should occur;
 - d) identified trigger levels to reflect when extraction would pose a risk to the aquifer;
 - e) restrictions that may be applied to the extraction of groundwater under a take and use licence and how the restrictions will be applied;
 - f) conditions on the transfer of take and use licences within or into the relevant water supply protection area.
4. In considering a draft statutory management plan under section 32A of the *Water Act 1989* (Vic), the Minister must consider whether the prescriptions included in the draft plan address the types of risks referred in paragraph (4) if identified for the water supply protection area relevant to the draft plan.
5. The storage manager will manage the system and above cap water in line with the Victorian water management framework described in Victoria's North and Murray Water Resource Plan in response to section 10.26(1) of the Basin Plan so the environmental watering requirements of PEAs and PEFs identified in relevant environmental water management plans are met, which is the responsibility of the VEWH.
6. References to sections of the *Water Act 1989* (Vic) do not have the purpose of including those sections as part of the response but are included for reference only.

Note 1: For environmental watering obligations and requirements see the response in Column 3 to section 10.26 of the Basin Plan in Victoria's North and Murray Index Table and the supplementary material discussed in Column 5.

Note 2: see response to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table for a discussion of environmental watering arrangements in Victoria.

<<end of accredited text for s10.18(3) of the Basin Plan>>

The following rule applies to the Goulburn-Murray water resource plan area under Victoria's North and Murray Water Resource Plan.

**Basin Plan
s10.18(3)**

1. This rule only applies where a statutory management plan has not been approved under section 32A of the *Water Act 1989* (Vic) and groundwater dependent ecosystems have been identified as high value in the Goulburn-Murray water resource plan area:
 - a) the Minister must undertake a risk assessment to determine whether the issue of a new licence or transfer of an existing licence will have a medium or high risk of having an adverse impact on the groundwater dependent ecosystem;
 - b) where a medium or high risk under paragraph (1), before issuing a take and use licence or approving the transfer a take and use licence for the take of groundwater the Minister must consider whether conditions should be imposed on the take and use licence to modify:
 - i) the adverse consequences of the take including pumping schedules, offsets, options for supplementing surface water flows;
 - ii) the adverse impact of the take including reducing the entitlement volume or location of the bore.
2. Where a water supply protection area has been declared under section 27 of the *Water Act 1989* (Vic) the rule under (1) above does not apply.

<<end of accredited text s10.18(3) of the Basin Plan>>

12.8.4 Ensuring environmental watering requirements are met when there is a significant connection between surface water and groundwater

Section 10.19 of the Basin Plan requires consideration to be given as to whether Victoria's North and Murray Water Resource Plan could compromise the meeting of environmental watering requirements where a significant hydrological connection between surface water and groundwater has been identified.

Surface water and groundwater are connected across the Goulburn-Murray water resource plan area to varying degrees and some of this variation is described in [Chapter 4](#). The hydrologic cycle is evidence that rainfall recharges the groundwater systems and provides streamflow, while groundwater baseflow from the water table sustains streams in between rainfall and runoff events. Many groundwater-dependent ecosystems are also maintained from groundwater resources. The surface water SDL resource units are closely connected to their adjacent groundwater SDL resource units and groundwater planning considers the impact on surface water and groundwater-dependent ecosystems when managing licences and allocations.

Statutory groundwater management plans and local management plans consider the interaction between the surface water and groundwater systems through the application of the Victorian Water Act, regulations and the supporting guidelines. For example, in the Upper Ovens area, the surface water and groundwater resources are managed conjunctively in recognition of the strong degree of connection between the surface water and shallow groundwater systems.

In approving a new groundwater licence or a trade regard must be had to the need to protect the riparian and riverine environment under section 40 of the Victorian Water Act. For all licence applications for take and use, the Minister or delegate is obliged to have regard to adverse effects on waterways, the environmental water reserve and to protect the environment, and

must not approve an application if it is likely to have a significant impact.

To support consideration of applications for new or transfer of existing licences the Minister released Guidelines for Groundwater Licensing and the Protection of High-Value Groundwater-Dependent Ecosystems (DELWP, 2015) which provide a framework for assessing risks and determining measures to manage those risks where the taking of groundwater will have adverse impacts on surface water flows. The Guidelines for Groundwater Licensing and the Protection of High-Value Groundwater-Dependent Ecosystems (DELWP, 2015) are not applied as the prescriptions contained in the relevant management plan apply to all licencing decisions in the water supply protection area to which the management plan applies. The Guidelines are outlined further in [Section 12.8.3](#).

As discussed, under the Victorian Water Act the Minister can declare a water supply protection area for areas that require intensive management and monitoring because of risks associated with groundwater extraction. There are four water supply protection areas in the Goulburn-Murray water resource plan area these are the Upper Ovens, Katunga, Loddon Highlands and Lower Campaspe Valley water supply protection areas.

These areas have had Water Management Plans prepared and approved by the Minister for Water. The prescriptions in these statutory management plans protect existing users and the environment by setting triggers based on groundwater use or groundwater levels. When the prescribed triggers are met, annual allocations may be announced in accordance with the Water Management Plan that allow users to pump a proportion of their entitlement (see for example the Upper Ovens River Case Study).

Case Study – Upper Ovens River Water Supply Protection Area Water Management Plan

The Upper Ovens River Water Supply Protection Area Water Management Plan (GMW, 2012) has been developed to conjunctively manage the surface water and groundwater resources in this area, given the very connected manner of both systems. The Upper Ovens River Water Supply Protection Area Water Management Plan recognises that groundwater in the unconsolidated sedimentary aquifer and surface water resources within the main stream systems are highly connected. The plan has established a water sharing regime with a focus on low flow periods where there are increased risks to the environment and other water users.

The Upper Ovens River Water Supply Protection Area Water Management Plan addresses the impact of groundwater extraction on groundwater-dependent ecosystems. It does this through prescriptions in the Water Management Plan:

- Prescriptions 2-7 - Describe the rules relating to taking surface water or groundwater under an all-year licence while restrictions are in place
- Prescription 18-25 - Describes the rules relating to issuing a new licence
- Prescription 27-30. - Describe rules relating to the transfer of a licence
- Prescription 35- Describes the rules relating to the transfer of a groundwater licence to a surface water licence
- Prescriptions 36 - Describes the rules relating to the transfer of a surface water licence to a groundwater licence
- Prescription 37-38 - Describes the rules relating to any transfers between a surface water licence in Management Zone 1 to an all-year groundwater licence in Management Zone 2 and all-year groundwater licence in Management Zone 2 to a surface water licence in Management Zone 1
- Prescription 44-48. Describes how the Corporation must meter take by consumptive users-
- Prescription 49 - Describes how the Corporation must ensure that an appropriate monitoring program is undertaken to ensure that flows in the catchment and groundwater levels are recorded, the water sharing regime is able to be implemented, the relationship between groundwater levels and stream levels can be observed

The extent and types of groundwater-dependent ecosystems in the Upper Ovens River catchment are not completely understood, although freshwater meadows and shallow freshwater marshes are expected to be supported. Given the low levels of current development related to the total water resources in the Upper Ovens catchment, it is expected that groundwater-dependent ecosystems would be relatively undisturbed as far as their water requirements are concerned.

From historic data, groundwater use from the unconsolidated sedimentary aquifer lowers groundwater levels by a small amount (0.25 m), however natural and seasonal variation in groundwater levels is around two to three metres and the impact of extraction on groundwater levels is only an issue in extremely dry years when periods of low flow conditions exist for the river.

As a result, these rules or prescriptions have been established that limit the use of groundwater from the connected groundwater and surface water resources when low flow periods exist. This has been done by linking surface water and groundwater extraction with restrictions on extraction to protect further loss of surface flow. This provides protection to groundwater-dependent ecosystems in and along the river reaches.

It is not considered that Victoria's North and Murray Water Resource Plan would compromise the meeting of environmental watering requirements where significant hydrological connections between surface water and groundwater have been identified. Due to the nature of Victoria's water resource management framework there is nothing in the Plan that would prevent or have adverse impacts on the meeting of environmental watering requirements. However, rules have been included to address potential emerging risks that may arise during the operation of the Plan to support adaptive water resource management.

The rules in response to section 10.19 of the Basin Plan (see accredited text below) contained in Victoria's North and Murray Water Resource Plan applies to decisions to issue or transfer (trade) a take and use licence for groundwater in the Goulburn-Murray water resource plan area.

As outlined below the proposed rules require the following:

- where no management plan is in place for a declared water supply protection area, to carry out an assessment to determine the existence of medium or high risk that the take of groundwater in relation to a new licence or the transfer of a licence will have an adverse impact on surface water flows as it relates to environmental ecosystems; and
- where a management plan is being prepared for a declared water supply protection area, to consider whether prescriptions are necessary in a management plan to address any risks to the meeting of environmental watering requirements where a significant hydrological connection between surface water and groundwater has been identified

The application of the Guidelines for Groundwater Licensing and the Protection of High Value Groundwater-Dependent Ecosystems (DELWP, 2015) which is outlined above is consistent with the proposed rule outlined below.

**Basin Plan
s10.19(3)**

1. This rule only applies where a management plan for a water supply protection area has not been approved under section 32A of the *Water Act 1989* (Vic) and where a significant hydrological connection between surface water and groundwater has been identified in the Goulburn-Murray water resource plan area and groundwater extraction has been identified as affecting surface water flow relating to a high value ecosystem:
 - a) the Minister must undertake a risk assessment to determine whether the issue of a groundwater take and use licence or transfer of groundwater take and use licence will have a medium or high risk of having an adverse impact on the high value ecosystem;
 - b) where a medium or high risk under paragraph (1) is identified, before issuing or approving the transfer a take and use licence for the take of groundwater the Minister must, in consultation with the relevant catchment management authority, consider whether conditions may be imposed on the take and use licence to modify:
 - i) the adverse consequences of the take (which may include pumping schedules, offsets, options for supplementing surface water flows);
 - ii) the adverse impact of the take (which may include reducing the entitlement volume or location of the bore).
2. Where a water supply protection area has been declared under section 27 of the *Water Act 1989* (Vic) the rule under (1) above does not apply.
3. Where a water supply protection area has been declared under section 27 of the

Water Act 1989 (Vic) the Minister may prepare guidelines under section 30 of the *Water Act 1989* (Vic) relating to the preparation of a draft statutory management plan for that declared area to require the consultative committee to consider the matters in paragraph (4) when developing a draft statutory management under section 31 of the *Water Act 1989* (Vic).

4. The guidelines may require the consultative committee to consider whether the draft statutory management plan should include prescriptions for groundwater management having regard to:
 - a) any significant hydrological connection between groundwater and surface water; and
 - b) any risk to meeting environmental watering requirements as a result of groundwater take in the area.
5. Prescriptions identified in accordance with paragraph (4) may include:
 - a) a requirement to undertake monitoring;
 - b) the period and frequency over which the monitoring should occur;
 - c) the locations at which monitoring should occur;
 - d) identified trigger levels to reflect when extraction would pose a risk to the aquifer;
 - e) restrictions that may be applied to the extraction of groundwater under a take and use licence and how the restrictions will be applied;
 - f) conditions on the transfer of take and use licences within or into the relevant water supply protection area.
6. In considering a draft statutory management plan under section 32A of the *Water Act 1989* (Vic), the Minister must consider whether the prescriptions included in the draft plan address the types of risks referred in paragraph (4) if identified for the water supply protection area relevant to the draft plan.
7. References to sections of the *Water Act 1989* (Vic) do not have the purpose of including those sections as part of the response but are included for reference only.

Note 1: For environmental watering obligations and requirements see the response in Column 3 to section 10.26 of the Basin Plan in Victoria's North and Murray Index Table and the supplementary material discussed in Column 5.

Note 2: see response to section 10.26(1) of the Basin Plan in Victoria's North and Murray Index Table for a discussion of environmental watering arrangements in Victoria.

<<end of accredited text for s10.19(3) of the Basin Plan>>

12.8.5 Protecting the productive base of groundwater

Section 10.20 of the Basin Plan requires consideration to be given as to whether the content of

Victoria's North and Murray Water Resource Plan would compromise:

- the structural integrity of an aquifer, whether within or outside the water resource plan area, arising from take within the long-term annual diversion limit for an SDL resource unit and
- hydraulic relationships and properties between groundwater and surface water systems, between groundwater systems and within groundwater systems

Water resources management across the Goulburn-Murray water resource plan area considers the integrity of the aquifer from which the resource is extracted and also the overall hydraulic relationships between groundwater and surface water systems and between and within groundwater systems. This is achieved through the Victorian Water Act, statutory management plans and local management plans that provide for managing the resource sustainably, prevent undue depletion and protect the integrity of the aquifer and the interests of existing water users and the environment.

By preventing undue depletion, such as by restrictions on allocation when water level triggers are met, the magnitude of groundwater level decline is limited and in Victoria such triggers consider both licensed and private rights users, and where identified, the environment and water ways. These preserve aquifer integrity (such as excessive de-pressurisation or de-watering resulting in subsidence and compaction) and hydraulic relationships, such as hydraulic gradients that limits risks of migration of saline groundwater towards fresher groundwater.

These were both considered in the development of the Katunga water supply protection area groundwater management plan (see case study – Kutunga water supply protection area groundwater management plan).

The plans achieve this through the same mechanisms that protect groundwater levels and quality, such as trigger levels, restrictions and regular sampling, testing and monitoring. In all cases, impacts on existing consumptive and environmental users will be detected from the regular sampling and monitoring before there is any impact on the structural integrity of the aquifer.

Case Study – Katunga water supply protection area groundwater management plan

The Katunga water supply protection area was declared in 1999. Several iterations of water resources planning have occurred in the years since, with recent amendments in 2017 providing a consolidated groundwater management plan. The Katunga Water Supply Protection Area Groundwater Management Plan was developed to protect the consumptive and environmental users of groundwater across and next to the plan area.

Intensive development and pumping of the Deep Lead aquifer in this region from the mid-1980s resulted in an observed decline of around 10 metres in the potentiometric surface of this aquifer. As well as declining water availability and the potential for bores to run dry, excessive groundwater pumping can lead to increased salinity through induced inter-aquifer flow and aquifer matrix compaction, affecting its structural integrity.

The Katunga water supply protection area groundwater management plan was developed to manage and control the risks that excessive groundwater development could have on the available water and its quality and the overall condition of the aquifer itself. The plan includes rules or 'prescriptions' that control the amount of take, or which describe the monitoring or management activities to sustain the resource.

These prescriptions include:

- Prescription 1: A limit on groundwater licences, with a maximum permissible consumptive volume set at 60,577 ML/yr. Zone limits are also set on some highly-developed zones within the water supply protection area
- Prescription 2: Restrictions on taking groundwater, based on review of groundwater levels within State Government groundwater observation bores. Trigger levels are set and varying groundwater allocation percentages are announced based on these levels, ranging from 70 percent to 100 percent allocation
- Prescription 3: Rules governing the transfer of licences to reduce the intensity of groundwater development in specific management zones
- Prescription 4: Metering of licensed take, to provide accurate information on the extent to which entitlements are accessed
- Prescription 5: Regular groundwater level monitoring to understand the impacts of high intensity groundwater pumping on water levels
- Prescription 6: Regular groundwater salinity monitoring, to understand and manage any impacts that may reduce the water quality, from over-pumping or leakage of saline groundwater from adjacent aquifers
- Prescription 7: Annual reporting to make sure that the ongoing resource management for this area is completely transparent and made publicly available

These prescriptions have been developed to protect the resource from declining water availability and quality.

In terms of prioritising risks, the risk to aquifer integrity is ranked much lower than the risk of groundwater shortage or of increasing groundwater salinity. This is purely due to the effect that more prominent risks have themselves become indicators that aquifer integrity could be compromised.

The Katunga Water Supply Protection Area Groundwater Management Plan includes prescriptions to protect water quantity and water quality. The monitoring systems put in place and the associated triggers and rules apply to protect the groundwater resource from these quantity and quality impacts. It would take an intensive and prolonged decline in water levels to lead to impacts in the structural integrity of the aquifer, which the currently- prescribed rules and procedures will detect at a very early stage.

Owing to the high levels of development in the area, and the prominence of this plan among the community, actions such as reduced allocations to respond to deteriorations in water levels and quality will also provide protection from any risk to the structural integrity of the aquifer.

The Katunga case study provided is consistent for the other statutory groundwater management plans across the Goulburn-Murray water resource plan area, where management prescriptions are in place to provide early warning and an adaptive response to any critical decline in water levels or any substantial increase in groundwater salinity.

In respect of section 10.20 the Basin Plan requires a rule that provides protection to ensure there is no structural damage to an aquifer arising from groundwater take.

Victoria considers there are no structural risks to the aquifers because the amount of take is limited by the Permissible Consumptive Volumes set for intensive use areas, and this level and prescriptions included in management plans will not cause significant aquifer drawdown and therefore structural risk to the aquifers.

As a result, it is not considered necessary to include rules in Victoria's North and Murray Water Resource Plan to respond to section 10.20 of the Basin Plan. However, section 10.21 of the Basin Plan requires that a rule to meet the objectives of section 10.20 must be included in a water resource plan that relates to the Goulburn-Murray: Sedimentary Plain SDL resource unit.

The rule identified to meet the objectives of section 10.21 of the Basin Plan for the Goulburn-Murray: Sedimentary Plain SDL resource unit has been applied to the whole Goulburn-Murray water resource plan area by including it as a response to section 10.20(3) of the Basin Plan (as outlined below).

This supports Victoria's approach to water resource management which is fundamentally consistent across the State, but adaptable enough to respond to localised issues. Therefore, where a risk arises to the structural integrity of an aquifer and the hydraulic relationships within groundwater systems or between groundwater and surface water, the Minister may prepare guidelines that require setting prescriptions in a statutory management plan where a water supply protection area has been declared.

The current statutory management plans in place in the Goulburn-Murray water resource plan area are consistent with the rules to respond to section 10.20 of the Basin Plan, see for example the Katunga Case Study outlined above.

**Basin Plan
s10.20(3)**

1. The Minister may prepare guidelines under section 30 of the *Water Act 1989* (Vic) for the preparation of a draft statutory management plan for an area declared under section 27 of the *Water Act 1989* (Vic) to require the consultative committee to consider the matters in paragraph (2) when developing a draft statutory management under section 31 of the *Water Act 1989* (Vic).
2. The guidelines may require the consultative committee to consider whether the draft statutory management plan should include prescriptions for groundwater management having regard to:
 - a) the risk to the structural integrity of the aquifer because of the level of take in the area;
 - b) the risk to maintaining the hydraulic relationships and properties between groundwater and surface water systems, between groundwater systems and within groundwater system within the area.
3. Prescriptions identified in accordance with paragraph (2) may include:
 - a) a requirement to undertake monitoring;
 - b) the period and frequency over which the monitoring should occur;
 - c) the locations at which monitoring should occur;
 - d) identified trigger levels to reflect when extraction would pose a risk to the aquifer;
 - e) restrictions that may be applied to the extraction of groundwater under a take and use licence and how the restrictions will be applied.
4. In considering a draft statutory management plan under section 32A of the *Water Act 1989* (Vic), the Minister must consider whether the prescriptions included in the draft plan address the types of risks referred in paragraph (2) if identified for the water supply protection area relevant to the draft plan.
5. References to sections of the *Water Act 1989* (Vic) do not have the purpose of including those sections as part of the response but are included for reference only.

<<end of accredited text for s10.20(3) of the Basin Plan>>

In addition to meet the requirements of section 10.21 of the Basin Plan, measures have also been included in Victoria's North and Murray Water Resource Plan to ensure that the objectives of section 10.20(2) of the Basin Plan are met. The measures are outlined below in the accredited text.

**Basin Plan
s10.21(2)**

1. Restrictions on taking groundwater and the granting or transfer of licences for the taking of groundwater in the Goulburn-Murray: Sedimentary Plain SDL resource unit must be informed by any resource condition limit specified in a statutory management plan approved under section 32A of the *Water Act 1989* (Vic) for a water supply protection area declared under section 27 of the *Water Act 1989* (Vic).
2. See also the response to section 10.20(3) of the Basin Plan above for rules that apply to the groundwater resources in the Goulburn-Murray water resource plan area including Goulburn-Murray: Sedimentary Plain SDL.
3. References to sections of the *Water Act 1989* (Vic) do not have the effect of importing the sections referenced into the accredited material but are included for reference only.

<<end of accredited text for s10.222 21(2) of the Basin Plan>>

12.9 Addressing risks

Section 10.22 of the Basin Plan requires consideration as to whether rules are necessary in the Goulburn-Murray water resource plan area to address risks identified in the risk assessment. **Chapter 5** sets out the current and future risks to the condition and continued availability of water resources. The risk assessment report is at **Appendix B**.

The risk assessment examined risks for matters identified under Part 4 of Chapter 10 of the Basin Plan.

12.9.1 Surface water related risks

Priority environmental assets and ecosystem functions are identified in Victoria's long-term watering plans and were assessed under the separate risk category: 'structural form of surface water resources based on categories that reflect priority assets, namely wetlands and rivers' (see **Section 5.3.4** and **Section 5.4.4**).

The risks to the assets and the ecosystem function that underpins them was assessed in terms of loss or decline in:

- longitudinal connectivity—barriers to fish passage and other barriers such as vegetation connectivity
- lateral connectivity—in-stream physical habitat such as sedimentation, erosion, loss of large wood
- loss or decline in instream physical habitat

Causes of medium, high and very high risk identified to priority environmental assets and priority ecosystems functions dependent on surface water were:

- climate change
- extreme drought
- timing and location of demands
- earth resource development
- failure to continue to invest in best practice land use initiatives
- pests and weeds

Strategies to address these risk are further explained in **Table 4.2.1** of **Appendix B**.

12.9.2 Groundwater-related risks

The following groundwater-related risks were assessed:

- groundwater requirements for priority environmental assets and ecosystem functions (section 10.18 of the Basin Plan) see **Part 3.2.6** and **Part 3.4.6** of **Appendix B**
- groundwater and surface water connections (section 10.19 of the Basin Plan) see **Part 3.3.6** of **Appendix B**
- productive base of groundwater and its management (section 10.20 of the Basin Plan) see **Part 3.3.6** of **Appendix B**
- environmental outcomes related to groundwater (sections 10.21 and 10.22(b) of the Basin Plan) see **Part 3.3.6** of **Appendix B**

Risks to the productive base of groundwater systems (section 10.20 of the Basin Plan) were assessed in terms of the ability of the aquifer to provide water for environmental and consumptive purposes in the context of damage to the structural form of the aquifer arising from take across environmental or consumptive users. Based on the previous section describing

the productive base of groundwater, no medium or high-level risks were associated with changes to the structural form.

In respect to the matters relevant to sections 10.18, 10.19 and 10.21 of the Basin Plan, these assets were assessed under risk categories in terms of the availability of groundwater for environmental purposes from:

- Goulburn-Murray: Shepparton Irrigation Region SDL resource unit
- Goulburn-Murray: Highlands SDL resource unit
- Goulburn-Murray: Sedimentary Plain SDL resource unit
- Goulburn-Murray: deep SDL resource unit

Climate change was identified as a potential medium or higher-level risk to meeting environmental watering requirements. (see [Table 2.2.2](#) of [Appendix B](#) for a full summary of the risks)

Mitigation measures and strategies have been identified in the risk assessment for all medium and high risks. It is not considered appropriate to impose rules to address risks in Victoria's North and Murray water resource plan area relating to climate change.

Instead the appropriate approach to managing climate change risks is through Victoria's water resource management framework that includes:

- the periodic review of regional catchment strategies required by the *Catchment and Land Protection Act 1994*
- regional sustainable water strategies required by the Victorian Water Act
- long-term water resource assessments required by the Victorian Water Act
- regional waterway strategies required by the Victorian Water Act
- planning duties of the Victorian Environmental Water Holder required by the Victorian Water Act

Section 10.22(b) of the Basin Plan requires the inclusion of rules in a water resource plan to respond to risks identified in the risk assessment. No rules have been included in addition to those identified for sections 10.18, 10.19 and 10.20 of the Basin Plan (see above) in Victoria's North and Murray Water Resource Plan. Victoria's response to section 10.22(b) of the Basin Plan is outlined in the accredited text below.

**Basin Plan
s10.22(b)**

1. Rules have been included in response to sections 10.18, 10.19, 10.20 and 10.21 of the Basin Plan in response to the requirements of those sections. For the risks identified as medium or high in response to section 10.41(1) of the Basin Plan in respect of the matters identified in sections 10.17, 10.18, 10.19 and 10.20 of the Basin Plan rules have not been included to ensure Victoria's North and Murray Water Resource Plan can remain adaptable to localised risks and respond to changing conditions over the life of the Plan. Column 5 of Victoria's North and Murray Index Table in response to those sections sets out why rules have or have not been included.
2. As set out in Column 5 of Victoria's North and Murray Index Table in response to sections 10.17-10.21 of the Basin Plan, additional rules of the kind listed in Part 4 were not considered necessary because in most cases, the risks referred to in s 10.41(1) are effectively managed to a low rating by the existing rules and management arrangements in place.
3. No rules have been identified to address climate change risks identified in response to section 10.41(1) of the Basin Plan. Strategies to address climate change risks have been identified in Victoria's North and Murray Risk Assessment Report at **Appendix B** to Victoria's North and Murray Comprehensive Report. Rules were not considered necessary to address any low risks identified in **Table 2.1.1** (Northern Victoria water resource plan area), **Table 2.2.1** (Goulburn-Murray water resource plan area) and **Table 2.3.1** (Victorian Murray water resource plan area).
4. The rules identified in response to sections 10.18 and 10.19 are considered sufficient to respond to consequences of risks arising from changes to the timing and location of demand. Additional rules are not considered necessary in addition to the strategies identified in relation to these risks in Victoria's North and Murray Risk Assessment Report at **Appendix B** to Victoria's North and Murray Comprehensive Report.
5. Reference to Column 5 of Victoria's North and Murray Index Table does not have the effect of importing the sections referenced into the accredited material but are included for reference only.

<<end of accredited text for s10.22(b) of the Basin Plan>>

Chapter 13. Recreational values





13. Recreational values

This Chapter outlines recreational values of waterways, the benefits for community and management practices to deliver these values within the State's existing water management framework.

13.1 Recreational values in the Murray-Darling Basin Plan

The Basin Plan cites various considerations regarding recreational values of water including:

Schedule 1 – Basin water resources and the context for their use:

- *Item 26: The water resources of the Murray-Darling Basin are used in agriculture, non-agricultural industry, meeting critical human water needs and normal domestic requirements, for recreational and cultural purposes, and in maintaining freshwater ecosystems.*
- *Item 32: The resources are also used for water sports, wider recreational activities, to attract visitors to particular regions, and for visual amenity.*
- *Item 39: An estimated 430,000 people use Basin water resources for more than 5 million recreational fishing trips a year, with a most likely direct expenditure estimate of \$1.35 billion. Recreation and tourism use of Basin water resources is generally non-consumptive, but depends on a degree of ecological health. Ramsar-listed wetlands are significant tourist destinations.*

The objectives and outcomes in the Basin Plan include:

- *5.02 (a): Communities with sufficient and reliable water supplies that are fit for a range of intended purposes, including domestic, recreational and cultural use*

Water quality management plans prepared as part of meeting the Basin Plan also require consideration of recreational values:

- *9.07: The water quality objective for recreational water quality is to achieve a low risk to human health from water quality threats posed by exposure through ingestion, inhalation or contact during recreational use of Basin water resources.*
- *9.18: The water quality targets for water used for recreational purposes are that the values for cyanobacteria cell counts or biovolume meet the guideline values set out in Chapter 6 of the Guidelines for Managing Risks in Recreational Water.*

13.2 Summary of risks to recreational values

The Victorian Government's strategic plan for how the state uses its water resources, Water for Victoria (DELWP 2016), defines recreational benefits or recreational values as:

"The objectives and benefits that recreational users and community members associate with the use of water, reservoirs and waterways for recreational activities."

Recreational/social values were included in the risk assessment undertaken during the development of Victoria's North and Murray Water Resource Plan. Recreational/social issues were considered separately from Traditional Owner values and uses of water to acknowledge the unique nature of that use.

Risks to recreational/social values were assessed in terms of their effect on availability and condition across the following categories.

- Availability:
 - social and recreational values
- Condition – based on state environment protection policy beneficial use categories of:
 - primary contact recreation (e.g. swimming)
 - secondary contact recreation (e.g. boating)
 - aesthetic enjoyment

The assessment found that the associated causes listed in [Table 13-1](#) pose a medium or higher risk to recreational water values in terms of the continuing availability of the resource and/or its condition.

Table 13-1: Identified medium or higher risks to the availability and condition for recreational/social values in Victoria's North and Murray water resource plan area

Cause	Surface Water				Groundwater	
	Northern Victoria water resource plan area		Victorian Murray water resource plan area		Goulburn-Murray water resource plan area	
	Availability	Condition	Availability	Condition	Availability	Condition
Climate change						
Extreme drought						
Extreme wet						
Failure to continue to invest in improved land management practices						
Earth resource development						
Pests and weeds						

Legend	5	4	3
	Very high risk	High risk	Medium risk

13.2.1 Addressing risks to water resources for recreational needs

Victoria is preparing for a warmer, drier future with less water available and more extreme events. Dry conditions regularly affect the north and west of the state. In dry conditions and in drought, less water is available for all uses and recreational uses of our waterways can be limited. Yet it is at these times that the presence of water and recreational opportunities provide relief for people and can become even more important for communities. When water becomes scarce, community concerns can increase.

In regulated systems, we capture and hold water for entitlement holders in storages and move that water to where it is needed through rivers and channels (see [Section 4.1.2](#)). In these systems, we may be able to move water in a way that provides recreational benefits without affecting existing entitlement holders. However, we cannot guarantee this, especially in dry times. In unregulated systems, we cannot control how water moves (see [Section 4.1.1](#)). This means that recreation can be significantly impacted in these systems in dry conditions.

Victoria's water entitlement and planning frameworks ensure we meet the needs of cities and towns and supply water for agriculture, industry and the environment. As part of the recreational water initiatives in *Water for Victoria*, the Victorian Government will continue to work within these frameworks to find ways to meet recreational objectives.

While there are many activities in and around waterways that people can enjoy regardless of water levels, some activities such as boating and fishing require a minimum water level or a consistent presence of water. There will be times when not enough water is available to support all recreational activities at all locations. This situation is likely to happen more often with climate change.

There are already limits to activities such as boating on some water storages to maintain safety, security and quality of supply. We need to manage access to water storages according to risk, particularly storages used for drinking water supply, which will continue to be managed within the requirements of the Victorian *Safe Drinking Water Act 2003*.

The Basin Plan requires states to identify strategies to address medium or higher risks. These strategies are detailed in the final Victoria's North and Murray water resource plan risk assessment (see [Appendix B](#)).

13.3 The benefits of recreational water

Victoria's rivers, streams, lakes and wetlands provide places for recreation and connection to nature, which is important for the health, wellbeing and social fabric of Victorian communities, and also provides significant contributions to regional tourism and employment (see Case Study). Victorians and visitors appreciate and seek recreational benefits through fishing, swimming, water-skiing, rowing, camping, walking, birdwatching, sporting events, social gatherings and other activities on or near waterways.

The recreational values of waterways depend on what activities are possible, the environmental health of the waterway, water quality, accessibility, facilities and safety.

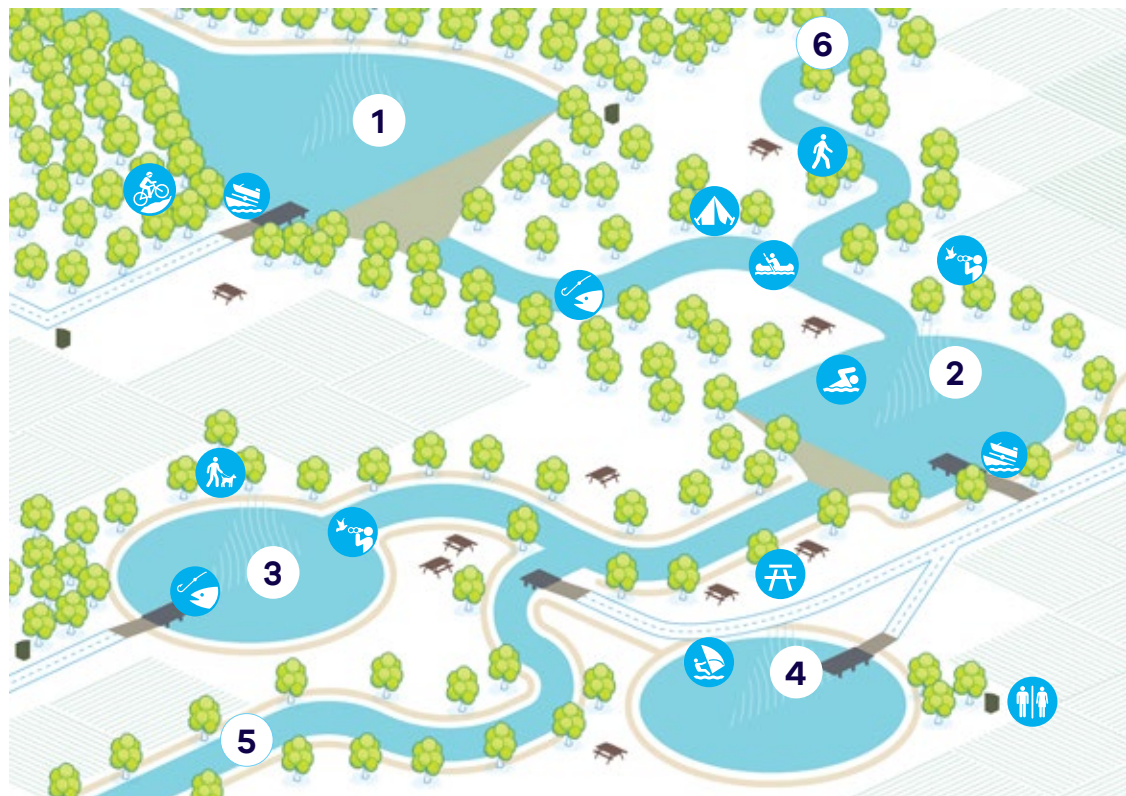
Prime recreational sites in regional areas provide opportunities for tourism and hospitality, drawing visitors from cities and towns, interstate and overseas. In small rural towns a local waterway or waterbody can be the lifeblood of a community, attracting and retaining people in the area through better amenity, social and recreational opportunities and providing an income for local businesses.

Recreational users benefit from Victoria's water management system as some water storages already support a variety of activities that visitors enjoy on and around water. Environmental water management and works to improve the condition of our waterways and wetlands also support recreational fishing, camping, walking and other social activities at these sites.

Figure 13-1 shows how water can be managed for recreational values at different water assets in a typical regional water system.

During the Millennium Drought, activities like boating, fishing and swimming were affected by low lake and storage levels and low river flows. Some water storages and lakes dried up during this period.

Water management opportunities for recreational values



1	2	3	4	5	6
Source storage	Transfer storage	End point lake or wetland	Disconnected lake or wetland	Regulated river	Unregulated stream
Harvest unregulated inflows	Provide temporary storage during season to enable water supply for entitlement holders	Water cannot be returned for consumption elsewhere	No existing connection to water grid	Recreational benefits from water supply and environmental flows	Sustainable limits on taking water support recreation
Critical for supplying downstream entitlement holders' water demands	Possible management of through-flows to support recreational values	Can receive supply that supports recreational values, where available	Infrastructure investment required to supply water for recreational use	Some ability to manage flows to support recreational values	Limited active management options to support recreational values
Ability to manage water to support recreational values very limited					

Figure 13-1: Water management opportunities for recreational values

Source: DELWP 2016

13.4 Recreational values in Victoria's North and Murray water resource plan area

Rivers, weir pools, storages and lakes throughout Victoria's North and Murray water resource plan area provide many social and economic benefits. Water in rivers and creeks offers amenity and recreation opportunities for local communities and supports tourism.

The purpose of this chapter on recreational values is to:

- articulate recreational values and connected benefits of these values to the community in Victoria's North and Murray water resource plan area, and the management practices that deliver these values
- outline the steps the Victorian Government is taking to better recognise recreational values in the state's existing water management framework as it delivers on actions in *Water for Victoria* (DELWP, 2016)
- discuss the risks to achieving improved outcomes for recreational values which emerged from the risk assessment conducted as part of the requirements of the Murray-Darling Basin Plan
- inform communities how they can continue engaging with government in upcoming processes to consider recreational values

Victoria's North and Murray water resource plan area contains an assortment of water-related recreation activities. Notable recreation destinations and tourism for the northern area include fly-fishing in the high-country rivers like the Kiewa River and Ovens River, water skiing on the River Murray, power boating on Lake Eppalock, sailing on Lake Boga, birdwatching at the Kerang Lakes and houseboating and camping at Lake Eildon.

There are also many locations for swimming, powered water craft, white water rafting and sightseeing. River swimming pools are also in high demand on the Ovens River at Bright and Porepunkah over the summer months. Traditional Owners and their Nations also hold significant recreational and cultural values for the waterways in the water resource plan area.

Annual recreation events and important regional drawcards include the Massive Murray Paddle, the Mildura Easter Power Sports competitions, the Speedboat Eppalock Gold Cup and the Dartmouth Cup Fishing Classic. The internationally-recognised wetland system of the Barmah Forest, part of the largest river red gum forest in the world, are major sites for recreational activities like birdwatching, walking and biking.

Water storages are important valued sites for recreation in the region. Goulburn-Murray Water (GMW) is the region's storage manager and actively works with local communities to improve recreational experiences at the lakes, dams and reservoirs it manages. GMW manages boating and recreation activities across most of its storages and is also Victoria's largest inland boating authority.

GMW works with reference committees of local waterbody users to develop management rules. It also works with local communities to manage water availability for recreational uses when storage levels decline during drought. Goulburn-Murray Water is investing in projects to provide more opportunities for recreation. However, any extended dry periods impact on recreational activities.

Case Study: Measuring the social and economic value of recreational water in selected waterways and waterbodies in the north east region

The North East Catchment Management Authority (NECMA) recently assessed the economic and social contribution that selected waterways and waterbodies make to the regional economy. The study interviewed providers supplying products and services to the lakes and weirs, users of waterways and waterbodies and local businesses.

The report was specific to north east Victoria and considered waterbodies in the Alpine Shire, Towong Shire, East Gippsland Shire, Rural City of Wangaratta and Wodonga City.

Findings from the report included:

- In 2017-18 the study estimated that the 15 selected recreational waterways and waterbodies contributed \$25.948 million to the north east region
- Families, club groups, retired couples and friendship groups are the most frequent users of recreational water facilities
- In 2017-18, 45.42 percent of visitors to waterways in the north east region came from Melbourne, while local users made up 16.66 percent
- There is a wide range of tourism experiences in the north east beyond water-based activities. At times of the year when these broader tourism activities are not at their peak, waterways and waterbodies contribute to the overall appeal of the region and bolster visits
- Water-based recreation in the region improves the physical and mental health of locals and visitors. In 2017-18 total health benefits calculated from participation at waterways and waterbodies were:

- Physical health: Annual benefits:	\$1,963,146
- Mental health: Annual benefits:	\$227,421
- Total annual health benefit:	\$2,190,567

13.5 Providing for recreational values

As the storage manager for the northern Victoria system, Goulburn-Murray Water provides opportunities for recreation in many of the region's reservoirs where this is compatible with other system management objectives including the primary role of supplying water to entitlement holders. As a result, much has been done in Victoria's North and Murray water resource plan area to improve access to water for recreation.

Land and on-water management plans have been developed for many of GMW's water storages including:

• Lake Eildon • Lake Eppalock • Cairn Curran Reservoir • Lake Nillahcootie • Waranga Basin • Greens Lake • Lake Hume	• Lake William Hovell • Lake Boga • Kow Swamp • Lake Mulwala • Nagambie Waterways • Lake Buffalo

Each plan is developed and put into action by an implementation group of 12 people representing the community, local councils, recreation groups and other agencies. It is part of GMW's role to manage these plans.

The implementation groups plan and source external funding for initiatives to address land and on-water issues such as:

- increasing community awareness and involvement
- community safety
- recreation and tourism
- maintaining healthy ecosystems
- cultural heritage

13.5.1 Providing shared benefits for recreation

Victoria's water sector works with communities and other agencies to explore ways of maximising shared or complementary benefits of all water uses, without compromising the needs of the environment, agriculture, towns and businesses. By sharing benefits from the storage, delivery and use of water, we can make the most of limited resources to better meet objectives of key groups in the community.

There are no specific entitlements for recreation in Victoria's North and Murray water resource plan area, however water corporations do consider shared benefits as they make decisions about managing storages and operating rivers. Catchment management authorities and the Victorian Environmental Water Holder also consider shared benefits in their decisions about environmental watering.

The Victorian Environmental Water Holder and catchment management authorities report each year on outcomes achieved through managing water for shared benefits. They also seek community feedback on any recreational benefits experienced after environmental water is delivered to sites.

13.5.2 Environmental water providing shared recreational benefits

Environmental watering (see [Chapter 12](#)) can increase recreational activities, sustain healthy Country for Traditional Owners and improve water quality for farmers. There are many examples where people enjoying recreation have shared the benefits of environmental flows, such as birdwatching and duck hunting at Hird Swamp, which is part of the Kerang Lakes.

Where possible, deliveries of environmental water entitlements are managed to boost the benefit to major recreational events and peak recreational periods. This can include adjusting the timing of flows to raise water levels and water quality, while still delivering environmental benefits.

The planning and delivery of environmental entitlements can consider recreational benefits where the environmental outcome will not be compromised. Members of community and recreational groups give feedback on the functions of delivering environmental water, including potential shared benefits like recreation.



Case Study: Kayaking down the Campaspe River

When water for the environment is released into the Campaspe River, the North Central Catchment Management Authority (CMA) and Goulburn-Murray Water notify landholders and other stakeholders so that people can take advantage of increased flows.

The North Central CMA notified stakeholders about the release of the 2017 spring high flow to the Campaspe River and the local canoe club took a trip down the river, navigating the rapids heightened by the increased flow. Their experience was captured on a Go-Pro provided by the North Central CMA and is available on the web: <http://www.nccma.vic.gov.au/media-events/videos/kayaking-down-campaspe>

13.6 Costs associated with recreational water management

Water for Victoria recognises the importance of maintaining affordable water services, while also noting that investment in infrastructure to provide services to homes and businesses, deliver environmental protection and recreational benefits and adapt to climate change will create pressure on costs.

This will be balanced by downward pressure on costs as the water sector continues to deliver efficiency through shared services and smarter procurement, innovative technologies and processes, greater interconnection of water resources and reduced red tape.

The Essential Services Commission is responsible for approving the price proposals of water corporations, in line with government policy and pricing processes for other water users. It is intended that people who benefit from recreational infrastructure and facilities contribute to the water corporations' investment in those services. Some water corporations recover the costs of land and recreation management functions at water storages through fees paid by urban water customers. Costs are also recovered through other activities such as licensing. GMW controls and manages the operations of houseboats on Lake Eildon through licensing and manages caravan parks and community clubs.

13.7 Recognising recreational values

Water for Victoria recognised the importance of recreational values to the community and noted this objective for recreational values of water:

'Water for Victoria will support the wellbeing of rural and regional communities who enjoy the recreational benefits our regional waterways provide. We will consider these values in the way we manage water.'

Water for Victoria acknowledged that until recently, incorporating recreational values in water planning had been inconsistent and community engagement on water and waterway management activities had not always considered recreation. It committed the water sector to improving its understanding of these values by including communities in conversations about water and waterway planning. This requires the water sector to collaborate with recreational water users, including the community, while still supplying water to entitlement holders and meeting environmental water and waterway health objectives.

Water for Victoria Action 7.1 – Include recreational values in water and waterway planning

The government will explicitly incorporate recreational values in state-wide and regional water planning processes.

Water corporations, catchment management authorities and the Victorian Environmental Water Holder will plan for and provide water services that explicitly consider recreational values within our existing frameworks and with awareness of the realities of dry conditions and climate change.

Water corporations, catchment management authorities and the Victorian Environmental Water Holder will engage with the community to identify and prioritise opportunities to deliver recreational outcomes. They will seek input from recreational users and regional and rural community members. They will report back on what is agreed and what has been done.

Water for Victoria also acknowledges that people may have new ideas about how to meet their recreational objectives that cannot be achieved in the day-to-day management of water and waterways. For example, recreational users could buy entitlements to increase the certainty of having water for recreation, or develop tourism strategies to attract visitors. However, they may not know how to progress their ideas or who can help them.

It can be difficult for community members to know where to start, but many agencies from the water and land management sector can help, including those shown in [Table 13-2](#). This sector has knowledge it can share to help people meet their recreational goals. Water corporations already share information about water levels and availability to help tourism operators plan events or fishery agencies make decisions about where to stock fish.

Table 13-2: Roles and responsibilities for recreational proposals at waterways

Role	Who
Driver of recreational objectives for waterways	Local community members Recreational clubs Peak recreational bodies Land managers e.g. Parks Victoria
Approvals for works on land or waterways	Catchment management authorities Department of Environment, Land, Water and Planning Land managers
Information about water availability, quality, supply and trade	Water corporations Catchment management authorities
Information about water and waterway management, infrastructure and access	Rural water corporations Urban water corporations Catchment management authorities Victorian Environmental Water Holder

Role	Who
Potential investors in recreational objectives	Local community members Land managers Recreational clubs Peak recreational bodies Private investors Local government Regional Development Victoria Visit Victoria Catchment management authorities

Land managers for waterways can help communities contact the right agencies to discuss their ideas or proposals. Land managers include committees of management for Crown land, local government, Parks Victoria and the Department of Environment, Land, Water and Planning. The land manager may be a water corporation responsible for a water storage location, or a catchment management authority responsible for managing Crown land. The government expects its agencies to work collaboratively to explore these requests and communicate the results of any efforts that are made.

Water corporations are the organisations to lead discussions about water storages.

Buying water or building facilities such as toilet blocks or water infrastructure can take significant funds. Recreational groups and communities can sometimes pay, but this is not always possible. People using recreational facilities and benefiting from investment in recreation are expected to cover the costs. Depending on the site and activities, these diverse users could be local people or businesses, recreational club members and visitors from other regions, interstate or overseas. Sites of high social and economic regional importance may benefit people across an entire region.

Existing ways of recovering costs from people who benefit from recreational services include fees charged for fishing licences, camping, boat ramp access and boating registration. These can support recreational aims at waterways.

Land managers may have their own ways of recovering the costs spent on recreational activities at the waterways they manage. It is essential that government agencies collaborate to access investment opportunities and increase the likelihood of achieving recreational aims. The availability of funds will depend on criteria for investment and funding priorities.

Water for Victoria Action 7.2 - Help communities understand how to achieve their recreational objectives

Public land managers will help recreational users connect with the right people, including local government, tourism boards and potential investing bodies, to progress actions relating to visitor experience at valued waterways. For water storages, water corporations are the right organisation to lead this.

The water sector will share knowledge, user-friendly information and expertise with community members, land managers and potential investors to help achieve recreational objectives.

The water sector will share information about community recreational objectives relating to waterways with organisations seeking to prioritise investment in regional development, recreation, community wellbeing and tourism objectives.

13.8 Opportunities for community involvement in water decision-making that affects recreational opportunities

13.8.1 Sustainable water strategies

Sustainable water strategies identify and manage threats to the supply and quality of the state's water resources and identify the potential to improve waterway health (see [Section 1.6.2](#)). The process provides a mechanism for methodical and thoughtful engagement to set priorities and directions in the regions.

Water for Victoria introduced a requirement to assess the sustainable water strategies after five years. The five-yearly assessments will identify any key trends and issues to be taken up for the 10-year reviews, and will inform the methodology of long-term water resource assessments.

Water for Victoria outlines a possible timetable to develop new sustainable water strategies. The review of the Northern Region Sustainable Water Strategy will begin in 2019.

Any new sustainable water strategy will include an appropriate range of climate change scenarios, a consultative committee with participation by Traditional Owners, and make sure it considers opportunities for achieving shared benefits for Aboriginal and recreational water values.

13.8.2 Land and on-water management plans

Action 7.3 of *Water for Victoria* outlines how water corporations will support recreation at water storages through infrastructure and better information. The action notes that water corporations will maintain infrastructure and facilities to support recreational objectives at their water storages under existing arrangements.

Action 7.3 requires water corporations to prepare land and recreation management plans for all major water storages of recreational value. In preparing and implementing the plan they will:

- work closely with the community and stakeholders
- consider the short, medium and long-term water resource management purposes and arrangements for the storage
- define agreed actions including the responsible agency and funding arrangements
- provide public progress reporting on the implementation of these plans and actions



Land and on-water management plans are in place for major Goulburn-Murray Water storages. These will be progressively reviewed over the coming years with community and stakeholders consulted throughout the process.

13.8.3 Including recreational values in water and waterway planning

Under *Water for Victoria Action 7.1* the government will explicitly incorporate recreational values in future state-wide and regional water planning processes. Key agencies, water corporations, catchment management authorities and the Victorian Environmental Water Holder will plan for and provide water services that explicitly consider recreational values within our existing frameworks and with awareness of the realities of dry conditions and climate change.

Water corporations, catchment management authorities and the Victorian Environmental Water Holder will engage with the community to identify and prioritise opportunities to deliver recreational outcomes. They will seek input from recreational users and regional and rural community members. They will report back on what is agreed and what has to be done.

Chapter 14. Managing water quality and salinity





14. Managing water quality and salinity

This Chapter explains how Victoria manages water quality and salinity of surface water and groundwater in Victoria's North and Murray water resource plan area. It also shows how Victoria has met the Basin Plan requirements to prepare a Water Quality Management Plan ([Appendix A](#)).

14.1 Water quality management in the Basin Plan

Part 7 of Chapter 10 of the Basin Plan requires a water resource plan to establish a water quality management plan. This plan should be developed with consideration of the impacts of wider natural resource management and land management on water quality within the water resource plan area.

Victoria's North and Murray Water Quality Management Plan ([Appendix A](#)) may specify alternative values provided that they give the same or better levels of protection as those set out in Chapter 9 of the Basin Plan. A key requirement is that water quality management plans incorporate cost effective measures that contributes to the achievement of the water quality objectives provided in Chapter 9 of the Basin Plan. The Basin Plan's overall objective for water quality and salinity is to maintain appropriate water quality, including salinity levels, for environmental, social, cultural and economic activities in the Murray-Darling Basin.

The outcome is that the Murray-Darling Basin water resources remain fit-for-purpose (section 5.04 of the Basin Plan). The water quality management plan must reproduce the water quality objectives for Murray-Darling Basin water resources set out in Chapter 9 of the Basin Plan.

Water quality management plans are concerned with the ongoing maintenance and improvement of water quality to ensure that water is fit-for-purpose and supports a range of beneficial uses. The water quality management plan identifies objectives and targets for water quality and measures to achieve these aims over time.

The management of extreme water quality events such as a blue-green algae outbreaks or blackwater events are covered in [Chapter 10](#).

14.1.1 Water quality objectives under the Basin Plan

The Basin Plan sets out six qualitative water quality objectives for maintaining and minimising impact on water quality. These objectives are listed here in [Table 14-1](#).

Basin states are required to identify measures that will contribute to the achievement of these objectives while considering the cause or likely causes of water quality degradation and identified water quality target values. The key measures that contribute to achieving water quality objectives are the State Environment Protection Policy (Waters) (EPA, 2018) and Victoria's commitment to implementing the Basin Salinity Management 2030 (Murray-Darling Basin Ministerial Council, 2015). These are discussed in detail in [Section 14.4.3](#).

Table 14-1: Water quality objectives in the Basin Plan

Use	Objective
Fresh water-dependent ecosystems (section 9.04 of the Basin Plan)	• <i>For Ramsar wetlands:</i> Quality of the water is sufficient to maintain the ecological character of those wetlands • <i>For other fresh water-dependent ecosystems:</i> Quality of the water is sufficient to: – protect and restore the ecosystems – protect and restore the ecosystem functions of the ecosystems – ensure that the ecosystems are resilient to climate change and other risks and threats
Raw water for treatment for human consumption (section 9.05 of the Basin Plan)	• To minimise the risk that the quality of drinking source water results in adverse human health effects • To maintain the palatability rating of drinking source water at the level of 'good' as set out in the Australian Drinking Water Guidelines (2011) • To minimise the risk that quality of drinking source water results in odour of drinking water being offensive to consumers
Irrigation water (section 9.06 of the Basin Plan)	• That the quality of surface water, when used in accordance with best irrigation and crop management practices and principles of ecologically sustainable development, does not result in crop yield loss or soil degradation
Recreational water (section 9.07 of the Basin Plan)	• To achieve a low risk to human health from water quality threats posed by exposure through ingestion, inhalation or contact during recreational use of Basin water resources
Maintaining good levels of water quality (section 9.08 of the Basin Plan)	• If the value of a water quality characteristic (e.g. salinity, nutrients, pH) is at a level that is better than the target value for water quality (in Part 4 of Chapter 9 of the Basin Plan), an objective is to maintain that level
Salt export (section 9.09 of the Basin Plan)	• For the River Murray System: To ensure adequate flushing of salt from the River Murray System into the Southern Ocean – This objective is expected to be achieved by the discharge of an average of two million tonnes of salt from the River Murray System into the Southern Ocean each water accounting period, and takes into consideration cyclical climate influences, existing works and measures like salt interception schemes that prevent substantial quantities of salt entering the River Murray System, and which complement this approach

14.1.2 Basin Plan requirements

Part 7 of Chapter 10 of the Basin Plan requires Victoria's North and Murray Water Quality Management Plan to address these requirements:

- key causes or likely causes of water quality degradation for surface water and groundwater
- address risks arising from water quality degradation
- identify water quality targets for surface water and groundwater
- identify measures that contribute to the achievement of Basin Plan water quality objectives for surface water
- identify rules to manage water quality in groundwater SDL resource units against elevated salinity or other types of water quality degradation

14.2 Victoria's water quality management framework

Victoria has well-established water quality planning mechanisms and frameworks. Surface water quality, groundwater quality and land salinity is affected by many processes and sources including:

- natural catchment processes such as runoff from uncleared catchments and groundwater discharges to waterways
- licensed point source wastewater discharges
- small dispersed point source discharges such as septic tanks
- diffuse sources, including runoff from dryland farms, drainage from irrigated land and stormwater from roads and towns
- changes in catchment water balances such as dryland salinity
- naturally occurring minerals present in aquifers that dissolve in groundwater

The water quality management framework in Victoria addresses these issues and will be used to deliver on the water quality and salinity requirements of the Basin Plan.

The Victorian water quality management framework includes a multifaceted arrangement of regulation, policy and strategy to protect water quality (see [Figure 14-1](#)).

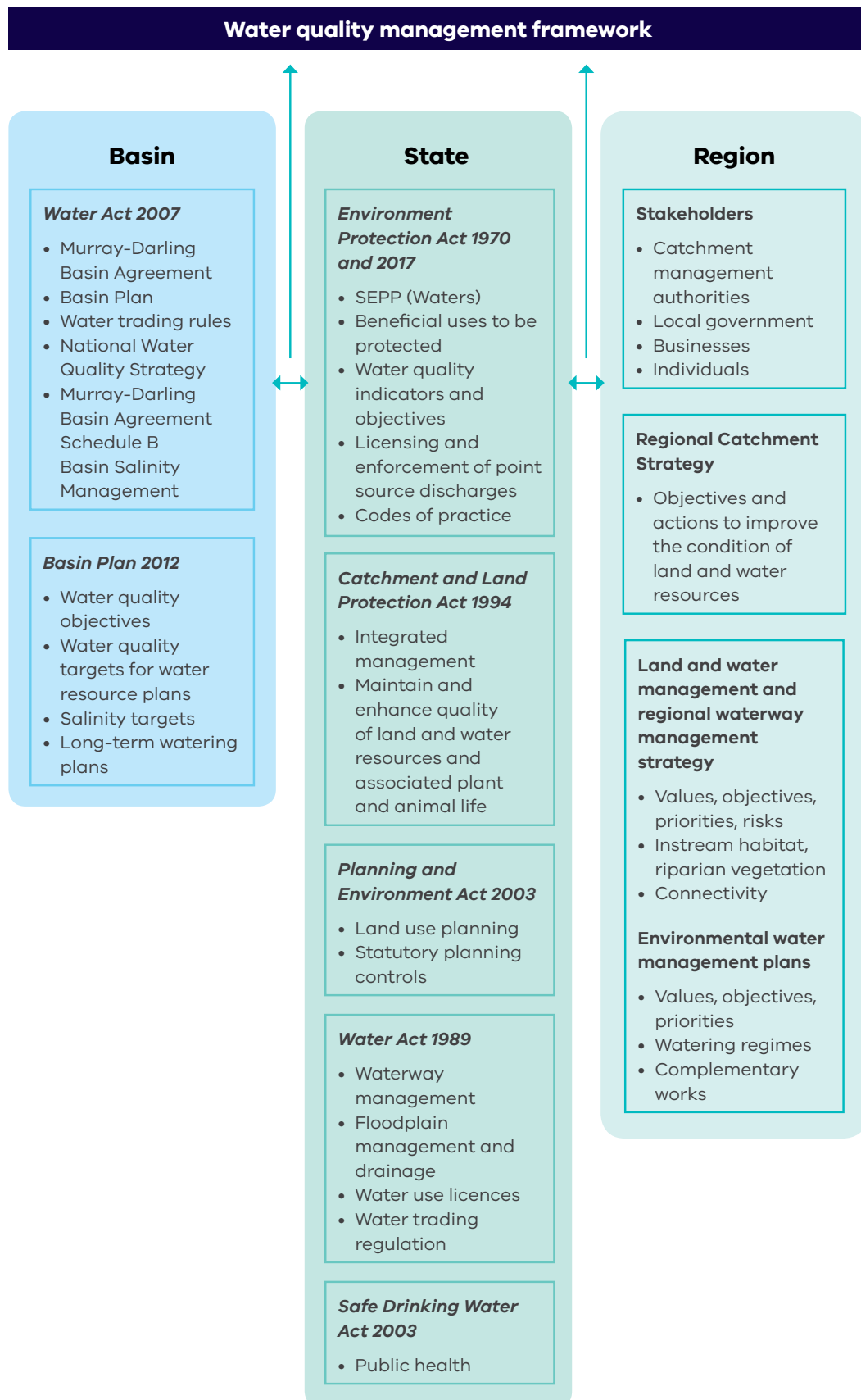


Figure 14-1: Victoria's water quality management framework

14.2.1 Roles and responsibilities

In Victoria the Department of Health and Human Services (DHHS), Department of Environment, Land, Water and Planning (DELWP), Environment Protection Authority (EPA), municipal councils, water corporations, local government and catchment management authorities all have a role in managing water quality.

DHHS, DELWP and the EPA work to regulate water quality requirements and respond to impacts on water quality. In regulating water quality, DHHS sets standards for drinking water quality and matters of public health. The EPA implements the State Environment Protection Policy (Waters) (SEPP (Waters)) and regulates discharges into and pollution of the environment. SEPP (Waters) also influences planning schemes administered by municipal councils.

DELWP administers the Victorian Water Act and the *Catchment and Land Protection Act 1994* and supports water corporations and catchment management authorities to carry out their obligations and functions. Water corporations have a major role in managing Victoria's water resources to help meet water quality targets and objectives and respond to water quality events. Catchment management authorities support this role through land management activities.

Figure 14-2 shows how various agencies and the community use SEPP (Waters) to inform decision making.



Figure 14-2: Applications of SEPP (Waters) in different areas of the water sector

14.3 How Victoria's water quality management aligns with the Basin Plan

Figure 14-3 shows how the Basin Plan requirements are linked to and inform water quality and salinity management in Victoria. The left-hand side of the figure shows the requirements of a water quality management plan as specified in the Basin Plan. The right-hand side of the figure shows the Victorian framework and how the two are connected.

Victoria's water quality framework and the National Water Quality Management Strategy are consistent. The Basin Plan water quality and salinity management plan has been developed using this nationally-agreed framework for water quality planning and management. As a result, Victoria can meet the requirements of the Basin Plan through its existing water quality management arrangements.

SEPP (Waters) environmental quality objectives and load-based reduction targets applied in Victoria are similar to, or more stringent than, those listed in the Basin Plan. Therefore the implementation of Victoria's environmental protection policy will have positive outcomes for the water quality of the shared waters of the River Murray and ultimately on South Australia and New South Wales. Victoria's activities will have no effect on Queensland and the Australian Capital Territory.

14.4 Surface water - water quality degradation, risks and targets

Surface water quality across the Victorian Murray and Northern Victoria water resource plan areas is highly variable spatially and temporally, but there is a general trend in decreasing water quality from east to west in the River Murray and from south to north in the tributary valleys.

These trends are associated with high yielding forested areas at the headwaters of catchments which contribute significant runoff and base flows, and the intensively developed areas on floodplains which receive less rain and contribute lower volumes to streamflows.

The trend in decreasing water quality from east to west is most evident in salinity concentrations along the River Murray as shown in **Figure 14-4**, with major increases in concentration occurring between the Torrumbarry Weir and Swan Hill resulting from lower inflows and higher salt loads. Increasing gradients also occur from east to west for other water quality parameters such as dissolved organic carbon, filterable reactive phosphorus, total Kjeldahl nitrogen, total phosphorus and turbidity (Henderson, Liu, & Baldwin, 2013).

Like all water quality characteristics in a dynamic river system, salinity varies within the year and from year to year. However, there is irrefutable evidence that the wide range of management actions implemented through the Basin Salinity Management Strategy and the Murray-Darling Basin Agreement have reduced salinity levels in waterways across Victoria's North and Murray water resource plan area. This is shown in **Figure 14-5**.

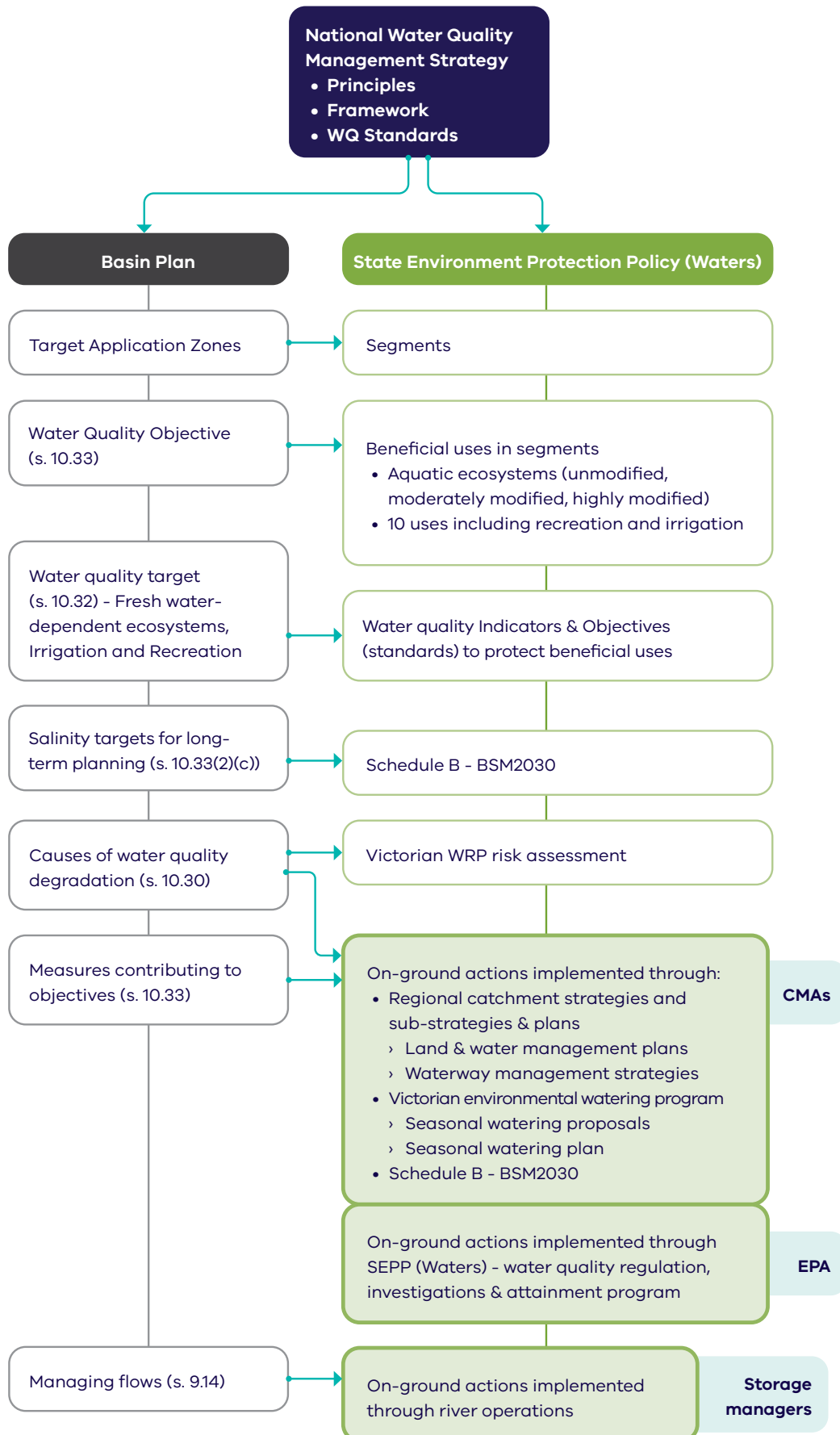


Figure 14-3: Alignment between Basin Plan water quality requirements and Victoria's water quality management arrangements in the water resource plan areas

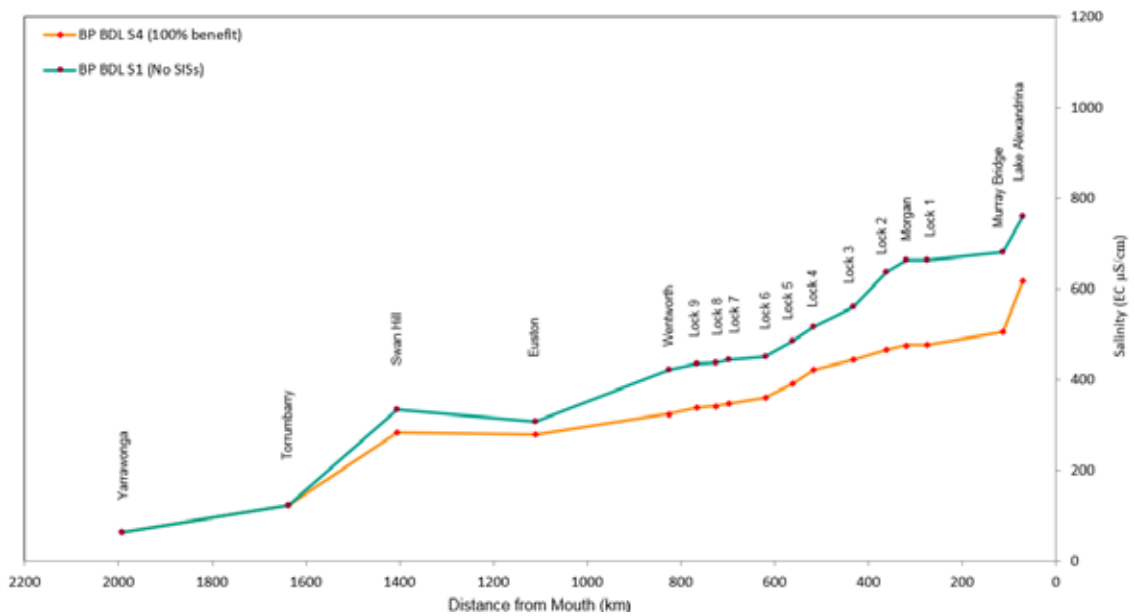


Figure 14-4: Average daily salinity along the River Murray over the 1975-2000 Benchmark Period with 2013 levels of development and salt interception

Source: MDBA (2014)

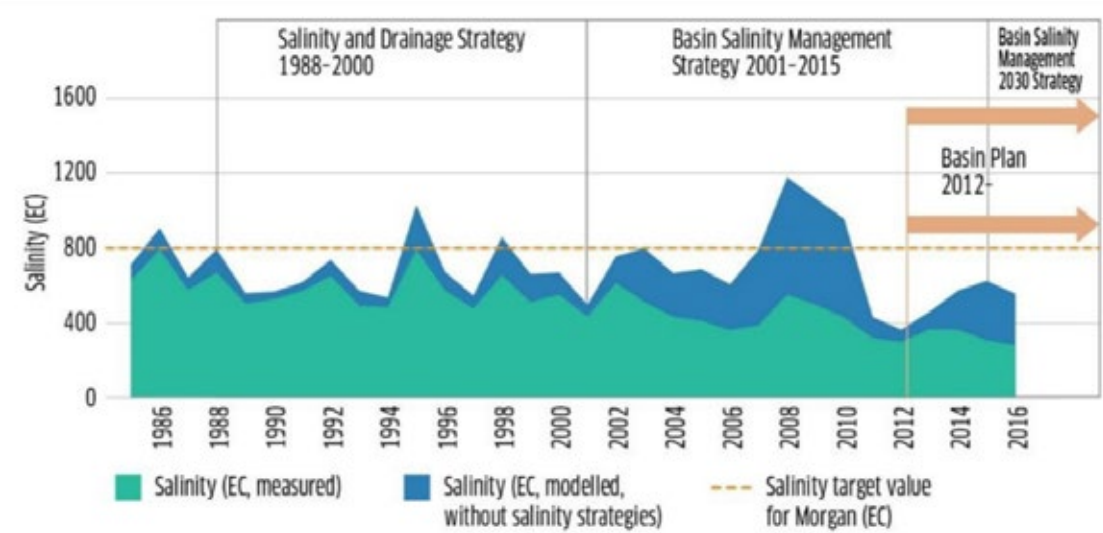


Figure 14-5: River Murray salinity at Morgan and impact of management strategies

Source: Source: MDBA (2017)

14.4.1 Causes or likely causes of water quality degradation

Section 10.30 of the Basin Plan requires Victoria's North and Murray Water Quality Management Plan to identify the causes, or likely causes, of water quality degradation of water resources in the water resource plan area. In identifying the causes or likely causes of degradation, there must be regard to the key causes identified in Chapter 9 of the Basin Plan. The Basin Plan identifies nine types of water quality degradation in the Murray-Darling Basin and their causes, including elevated salinity, suspended matter and nutrients. More details are in the Basin Plan Schedule 10.

Appendix A details the types of water quality degradation in the Victorian Murray and Northern Victoria water resource plan areas. In identifying this list, the Risk Assessment (**Appendix B**) was considered and there was consideration of the Basin Plan Schedule 10 list of causes of water quality degradation. Victoria also reviewed the state's strategies and plans and consulted with regional agencies.

Degradation or decline in water quality, either from natural occurring events like drought and fire or human-induced impacts from land clearing and land use change, can significantly impact on beneficial uses. Sections of the catchments that retain a large amount of native vegetation like the mountains and highlands have been less affected by water quality degradation than flat lands that have been highly modified.

Some of the degradation in the northern sections that has occurred through a major shift in catchment land use and water use has led to a 'step change' in water quality. While there have been actions to alleviate or reduce these impacts, water quality cannot be returned to that experienced before European settlement.

Many risks and causes of water quality degradation occur at a local level and do not affect the overall condition at a water resource plan scale. The water quality management plan for Victoria's North and Murray water resource plan area considers both system-wide and local risks and causes of water quality degradation as identified in **Appendix A**.

14.4.2 Risks to water quality

The Risk Assessment (**Appendix B**) for the Victoria's North and Murray water resource plan area assessed risks to the condition of surface water. It outlined the risks, the level of risk, description of medium to high risks, and strategies to address each medium to high risk as required in sections 10.41-10.43 of the Basin Plan.

Section 10.31 of the Basin plan requires Victoria's North and Murray water quality management plan to identify measures to address the risks arising from elevated levels of salinity or other types of water quality degradation as outlined in the Basin Plan and identified as a result of the Risk Assessment. See **Appendix B**.

The Risk Assessment (**Appendix B**) identified the current and future risks to water quality for surface water and groundwater. The Risk Assessment outlines:

- the risks
- the level of risk
- description of medium to high risks
- strategies to address each medium to high risk as required in 10.41-10.43 of the Basin Plan

Table 14-2 shows the consolidated risks to water quality that rank medium or higher across the three water resource plan areas. Climate change, extreme drought, failure to continue to invest in best practice land use, earth resource development and pests and weeds generated the highest levels of risk. All risks which were rated as medium or higher require a strategy to be identified to address the risk, these risks and strategies are outlined in **Appendix B**.

Detailed summaries of the risks, the causes of degradation and the impact on water users and measures to address water quality are contained in [Appendix A](#).

The risks to consumptive and Aboriginal uses of groundwater are addressed by a range of strategies described in the Risk Assessment ([Appendix B](#)).

Table 14-2: Consolidated medium or higher-level water quality risks in the water resource plan areas

Cause	Condition (water quality)										
	Northern Victoria (surface) water resource plan area					Victorian Murray (surface) water resource plan area					Goulburn-Murray groundwater
	Environment	Consumptive	Recreational	Aboriginal		Environment	Consumptive	Recreational	Aboriginal	Consumptive	Aboriginal
Climate change											
Extreme drought											
Extreme wet period											
Flooding and overbank inundation											
Bushfires											
Land use changes affecting condition											
Failure to continue to invest in improved land use practices											
Farm dams											
Increased utilisation of water access rights											

Cause	Condition (water quality)											
	Northern Victoria (surface) water resource plan area					Victorian Murray (surface) water resource plan area					Goulburn-Murray groundwater	
	Environment	Consumptive	Recreational	Aboriginal		Environment	Consumptive	Recreational	Aboriginal	Consumptive	Aboriginal	
Increases in the number of entitlements leading to increased take												
Non-compliance with the <i>Water Act 1989</i>												
Changes to the timing and location of demands												
Earth resource development												
Point source discharge												
Major asset failure												
Pests and weeds												
Legend	5					4					3	
	Very high risk					High risk					Medium risk	

14.4.3 Measures to address water quality degradation

Section 10.31 of the Basin Plan requires Victoria's North and Murray Water Quality Management Plan to identify measures to address the risks arising from elevated levels of salinity or other types of water quality degradation (section 10.41(2)(d)) identified as a result of the Risk Assessment (see [Appendix B](#)).

The measures to address these risks are:

- BSM2030 which protects the waters of the Murray River and its tributaries
- the implementation of SEPP (Waters)

It is not considered any other measures are necessary to meet Basin Plan requirements on the basis that all risks identified have been addressed in Victoria's North and Murray water resource plan area through:

- strategies identified in the Risk Assessment as outlined in [Appendix B](#) and
- the measures contributing to the achievement of water quality objectives as outlined in [Appendix A](#)

This section provides details of the key measures to achieve water quality objectives in Victoria relevant to the Basin Plan. These are the State Environment Protection Policy (Waters) and the Basin Salinity Management Strategy. More detail is provided in [Appendix A](#).

14.4.3.1 State Environment Protection Policy (Waters)

The primary regulatory mechanism for protecting Victoria's water environments from pollution and waste is the *Environment Protection Act 1970* and 2017 (the EP Act). The EP Act defines high-level objectives for protecting Victoria's water environments and gives the Environment Protection Authority and other duty holders their roles, responsibilities and powers for environmental protection.

State Environment Protection Policy (Waters) (SEPP (Waters)) was updated in 2018 and ensures that Victoria has a contemporary statutory policy for the protection and management of surface water and groundwater in Victoria. This is achieved by establishing in law the uses and environmental values to be protected, defining the level of environmental quality required for their protection and setting rules and obligations to make sure management actions are taken to protect water quality.

The State Environment Protection Policy (Waters) objective is to protect and improve the quality of Victoria's waters while providing for economic and social development.

SEPP (Waters) works in parallel with a number of tools used by Victoria's environment and resource managers, industry groups and the broader community to protect our water environments and the health of Victoria's waters. The most prominent of these are the Victorian Water Act and associated regional waterway strategies.

By aiming to improve the health of Victorian waters, SEPP (Waters) is aiming to enhance the quality of shared waters, and so it has regard to possible impacts on the ability of another Basin State to meet water quality targets.

State environment protection policies are subordinate legislation under the Environment Protection Act. The State Environment Protection Policy (Waters) supports protection of Victoria's waters in two key ways:

- it outlines the beneficial uses or public values to be protected in different water bodies and associated environmental quality indicators and objectives required to support these beneficial uses
- it provides the rules for the regulator, the Environment Protection Authority (EPA), and obligations on industry to protect and improve water quality. The rules and obligations typically include:
 - obligations on duty holders — detailed expectations and requirements for a range of activities that impact on water quality, such as setting the standards for sewerage infrastructure containing flows
 - decision rules for the regulator and processes to be followed when managing scheduled premises, including that there must not be any direct discharge of waste to any aquifer except for specific purposes, and where specified conditions are met, such as where the EPA may approve a mixing zone when issuing a licence

The environmental quality indicators and objectives in SEPP (Waters) have been developed to conform with and complement the nationally-agreed approach outlined by the Australian and New Zealand Environment Conservation Council.

The SEPP (Waters) rules and obligations collectively make up a program of actions through which environmental quality objectives are to be achieved or 'attained' to protect beneficial uses.

By highlighting these legal obligations in the State Environment Protection Policy (Waters), duty holders can understand their legal obligations to manage water quality.

SEPP (Waters) has an implementation plan that outlines the Government's priorities and drives work priorities and budgeting. This policy is also used to inform regional and local strategies and plans that aim to improve environmental quality objectives (EPA, 2018).

14.4.3.2 Basin Salinity Management 2030 Strategy

The second measure identified is Implementation of Victoria's obligations under the Basin Salinity Management Strategy 2030 (BSM2030) (Murray-Darling Basin Ministerial Council, 2015). The salinity levels of the River Murray historically have been the highest priority water quality issue.

BSM2030 protects the waters of the River Murray and its tributaries by requiring all Basin states including Victoria to monitor and report on any action taken after 1988 that changes the salinity concentration of the River Murray at Morgan in South Australia by 0.1 electrical conductivity (EC) or greater, and to maintain the balance of their actions as a net credit.

Implementation of this strategy monitors and manages any causes of salinity water quality degradation.

Each year Victoria monitors and reports on the end-of-valley salinity targets recorded in Division 4 of Part 4 of Chapter 9 of the Basin Plan and Appendix 1 of Schedule B of Schedule 1 of the *Commonwealth Water Act (2007)*. This provides a valley-scale context to the identification and management of salinity risk to the shared water resources and assets within valleys.

The end-of-valley targets are to be reviewed by each Basin state before the BSM2030 mid-term review in 2026, to make sure these target values represent the contemporary understanding of valley catchments.

The Salinity and Drainage Strategy (1988) provided an interstate management agreement between Victoria, South Australia and New South Wales to reduce river salinity and protect irrigated land. It was a pollutant-trading framework based on a register of actions that earned



salinity credits and debits and was supervised by the Murray-Darling Basin Ministerial Council and administered by the Murray-Darling Basin Authority.

The Salinity and Drainage Strategy was formalised as Schedule B of the Murray-Darling Basin Agreement which enabled the construction of salt interception schemes.

Victoria planned its salinity management activities to comply with this agreement and on the understanding that salinity credits were scarce and needed to be carefully rationed.

In 2000 all Basin states became signatories to the Basin Salinity Management Strategy 2001-2015 (BSMS) (MDBA, 2001) which continued the beneficial work of the Salinity and Drainage Strategy. The BSMS focused on managing the impact of irrigation development before 1988 and continues to address the impacts of salinity on the River Murray.

The register of salinity credits and debits is subject to regular reviews and independent audits. These audits have confirmed that Victoria has consistently complied with the requirements of Schedule B of the Basin Plan.

Salinity management activities in Victoria will continue to comply with these requirements, and as such have positive effects on South Australia and New South Wales. Victoria's activities will have no effect on Queensland and the Australian Capital Territory.

14.4.3.3 Water quality targets for surface water

To help maintain appropriate water quality for environmental, social, cultural and economic activities, the water quality management plan identifies water quality target values for fresh water-dependent ecosystems, irrigation water and recreational water for the water resource plan area. Establishment of these target values provides the framework for addressing the causes of water quality degradation and maintaining or improving water quality in the water resource plan area.

The Basin Plan presents water quality target values for water resource plans (sections 9.15-9.18 of the Basin Plan) which are to be considered in the developing measures for each water resource plan area.

These are identified as water quality targets for:

- fresh water-dependent ecosystems
- irrigation water
- recreational water

These targets must be identified for each water resource plan area, or alternative targets may be identified (section 10.32(4) of the Basin Plan).

For the purposes of section 10.32 of the Basin Plan, Victoria identifies alternative targets for the Northern Victoria and Victorian Murray water resource plan areas for fresh water-dependent ecosystems, irrigation water and recreational water.

Fresh water-dependent dependent ecosystems

In October 2018 Victoria gazetted the State Environment Protection Policy (Waters) (EPA, 2018). The review process involved considerable scientific analysis of water quality data and stakeholder consultation to revise the environmental quality objectives.

Specific water quality objectives for water-dependent ecosystems and species for the Northern Victoria and Victorian Murray water resource plan areas are listed in [Appendix A](#). Using the indicator and objective values of water-dependent ecosystems, species and segments⁸ from

⁸ Segment is a term used to identify parts of the policy area that have common features in terms of environmental

SEPP (Waters), as distinct from the Basin Plan targets for freshwater dependent ecosystems, means the environmental quality objectives are more relevant to the local Victorian conditions. The application of each target value to the Northern Victoria water resource plan area and the Victorian Murray water resource plan area are provided in [Appendix A](#).

The Victoria's North and Murray Water Quality Management Plan applies the SEPP (Waters) segments and sub-segments. These targets will not only provide more targeted levels of protection but will also support effective management as they form part of Victoria's current water quality management framework.

Irrigation water

Victoria's water quality target for irrigation water for the Northern Victorian water resource plan area and the Victorian Murray water resource plan area is:

That the quality of water distributed by Rural Water Corporations for the primary purpose of irrigation is representative of the quality of source water which is managed for quality through intergovernmental agreements, and Victoria's water quality management framework.

This target is an alternative to the Basin Plan target and recognises Victoria's commitment to water quality protection for irrigation by protecting source water quality through the state's water quality management framework, both in the shared waters of the Murray and in Victorian waterways.

Victoria's recognises that a single numerical figure to protect all irrigation in multiple districts is not an approach recognised by the Australian and New Zealand Environment Conservation Council guidelines, nor are there indicators and environmental quality objectives for irrigation included in Victoria's SEPP (Waters). There are many factors relevant to whether water of a particular quality is suitable for irrigation, including matters such as crop selection, irrigation method and soil type.

Rather than stating what quality of water in a waterway is suitable for irrigation, Victoria's water quality target encourages the need for crop selection and irrigation practices to consider the quality of available water and likely quality of that water in changing conditions.

Recreational water

The Basin Plan specifies the blue-green algae (cyanobacteria) values according to the National Health and Medical Research Council (NHMRC) Guidelines for Managing Risk in Recreational Water.

The State Environment Protection Policy (Waters) include indicators and objectives for primary and secondary contact recreation that are mostly based on the National Health and Medical Research Council guidelines:

- E. coli or enterococci can be used for freshwaters. Water managers can select either indicator but are recommended to use E. coli if they have been doing this previously, to maintain a historical dataset

As the National Health and Medical Research Council guidelines do not provide objective values for E.coli, values from the New Zealand Government Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas were used for SEPP (Waters).

SEPP (Waters) also includes objectives for secondary contact recreation which are not provided for in the NHMRC Guidelines. SEPP (Waters) was largely based on the NHMRC guidelines but departed from these guidelines in some aspects. To provide confidence for this process, three

condition, aquatic ecosystem type and a range of current and future beneficial uses.

international experts were invited to peer review the work done to develop the draft SEPP (Waters). These experts were Graham McBride from the National Institute of Water and Atmosphere Research in New Zealand, Timothy Wade from the US Environment Protection Authority and Professor Charles Gerba from the University of Arizona. The reviewers' feedback supported the Victorian EPA's work and the reviewers considered it was sound in substance, rational and scientifically defensible.

The Basin Plan water quality targets for water used for recreational purposes are the values for cyanobacteria cell counts or biovolume in Chapter 6 in (National Health and Medical Research Council, 2008).

The water quality management plan will apply the SEPP (Waters) water quality objectives for recreational water, noting that these are based on a rigorous scientific review process.

14.5 Groundwater - water quality degradation, risks and targets

Like surface water quality, good quality low salinity groundwater statewide is generally found in the upland areas of the north east and ranges to the south. Water quality declines to the west and north especially in the shallow (water table) resources. Groundwater salinity in these areas is naturally very high where the water table is shallow, and evaporation is higher than recharge. Saline groundwater may occur above and beside aquifers containing relatively much fresher groundwaters. The areas of elevated salinity are considered natural and do not reflect degradation of the resource.

14.5.1 Causes or likely causes of water quality degradation

Section 10.35A of the Basin Plan requires Victoria's North and Murray Water Quality Management Plan to identify the causes, or likely causes, of water quality degradation of water resources in the water resource plan area. Victoria undertook an assessment of groundwater quality and identified that there has been no degradation of groundwater. Because there has been no degradation of water quality of groundwater in the Goulburn-Murray water resource plan area there has thus been no causes, or likely causes, of water quality degradation of groundwater. Areas of high groundwater salinity in the and around the Shepparton Irrigation District and in the west of the state are not a matter of degradation, but rather the natural state of the system. This is explained further in [Part 5](#) of [Appendix A](#).

In assessing degradation regard was had to causes identified in Part 2 of Chapter 9 of the Basin Plan. Also, the risks identified in the Risk Assessment ([Appendix B](#)) outlined below.

14.5.2 Risks to the quality of groundwater resources

14.5.2.1 Summary of regard to the Basin Plan

Part 2 of Chapter 9 of the Basin Plan and Schedule 10 of the Basin Plan identifies the type of water quality degradation and their causes. These are:

- Elevated levels of salinity:
 - the process of mobilisation of salt stores in the landscape and geological predisposition to salinity development by irrigation at high salinity risk locations without adequate drainage management
Example: Locations where there is a high risk of recharge to groundwater resulting in saline discharges to surface waters.
 - the use of groundwater for irrigation purposes at locations where highly saline upper aquifer water drains to the lower aquifer
- Elevated levels of pesticides and other contaminants:

- allowing pesticides or other contaminants to leach into groundwater

Elevated levels of salinity

In areas where salt stores in the landscape have shifted due to the application of irrigation water without adequate drainage this has an impact on land and surface water, and there is no impact on groundwater as it is naturally saline.

The areas where groundwater use occurs in the Goulburn-Murray water resource plan area, where highly saline upper aquifer water is found overlying a higher quality lower aquifer, is in an area where the Shepparton Irrigation Region overlies the Katunga water supply protection area and Lower Campaspe water supply protection area. Management plans for these areas have identified the potential for this to occur and provide for salinity monitoring as part of the requirements of the plan. Due to these measures there this has not caused, nor it is likely to cause a degradation of groundwater by elevating the levels of salinity in the groundwater.

There are significant low transmissivity clays and silts that underlie the Shepparton Irrigation Region, which limits drainage of saline groundwater into the deeper aquifer. In the central area of the Lower Campaspe water supply protection area, monitoring of the water quality has found a trend towards increasing salinity in some extraction bores in the Calivil formation, but a trend has not been observed in nearby monitoring bores.

The salinity levels of groundwater are considered with regard to the suitability of the resource for its intended purpose, and as described in [Section 14.5.3](#) there has been no water quality degradation or groundwater and salinity is naturally occurring.

Elevated levels of pesticides and other contaminants

Victoria undertakes monitoring of groundwater quality in areas where potential degradation of groundwater may occur. Specifically, these are the Lower Campaspe and Katunga water supply protection areas and Mid-Loddon groundwater management area where sampling for water quality occurs at both State Observation Bores and groundwater users' bores. Results are reported annually and in Victoria's Water Information Management System. Monitoring indicates there has been no degradation of groundwater. Because there has been no detected degradation of water quality of groundwater in the Goulburn-Murray water resource plan area there has thus been no causes or likely causes of water quality degradation of groundwater.

14.5.2.2 Summary of risk assessment

The Risk Assessment ([Appendix B](#)) for the Goulburn-Murray water resource plan area assessed risks to the condition of groundwater. It outlined the risks, the level of risk, description of medium to high risks, and strategies to address each medium to high risk as required in sections 10.41-10.43 of the Basin Plan.

In summary, the Goulburn-Murray water resource plan area risk assessment identified these areas of medium or higher risk.

Risk of impacts on consumptive uses from:

- climate change (elevated salinity)
- land use changes which affect water condition (elevated salinity and toxicants)
- earth resources development (elevated salinity and toxicants)
- point source discharges (elevated salinity and toxicants)

These risks were identified with a low level of confidence. No risks to environmental uses were identified.

Risk of impacts on Aboriginal uses of water were identified from:

- climate change, bushfires, extreme drought, extreme wet, flooding and overbank inundation, point source discharges, major asset failure, increase in farm dams, earth resources development, failure to continue to invest in best practice land use initiatives, land use change which affects water condition, non-compliance with the Victorian Water Act, increase in the number of entitlements leading to increased take, increased utilisation of water access rights (elevated salinity and toxicants, and other water quality impacts).

It is recognised that in Victoria there is limited confidence about understanding of Aboriginal values of groundwater and the ability to manage for those values. For this reason, high risks were identified for Aboriginal use of water across all potential causes until there is greater understanding of local values and the ability to assess these more accurately. A range of strategies is being employed to manage and minimise these risks. Importantly, *Water for Victoria* (DELWP, 2016) commits to a process of information gathering and understanding of Aboriginal water values and uses to better inform the strategies and measures around water quality.

The risks to consumptive and Aboriginal uses of groundwater are addressed by a range of strategies described in the Risk Assessment ([Appendix B](#)). A risk does not constitute a cause or likely cause, and as there has been no degradation of groundwater quality observed it is clear that these risks have not eventuated.

14.5.3 Water quality targets for groundwater

The following water quality target approach for fresh water-dependent ecosystems have been considered in line with State Environment Protection Policy (Waters).

Fresh water-dependent ecosystems

The quality of groundwater must be prevented from degradation so that:

- a) groundwater does not cause receiving waters to be affected to the extent that the level of any environmental quality indicator is greater than the level of that indicator specified for surface waters in Victoria's North and Murray Water Quality Management Plan. The indicators are the alternative water quality targets for freshwater dependent ecosystems explained in [Part 4.6.1](#) of [Appendix A](#), that are consistent with Victoria's SEPP (Waters).
- b) groundwater quality must not adversely affect the maintenance of environmental values that depend on groundwater

The target ensures that groundwater degradation is prevented by ensuring that groundwater discharge to surface water, does not result in the surface water quality indicators in Victoria's North and Murray Water Quality Management Plan not being met. A key parameter for which groundwater quality may impact on surface water is salinity (EC/TDS) and so this is the focus of rules and measures to protect groundwater from degradation.

Irrigation water

Water quality targets do not apply as no groundwater is distributed by an irrigation infrastructure operator for irrigation.

Recreational water

Water quality targets do not apply as no groundwater is used for recreational purposes.

14.5.4 Measures for the Goulburn-Murray: Sedimentary Plain SDL resource unit

Section 10.35D of Basin Plan requires that a measure or rule is provided for the Goulburn-Murray: Sedimentary Plain SDL resource unit to ensure that requirements in section 10.35C of the Basin Plan are met. These requirements relate to rules for:

- the time, place and rate of take for groundwater
- limits and restrictions on groundwater take
- maintenance of a register of bores used for monitoring water quality and salinity

Victoria meets these requirements for all SDL resource units in the Goulburn-Murray water resource plan area through prescriptions in statutory plans and local management plans and maintaining the State Observation Bore Network. This is explained further in [Part 5.5](#) of [Appendix A](#) and through Victoria's accredited response to section 10.35D and 10.35C of the Basin Plan.

14.6 Monitoring water quality

Victoria manages its freshwater and groundwater systems through a range of long-term monitoring programs. Various water quality indicators are monitored, depending on the objectives of the monitoring program.

The Department of Environment, Land, Water and Planning (DELWP) carries out monitoring programs across the state with the help of catchment management authorities and water corporations using physio-chemical, bacteriological and biological indicators.

DELWP is responsible for carrying out long-term assessment of the state's water resources under the Victorian Water Act. DELWP monitors Victoria's environmental water quality through its Victorian Water Quality Monitoring Network, largely through regional water monitoring partnerships and partnering with the EPA for biological monitoring.

Monitoring in the Northern Victorian water quality management plan applies the general principles for monitoring set out in section 13.04 of the Basin Plan.

The regional water monitoring partnerships and State Observation Bore Network have been established to collect data on water quality and water quantity for surface water and groundwater respectively to satisfy legislative and regulatory compliance, performance monitoring, policy development and operational decision-making as set out in the Victorian Water Act for more information see [Chapter 15](#).

Victoria has a range of reporting initiatives that are being implemented to improve water quality monitoring and are described here.

Data collected primarily through the regional water monitoring partnerships, State Observation Bore Network and salinity management program is made available for a variety of data sources and reports including:

- Water Management Information System: data collected on water quality and quantity is held in this system, which is made available on the DELWP website
- annual Victorian Water Accounts: document key water management data for Victoria and provide a summary of water availability, water allocation and use of bulk water for surface water and groundwater
- Victorian Environmental Water Holder: VEWL publishes its annual report and various other reports about outcomes of the use of environmental water allocations
- Basin Salinity Management 2030: monitors and documents salinity management, including analysing and modelling to quantify, validate and review accountable actions to delayed salinity impacts. BSM2030 supports river managers, environmental holders and other water managers

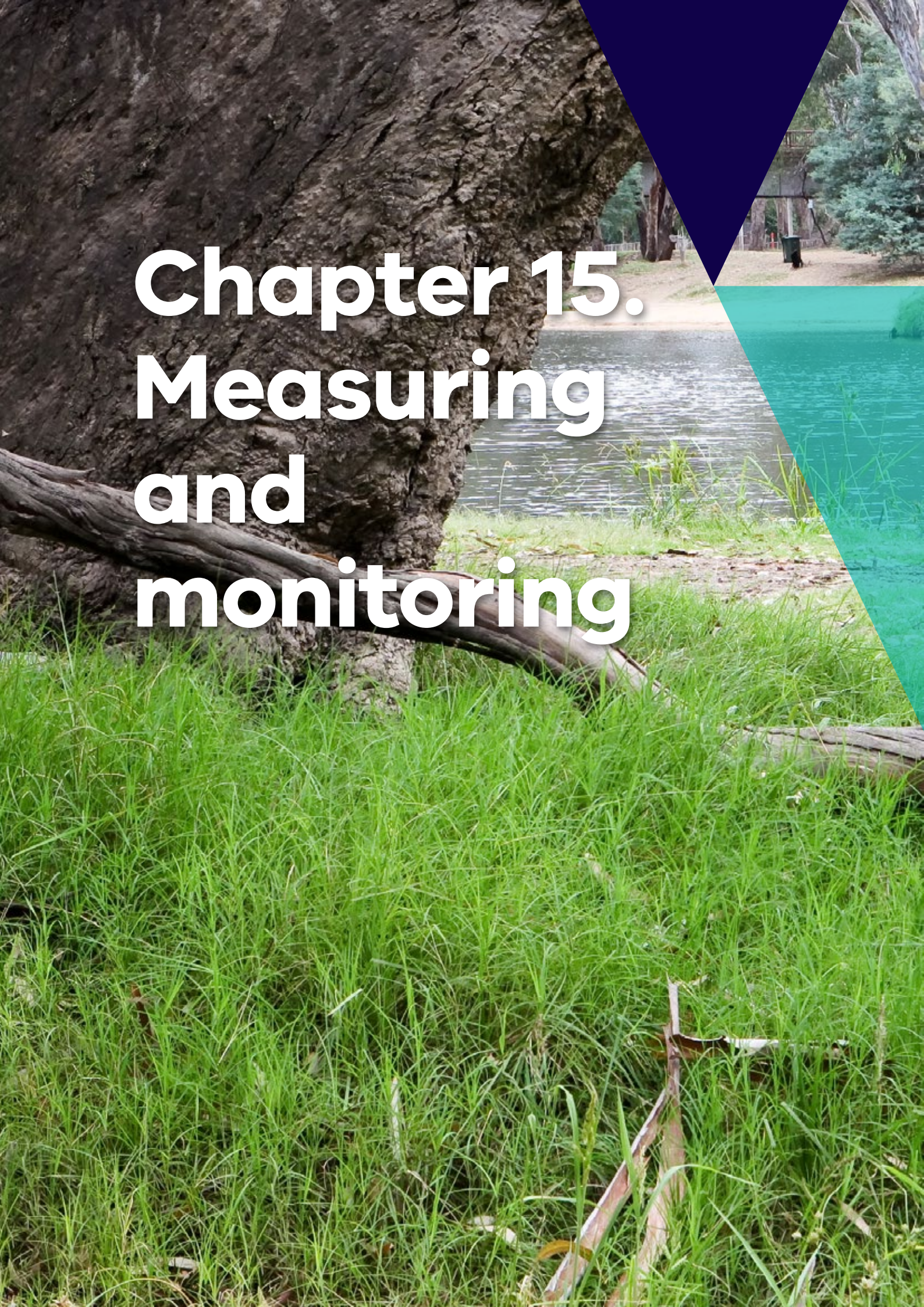
Victoria also reports on streamflow and salinity for end-of-valley target sites annually. Every second year, a comprehensive report is provided to the Ministerial Council on progress against BSM2030 objectives. Every other year, a status report is provided for the Basin Officials Committee along with a summary report for the Ministerial Council.

Schedule 12 of the Basin Plan requires the Basin states to report on water quality targets on a five-yearly basis. The Basin Plan water quality objectives in Chapter 9 are consistent with Victoria's beneficial uses for protecting drinking, industrial and aquatic ecosystems that a waterway and waterbody can support.

Implementing the State Environment Protection Policy (Waters) is designed to:

- protect beneficial uses
- make sure that actions in the catchments do not have a detrimental impact on the quality of freshwater
- ensure that different water uses and values, including for drinking, agricultural, recreational and aquatic ecosystems, are suitable for their purpose consistent with section 5.04 of the Basin Plan

For further detail see [Appendix A](#).



Chapter 15. Measuring and monitoring



15. Measuring and monitoring

This Chapter provides information about how Victoria measures and monitors water resources and what is done to ensure the measurements are maintained. It meets the requirements of Part 10 of Chapter 10 of the Basin Plan.

15.1 Basin Plan requirements for measuring and monitoring

Part 10 of the Basin Plan requires:

- the best estimate of the total long-term annual average quantity of water taken that is measured
- how the quantity measured was calculated
- the proportion of that quantity that is measured in accordance with agreed metering standards
- the best estimate of the total long-term annual average quantity of water taken that is not measured and how that quantity was calculated
- actions and timeframes for actions for maintaining and, if practicable, improving:
 - the proportion of take that is measured
 - the standard to which the take is measured
- monitoring of water resources to fulfil the reporting obligations under section 13.14 of the Basin Plan

Appropriate measuring and monitoring is critical for sound water resource management. This informs policy, evidence-based decision-making and management of Victoria's water resources to adapt to changing conditions. It supports a strong compliance and enforcement framework. Good measuring and monitoring means Victoria can protect the reliability of water for the environment and existing entitlement holders, giving water users and the community confidence that our water resources are well managed.

15.2 Victoria's Regional Water Monitoring Partnership

Victoria's Regional Water Monitoring Partnerships and State Observation Bore Network have been established to collect data on surface water and groundwater quantity and quality to meet legislative and regulatory compliance requirements and for performance monitoring, policy development and operational decisions.

Catchment management authorities, water corporations, local government and other agencies may also monitor water quality beyond these two key networks.

15.2.1 Surface water

The Regional Water Monitoring Partnership is made up of 40 partner organisations. It routinely monitors surface water and collects surface water data from around 780 monitoring sites across Victoria.

The data is collected to identify:

- how much water there is
- where the water is



- the water quality
- how much water is being used
- what the water is used for

15.2.2 Groundwater

The Groundwater Monitoring Partnership includes the Department of Environment, Land, Water and Planning (DELWP), Southern Rural Water, Grampians Wimmera Mallee Water, Central Highlands Water and Goulburn-Murray Water. These agencies routinely monitor groundwater and collect groundwater data from the 1,400 State Observation Bore Network (SOBN) bores. This also includes an annual spring sampling program to analyse groundwater quality parameters.

15.2.3 Water Management Information System

All surface water and groundwater data collected through the Regional Partnerships is stored and managed in the Water Management Information System (WMIS). WMIS is a publicly accessible web site and contains data on water levels (surface and groundwater), surface water discharge and water quality (surface and groundwater). This includes all telemetered water data which is published within one hour of collection. Verified water data is published within two weeks of collection.

15.3 Victorian Water Accounts

The annual Victorian Water Accounts provide detailed information about water availability and use each water year. Accounts have been produced every year since the first accounts were put together for 2003–04.

Water accounts are produced for each of Victoria's 29 river basins and 20 groundwater catchments.

Producing the Victorian Water Accounts is an important process to demonstrate how Victoria's water resources are managed. The strength of the accounts is in the data and the process for reporting on that data. Victoria has an extensive network of monitoring sites that record information on rainfall, temperature, river quantity and quality, groundwater levels and quality and the production and quality of recycled water. The amount of water taken from rivers and groundwater is also monitored and use is metered wherever practical.

Data is collected from rural and urban water corporations, the Department of Environment, Land, Water and Planning (DELWP), the Australian Bureau of Meteorology, the Victorian Environmental Water Holder (VEWH), the Essential Services Commission, the Murray-Darling Basin Authority (MDBA), the Victorian Alpine Resort Commission, power companies and other major water users.

15.3.1 Surface water accounts

Surface water data in the water accounts aligns with river basin boundaries. For the purposes of the basin water accounts, water is accounted for at the point of diversion from the waterway and not the point of use.

The surface water accounts present the water balance for each basin. The water balance is made up of:

- change in the volume stored in the river basin
- inflows to the basin, such as catchment inflows, rainfall on major storages, transfers from other basins, return flows from irrigation and treated wastewater discharged back to rivers

- diversions such as urban diversions, irrigation district diversion, licensed diversions from regulated and unregulated streams, transfers to other basins, environmental water diversions and small catchment dams
- losses such as evaporation from major storages, losses from small catchment dams and instream infiltration to groundwater
- water passed at the basin outlet

Information for the surface water accounts is obtained from:

- the Victorian Water Register
- data from rural and urban water corporations, the VEWH, DELWP, the MDBA and other major water users
- water consumption and recycled water data collected from water corporations by the Essential Services Commission
- hydrological data for surface water monitoring sites is obtained from WMIS
- climate information from selected rainfall and evaporation monitoring sites provided by the Bureau of Meteorology and water corporations
- estimated relationships between water use and climate or hydrological data, which is produced by water supply system modelling

Details of the methodology used to quantify each component of the water balance are described in the Victorian Water Accounts (DELWP, Victorian Water Accounts: 2015-2016, 2017-18).

Victoria's North and Murray water resource plan area includes the Murray (Victoria), Kiewa, Ovens, Broken, Goulburn, Campaspe and Loddon basins and surface water accounts are prepared for these basins. Note: the Murray Basin and the Kiewa basin are amalgamated in the Victorian Water Accounts.

15.3.2 Groundwater accounts

Accounts are presented for each groundwater catchment. Boundaries of these catchments are determined by hydrogeological features and differ from surface water catchments. The groundwater accounts present data about:

- licensed groundwater volumes and use
- urban groundwater use, which is a sub-category of licensed use
- estimated number of groundwater bores and use for domestic and stock supplies

Information for the groundwater accounts is obtained from:

- the Victorian Water Register
- responses to requests for data to water corporations, DELWP and other major users of groundwater
- hydrogeological information for groundwater monitoring sites is obtained from WMIS
- estimated relationships between water use and hydrological data, which is produced by water supply system modelling
- water corporation groundwater statements and annual reports

Victoria's North and Murray water resource plan area includes the area covered by the Goulburn-Murray groundwater basin and incorporates groundwater data in the Upper Murray, Kiewa, Ovens, Goulburn, Broken, Campaspe and Loddon catchments.



15.3.3 Estimating evapotranspiration

Evapotranspiration estimates are provided as supplementary information in the accounts to estimate the use of water by commercial plantations. Data used in the accounts is estimated by the SoilFlux model as the sum of transpiration by plants, evaporation from soil and open water surfaces and evaporation from the wet surfaces of plants soon after rainfall.

SoilFlux is a one-dimensional water balance model. It requires many approximations and assumptions, which limit its accuracy. Major assumptions and limitations of this method include:

- not accounting for water applied by irrigation
- not allowing for changes in water storage, such as rises and falls in the water table and soil moisture, or lateral flow
- using land use information from 2009, which has been condensed from the Victorian Land Use Information System into 10 representative land use types, for water balance modelling
- using one kilometre gridded data for land use, geology, depth to groundwater and rainfall

15.3.4 Victorian Water Register

The Victorian Water Act requires records of all water entitlements to be recorded by the Victorian Water Register, which contains detailed water accounts. The register is the central source of information about water entitlements, trade and usage and contains information on:

- bulk and environmental entitlements
- water shares
- water-use licences and registrations
- take and use licences
- works licences

The register records details about:

- ownership
- changes in ownership through trade
- entitlement characteristics including maximum volume
- allocations to entitlements where relevant
- use
- carryover where relevant

The register's water entitlement records are reconciled quarterly and finalised at the end of each financial year.

15.4 Collecting data for the accounts

15.4.1 Bulk entitlements

The holder of each bulk entitlement must prepare and implement a metering plan that demonstrates how the entitlement holder collects and stores the data necessary to determine that the entitlement holder has complied with the bulk entitlement. The metering plans must be prepared in accordance with the *Ministerial Guidelines for the Development of Bulk Entitlement Metering Programs* (Minister for Water, 2009), including meeting the relevant national standards.

Entitlement holders are also required to keep records collected from the metering program and provide reports to the Minister on request. Each year the Minister requests water corporations report on their take and use of water in their annual reports which are tabled in Parliament. Entitlement holders are also required to include details of any non-compliance with their bulk entitlement in these annual reports.

15.4.2 Environmental entitlements

Like bulk entitlement holders, the Victorian Environmental Water Holder (VEWH) has obligations to prepare metering programs to demonstrate how it complies with the requirements of its environmental entitlements. The Ministerial rules relating to the Victorian Environmental Water Holder (Minister for Water, 2014) require the VEWH to report each year on:

- the rights and entitlements in the water holdings at the end of the year
- water allocations made available
- changes in the water holdings
- the use of carryover
- water trading activity

The VEWH annual report is also tabled in Parliament and contains comprehensive information about the use of environmental holdings in response to these requirements. See for example, the Victorian Environmental Water Holder Annual Report 2017-18 (VEWH, 2018).

15.4.3 Take and use licences

Victoria's metering policy for non-urban water supplies (DEPI, 2014) includes:

Where a delegate issues, renews or approves the transfer of a licence to take water in a non-urban situation, the following conditions apply:

- a) *All new licences where the water taken under the licence is to be used for irrigation or commercial purposes must be metered*
- b) *Existing licensed extraction sites must be metered if the licensed volume is –*
 - i) *10 ML or greater, for surface water, or*
 - ii) *20 ML or greater, for groundwater*
- c) *The obligations in paragraph (a) and (b) do not apply if, in the view of the delegated authority, a meter would be impractical or can be exempted according to the following criteria:*
 - i) *Cost of metering can be shown to significantly outweigh the benefits*
 - ii) *Resource management objectives can still be achieved without impacting negatively on the resource, the environment or other users*
 - iii) *An exemption exists according to the Victorian Water Act*
- d) *In these cases, the delegate must:*
 - i) *Document clearly the reasons for its view, and*
 - ii) *Identify a substitute method for estimating the volume of water taken to meet state and federal water accounting and reporting requirements*

The above requirements do not preclude a delegate from requiring more extensive metering.

This policy is implemented through the Ministerial policies for Managing Take and Use Licences (Minister for Water, 2014). These policies require details of all take and use licences to be recorded on the Victorian Water Register. Metered use is also recorded on the Water Register.

Water corporations that provide non-urban supplies must prepare and implement metering action plans that comply with the Victorian implementation plan for the national metering standards for non-urban water meters. See clause 7.4 of the Statement of Obligations (DELWP, 2015).



15.4.4 Basic rights

15.4.4.1 Section 8 rights

The Victorian Water Accounts do not include estimates of the volume of water taken under the section 8 rights provisions of the Victorian Water Act, known as basic rights in the Basin Plan. The most significant use under this category is by stock drinking from unfenced waterways. The water taken under section 8 rights is relatively small and there is no practicable way of measuring the volume. For the purposes of determining permitted and actual take, an estimate has been made as described in [Appendix C](#) (see [Table 6](#), item 4).

Similarly, the use of groundwater from domestic and stock bores is not known with any precision. Records are kept of the works licences required to construct a domestic and stock bore. However, these bores are not metered and there is no record of which bores are actively used. The number of domestic and stock bores includes all bores on the groundwater management database that are not licensed bores and that are less than 30 years old. The volume of domestic and stock use is estimated by assuming each bore uses 2 ML per year as described in [Table 11](#) of [Appendix C](#).

15.4.4.2 Section 8A rights

The Victorian Water Accounts do not include estimates of the volume of water taken under the section 8A rights provisions of the Victorian Water Act, known as basic rights in the Basin Plan. These rights for Traditional Owners to take water under section 8A are outlined in more detail in [Section 7.2.1.2](#). At the time of producing this report there are no circumstances of Traditional Owner groups exercising this right in Victoria's North and Murray water resource plan area. However, this may change as a result of the implementation of the Aboriginal Water policy outlined in *Water for Victoria* (DELWP, 2016). An estimate has been used for determining permitted and actual take as described in [Appendix C](#) (see [Table 6](#), item 4).

15.4.4.3 Farm dams

No cost-effective method is available to measure the volume of water diverted from farm dams. There is no practicable way of metering use from these dams, which are mainly for stock. The volume of water harvested by small dams is included in the Victorian Water Accounts as an estimate.

This estimate is based on spatial data compiled using aerial imagery from 2005–2010 and showing the location and surface area of all dams in Victoria. This data was combined with hydrologic modelling of the impact of small catchment dams on mean annual streamflow.

The estimated total water harvested by small catchment dams, or their total impact in a basin, is represented in the water balance as two separate components:

1. the estimated volume that owners extract from dams to supply their needs is accounted for as a diversion in the surface water balance
2. the estimated volume of evaporation from small catchment dams is accounted for as a loss in the surface water balance

The method used to estimate the number and capacity of dams uses outputs from aerial photography. This dataset was wholly based on the Murray–Darling Basin Authority's waterbodies data prepared by Geoscience Australia in 2010 using aerial imagery from around 2004–05. This data represents the best available information.

While the estimates of the number and locations of the dams are relatively accurate, it requires significant assumptions to convert this spatial data to estimates of take. These estimates are not sufficiently precise to provide accountable volumes of take (see [Chapter 11](#)).

15.5 Information related to take

The best estimates of the total long-term annual average quantity of surface water taken that is measured and not measured in the Victorian Murray water resource plan area, the Northern Victoria water resource plan area and the Goulburn-Murray water resource plan area, are set out in [Table 15-1](#).

Measured take for bulk entitlements is determined in accordance with the metering plans prepared and implemented by bulk water entitlement holders. Measurement usually includes a combination of stream gauging and metering, depending on the physical water harvesting arrangements.

Water corporations are responsible for making sure meters comply with the requirements of the national metering standards for urban and non-urban water meters, and that stream gauges are read, calibrated and maintained in line with their metering programs.

Table 15-1: Volume and method used to quantify take in Victoria's North and Murray water resource plan area

Water access right	Estimated / measured	Annual volume (ML/year)
Victorian Murray water resource plan area		
Bulk entitlement ^{(a)(b)}	Measured	1,669,595
Take and use licence ^{(b)(c)}	Measured	13,356
Take and use licence ^(d)	Estimated	1,750
Basic rights (regulated and unregulated streams)	Estimated	9,166
Runoff dams – licence ^(b)	Measured	9,362
Runoff dams – basic rights ^(b)	Estimated	11,285
Northern Victoria water resource plan area		
Bulk entitlement ^{(a)(b)}	Measured	1,784,030
Take and use licence ^{(b)(c)}	Measured	34,930
Take and use licence ^(d)	Estimated	4,940
Basic rights (regulated and unregulated streams) ^(b)	Estimated	17,134
Runoff dams – licence ^(b)	Measured	74,164
Runoff dams – basic rights ^(b)	Estimated	74,043

Water access right	Estimated / measured	Annual volume (ML/year)
Goulburn-Murray water resource plan area (groundwater)		
Take and use licences ^(b)	Measured and estimated	435,841
Basic rights ^(b)	Estimated	16,400

- a. The annual volume of take measured will vary from year to year. The annual volumes are the best estimate of the portion of the BDL that is attributed to bulk entitlements. Bulk entitlements include high-reliability water shares, low-reliability water shares, loss provisions, waterworks districts, provision for unlicensed domestic and stock use and urban water corporation bulk entitlements from regulated and unregulated parts of the system.
- b. For more detail about how the data is estimated and measured refer to [Appendix C, Table 6](#) (surface water) and [Table 11](#) (groundwater)
- c. The annual volume of take measured will vary from year to year. Take and use licences are for the undeclared parts of the system. The annual volumes are the best estimate of the portion of the BDL that is attributed to take and use licences minus any volume that is estimated.
- d. take and use licences are for the undeclared parts of the system. The estimated portion is the best available data as at April 2019 of the total volume of take and use licences less than 10ML, excluding those in Coliban Water's irrigation districts that are 100% metered at the bulk offtake.
- e. Victoria will incorporate water resource plan reporting requirements about actual take of water into the existing processes to prepare the annual Victorian Water Accounts. In this way, data that is already collected and reported will be used for both purposes.

15.6 Improving measuring

Stream gauges are funded by water corporations and DELWP, with private contractors operating and maintaining these stream gauges in accordance with best practice. Non-urban water metering is being progressively upgraded consistent with the National Framework for Non-Urban Water Meters and Victoria's state-wide implementation plan.

The Victorian Government has made these commitments in *Water for Victoria* (actions 8.4 and 8.11) to improve water use information (DELWP, 2016) and to:

- monitor and report on the impact of water use on other users and the environment, and report on significant uses of water in the annual Victorian Water Accounts
- periodically review the long-term risks to Victoria's water resources through mechanisms such as long-term water resource assessments and sustainable water strategies
- work with water corporations and catchment management authorities to:
 - continue to invest in ongoing statewide surface water and groundwater monitoring networks
 - improve the quality and accuracy of monitoring data through investment in infrastructure upgrades and new technologies to receive more timely data
 - strengthen water resource assessments and modelling by including up-to-date information on catchment characteristics to better understand water availability, use and climate change

These actions are continuous and will be reported through *Water for Victoria* (DELWP, 2016) implementation progress reports.

**Basin Plan
s10.45(1)**

1. Victoria has committed to the following measures under Water for Victoria for maintaining and, where practicable, improving the proportion of take that is measured in the water resource plan area, and the standard to which take is measured by:
 - a) the Implementation Plan under the Basin Compliance Compact to improve metering against the National Standard for metering in accordance with the approved exemptions published in under Action 3.1 (including Actions 3.1-1.5) and supported by Actions VIC 3.1-3.7 by December 2019 (subject to revised timeframes negotiated with the MDBA)
 - b) maintenance of stream gauges by water corporations and DELWP according to national standards over the next 7 years
 - c) installation and maintenance of meters by water corporations according to national standards over the next 7 years
 - d) upgrades to non-urban metering according to the *National Metering Standards for Non-Urban Water Meters* consistent with the Victorian Policy for non-urban water metering and the state-wide implementation plan over the next 7 years
 - e) continued investment in ongoing statewide surface water and groundwater monitoring networks over the next 7 years
 - f) investment in infrastructure upgrades and new technologies to improve the quality, accuracy and timeliness of monitoring data over the next seven years; and
 - g) investigation into the introduction of a reasonable use limit for domestic and stock rights to improve monitoring and reporting of the quantity of water used under these rights over the next 7 years.

<<end of accredited text for s10.45(1) of the Basin Plan>>

**Basin Plan
s10.45(2)**

These measures will be implemented in the timeframes specified in Column 3 in response to section 10.45(1) of Victoria's North and Murray Index Table.

<<end of accredited text for s10.45(2) of the Basin Plan>>

15.7 Monitoring water resources

In relation to reporting obligations under section 13.14 of the Basin Plan, Schedule 12 lists 2 matters that Basin states, the MDBA, the Commonwealth Environmental Water Holder and the relevant Commonwealth department must report on, annually or five yearly. From this list, Basin states are required to report on 13 of the matters and monitoring of water resources is relevant to eight of these: 4, 8, 9, 10, 12, 14, 18 and 19.

15.7.1 Current monitoring to meet Basin Plan requirements

Table 15-2 shows the monitoring of water resources to be done to meet the accreditation requirements of the Basin Plan.

Four core matters require monitoring of water resources to report against them:

- Matter 8 – Achievement of environmental outcomes at an asset scale
- Matter 9 – Identification of environmental water and monitoring of its use
- Matter 12 – Progress towards water quality targets
- Matter 19 – Compliance with water resource plans

**Basin Plan
s10.46(1)**

1. Table 15-2 of Victoria's North and Murray Comprehensive Report and Part 6 of Victoria's North and Murray Water Quality Management Plan sets out the monitoring of the water resources of Victoria's North and Murray water resource plan area that will be done to fulfil the reporting obligations under section 13.14 of the Basin Plan.
2. The remaining four matters will be informed by the monitoring conducted for the purposes of the matters listed in Table 15-2 of Victoria's North and Murray Comprehensive Report. These four matters relate to:
 - a) Matter 4 - the effectiveness of the management of risks to Basin water resources (informed by monitoring of Matters 8, 9 and 12)
 - b) Matter 10 - implementation of the environmental management framework (informed by Matter 8)
 - c) Matter 14 - the implementation of the water quality and salinity management plan including to the extent to which regard is had to the targets in Chapter 9 when making flow management decisions (informed by Matter 12)
 - d) Matter 18 - the efficiency and the effectiveness of the operation of water resource plans, including in providing a robust framework under a changing climate (informed by Matters 8, 9, 12 and 19).

Monitoring undertaken in accordance with approved Management Plans for declared water supply protection areas supports reporting requirements under section 13.14 of the Basin Plan to report on matters listed in Schedule 12 to the Basin Plan. More specifically:

- Matters 4, 8, 12, 14, and 18 - routine monitoring and data collection by the Groundwater Monitoring Partnership from the State Observation Bore Network including annual spring sampling program to analyse groundwater quality parameters
- Matters 16 and 18 - Monitoring of take and use of groundwater via the Victorian Water Register and reported via the Victorian Water Accounts
- Matter 14 - Existing monitoring relating to the Basin Salinity Management 2030 (BSM2030) to support reporting to the Ministerial Council and the Basin Officials Committee Matter 18 - reporting will be informed by the reporting on the matters identified above.

Note: Obligations to undertake monitoring may be prescribed in statutory management plans in accordance with the obligation set out in response to section 10.35C of the Basin Plan in Victoria's North and Murray Index Table.

<<end of accredited text s10.46(1)>>

Table 15-2: Monitoring of water resources of Victoria's North and Murray water resource plan area that will enable Victoria to fulfil its reporting obligations under section 13.14.

Matter	Relevant indicators	What will be reported	Monitoring to fulfil reporting obligations	Reporting frequency
8	Asset-scale indicators will be developed by Basin states following the development of objectives and targets for long-term watering plans and annual priorities using the Environmental Management Framework	Report on achievement of environmental outcomes at an asset scale as per indicators in the long-term watering plan	Victoria undertakes the following monitoring to evaluate its long-term watering plan targets: - ecological monitoring of rivers through the Victorian Environmental Flows Monitoring and Assessment Program and the Native Fish Report Card - ecological monitoring of wetlands through the Wetlands Monitoring and Assessment Program for environmental flows - Victoria's Regional Water Monitoring Partnerships programs (surface water and groundwater water quality and hydrology) and - CMA monitoring related to long-term watering plan objectives To report against Matter 8, Victoria will also use data from the following Commonwealth funded programs: - Murray-Darling Basin Fish Survey - The Living Murray program and - Long-term Intervention Monitoring (Goulburn River)	5 years
9.1	Volume of Held Environmental Water (HEW) that is available for use:	Volume of HEW entitlements by SDL resource unit Carryover and forfeiture of HEW by SDL resource unit Volume of HEW used by SDL resource unit	Allocation, use, carryover, spills and forfeiture of HEW is accounted for in the Victorian Water Register, and VEWH reports this annually in their Annual Report. The monitoring to ensure environmental water delivery occurs is described in the VEWH metering programs.	1 year ^b
9.2	Volume of planned environmental water (PEW) that was available	There is a PEW reporting requirement for the Ovens and Broken basins. However due to the complex nature of minimum flow requirements, with different flow requirements at multiple sites along the system, only qualitative remarks can be made in the reporting.^(a)	There are PEW reporting requirement for the Ovens and Broken basins. Monitoring to fulfil reporting obligations occurs in accordance with the GMW bulk entitlement metering programs.	1 year ^b

Matter	Relevant indicators	What will be reported	Monitoring to fulfil reporting obligations	Reporting frequency
9.3	Purpose and consequences of environmental water use	This indicator has been excluded	Accounting for the use of held environmental water is managed through the Victorian Water Register. The monitoring arrangements to ensure environmental water delivery occurs is described in the VEWI metering programs. Monitoring of the impact of use of held environmental water is managed through monitoring done for Matter 8 outlined previously in this table.	1 year ^b
12.1	Implementation of measures identified in Water Quality Management (WQM) plans (Basin Plan s10.33)	A summary of the implementation of measures set out in the WQM plan in each water resource plan area	Monitoring to be undertaken is detailed in Part 6 of Victoria's North and Murray Water Quality Management Plan (Appendix A) for both surface water and groundwater.	5 years
12.3	The number and severity of blue-green algae and blackwater events	An analysis of the frequency, duration and extent of blue-green algae and blackwater events	Victoria and its regional agencies monitor blue-green algae through the steps outlined in the Blue-Green Algal Circular and emergency management documents. Blue-green algae monitoring is undertaken by Goulburn-Murray Water and Lower Murray Water as regional coordinators and urban water corporations, CMAs, Parks Victoria, local government and DELWP where they act as local waterway manager.	5 years
19	The MDBA does not propose reporting beyond the Statements of Assurance as agreed in the Implementation Agreement	Statement of Assurance	Monitoring to be undertaken is that required to measure compliance against the tasks under the Statement of Assurance. No additional monitoring is proposed.	1 year

a. for more information about what is and is not considered planned environmental water and held environmental water please refer to [Chapter 12](#)

b. these matters are reported to the MDBA through Victoria's annual water resource reporting required under section 71 of the Commonwealth Water Act

In Victoria the VEWH reports on its environmental watering in its annual publication, *Reflections*.

The publication outlines the following:

- carryover and trade that occurred during the year
- volume of water delivered by region and by site
- environmental outcomes resulting from the water delivered

The VEWH works with catchment management authorities to do monitoring, investigations and research projects that test assumptions and address knowledge gaps to improve on-ground adaptive management of environmental water. The VEWH's investment generally focuses on short-term projects with a defined question of interest, for example projects to improve understanding of the volume, magnitude or timing of flows that will improve outcomes achievable with the environmental water that is available.

The VEWH's contribution aims to complement investments in longer-term and broader-scale monitoring made by partner agencies such as DELWP, the Victorian Environmental Flows Monitoring and Assessment Program, the Wetlands Monitoring and Assessment Program, the Commonwealth Environmental Water Office's Environmental Water Knowledge and Research project, and the Long-Term Intervention Monitoring project. The VEWH also invests in small-scale complementary works and measures to improve environmental water outcomes. See [Chapter 12](#) for more information.

In contributing to Victoria's Basin Plan obligations, the VEWH reports each year on water use and alignment of outcomes with the MDBA's annual watering priorities. The results of monitoring and investigations supported by VEWH and its partner organisations help to build a comprehensive picture of the ecological benefits of environmental watering and inform reporting towards Basin Plan outcomes.

The VEWH's publications are on its website. Reporting on environmental water use and management in Victoria is also undertaken by other environmental water managers. For example, the Commonwealth Environmental Water Holder has annual reporting obligations under both the Basin Plan and Commonwealth Water Act.

15.7.2 Proposed improvements to monitoring

To further support reporting against Matter 8 of Schedule 12 of the Basin Plan, Victoria is currently working to develop:

- an approach for monitoring the hydrological, physical or ecological response to environmental watering in the Wetlands Monitoring and Assessment Program
- an Aboriginal Waterways Assessment tool that can assess the cultural health of waterways and the outcomes of environmental watering



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Glossary





Glossary

Term	Definition
Aboriginal Victorians	An Aboriginal Victorian is a person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the Victorian Aboriginal community in which they live.
above cap water	The water available above limits on consumptive volumes of surface water and groundwater. It includes unregulated flows which cannot be kept in storage.
adaptive management	In the Murray-Darling Basin Plan, adaptive management is taken to include the following steps: (a) setting clear objectives; (b) linking knowledge (including local knowledge), management, evaluation and feedback over a period of time; (c) identifying and testing uncertainties; (d) using management as a tool to learn about the relevant system and change its management; (e) improving knowledge; (f) having regard to the social, economic and technical aspects of management.
algal bloom	A rapid increase in the population of algae that can occur in waterways, often caused by excess nutrients (particularly phosphorus and nitrogen).
allocation	An allocation is: (a) water that is actually available to use or trade in any given year, including new allocations and carryover; (b) the water that is actually in the dam in any given year is allocated against the relevant bulk entitlement and environmental entitlement (or water share where these have been issued). The seasonal allocation is the percentage of volume available under current resource conditions, as determined by the resource manager. For example, in a dry year a 50% allocation of a 100 ML bulk entitlement would allow for 50 ML of water available to use or trade. A 100% allocation that the full volume is available. The resource manager uses seasonal determination instead of allocation when allocating water to entitlements. Seasonal determination is the term used in bulk entitlements and the Victorian Water Act in relation to water shares.
annual actual take	In the Murray-Darling Basin Plan annual actual take has the meaning given in section 6.10.
annual environmental watering priorities	In the Murray-Darling Basin Plan annual environmental watering priorities has the meaning given in section 8.23.



Term	Definition
annual permitted take	In the Murray-Darling Basin Plan annual permitted take has the meaning given in section 6.10.
ANZECC Guidelines	The Australian and New Zealand Guidelines for Fresh and Marine Water Quality published by the Australian and New Zealand Environment and Conservation Council and the Agriculture and Resource Management Council of Australia and New Zealand.
aquifer	An underground layer of rock or sediment that holds water and allows water to flow through it.
aquitard	An underground layer of clay, silt or rock with low permeability which restricts the movement of groundwater between aquifers.
assets	Assets are resources that provide benefit. This includes, for example, infrastructure such as treatment plants, pipes and pumps, water assets such as dams, bores and wetlands, and community assets such as sporting facilities, public gardens and street trees. Natural assets are assets of the natural environment, for example waterways and vegetation, also known as natural capital.
Australian Drinking Water Guidelines	Published by the National Health and Medical Research Council and the Natural Resource Management Ministerial Council in 2011.
Australian Height Datum (AHD)	In 1971 the mean sea level for 1966–68 was assigned the value of zero on the Australian height datum at 30 tide gauges around the coast of the Australian continent. The resulting datum surface, with minor modifications in two metropolitan areas, was termed the Australian height datum and was adopted by the National Mapping Council of Australia as the datum to which all vertical control for mapping is to be referred. Elevations quoted using this datum are normally followed with the acronym 'AHD'.
Australian National Committee on Large Dams	A voluntary association of organisations and individual professionals with an interest in dams in Australia.
Authority	An Authority in relation to a bulk entitlement holder under the Victorian Water Act, includes a water corporation, the Minister for Environment and Climate Change, and a power generation company.
barriers	Artificial instream structures, such as dams, weirs, causeways and culverts that restrict the migration and movement of fish or other biota and can interrupt transport of organic material and sediment.
baseline	Conditions regarded as a reference point for the purpose of comparison.
baseline diversion limit	In the Murray-Darling Basin Plan the baseline limit of take from a SDL resource unit is: (a) for a surface water SDL resource unit – the quantity of water calculated in accordance with column 2 of the table in Schedule 3 for that SDL resource unit; and (b) for a groundwater SDL resource unit – the quantity of water specified in column 3 of the table in Schedule 4 for that SDL resource unit.

Term	Definition
basic right	In the Murray-Darling Basin Plan a basic right means any of the following: (a) a right under State water management law to take water for domestic or stock purposes; (b) a harvestable right under the Water Management Act 2000 (New South Wales); (c) a native title right.
Basin (river basin)	The area of land into which a river and its tributaries drain. In the Victorian Water Accounts, river basins are consistent with those defined by the Australian Water Resources Council. The exception is the Murray Basin which, for the purposes of this report, includes the Upper Murray Basin as defined by AWRC and areas in Victoria supplied from the Murray River downstream of Lake Hume.
Basin annual environmental watering priorities	In the Murray-Darling Basin Plan the basin annual environmental watering priorities has the meaning given in section 8.27.
Basin Plan	The Basin Plan 2012 made under the Commonwealth Water Act that was registered on the Federal Register of Legislative Instruments on 23 January 2017 with reference F2017C00078.
Basin State	For the purposes of the Basin Plan, the Basin States are defined in the Commonwealth Water Act as New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory.
Basin water resources	Under the Commonwealth Water Act, Basin water resources are within or beneath the Murray-Darling Basin, but do not include water resources within or beneath the Basin that are prescribed by the regulations, or groundwater that forms part of the Great Artesian Basin.
Basin-wide environmental watering strategy	In the Murray-Darling Basin Plan the Basin-wide environmental watering strategy has the meaning given in section 8.13.
beneficial use	The use to which water resources are applied including environmental, consumptive, Aboriginal and social.
best available information and methods	Those methods expertly judged to be the most appropriate and technically sound for the purpose. These judgments may be informed by peer review. If there is no available knowledge or analysis, it is expected that water planning agencies will use their own expertise to reach a position or seek expert advice from reputable sources.
biodiversity	The numbers and variety of plants, animals and other living beings, including microorganisms, across our land, rivers and oceans. It includes the diversity of their genetic information, the habitats and ecosystems in which they live and their connections with other life forms.
blackwater	Occurs when accumulations of organic matter, such as leaves, twigs and nutrients, decays in wetlands or waterways after being washed in by a flood, drawing oxygen from the water. The water turns to a black colour and can have a very low level of dissolved oxygen, which can cause stress to fish, crayfish and other animals.



Term	Definition
bore	Usually a hole constructed by a licensed driller to reach groundwater. Bores can also include a well or artificial excavation. Any person who wants to drill a bore must have a works licence.
brackish water	Water that is saltier than freshwater, but not as salty as seawater. It may result from the mixing of seawater with freshwater, as in estuaries.
bulk entitlement	The right to water held by the Authorities defined in section 34 of the Victorian Water Act. A bulk entitlement sets the amount of water from a river or storage to which an Authority is entitled, and may include the rate at which it may be taken and the reliability of the entitlement. Bulk entitlements also define a right to use and supply water in a waterway, water in storage works of a water corporation, and groundwater. A bulk entitlement sets out the amount of water that can be taken or stored under specific conditions or specifications, up to a maximum volume. Water corporations and other specified bodies defined in the Victorian Water Act can hold bulk entitlements, as a source bulk entitlement (an entitlement to harvest water directly from a water source) or a delivery bulk entitlement (an entitlement to be supplied water from another water corporation's dam or within a system regulated by the works of another corporation). Bulk entitlements can be traded temporarily or permanently.
bulk entitlement conversion order	The statutory instrument used to issue a bulk entitlement under the provisions of section 47 of the Victorian Water Act where the entitlement holder had a long standing legal right to water in a waterway.
bulk entitlement holder	Water corporations, the Victorian Environmental Water Holder and other bodies specified in the Victorian Water Act, such as electricity generation companies, can hold a bulk entitlement. Bulk entitlement holders have to meet conditions and obligations set out under the Act and in their bulk entitlements.
bundled entitlement	A take and use licence that allows the take and use of water.
cap	An upper limit for the diversion of water from a waterway, catchment, basin or aquifer.
Cap (the Cap on diversions)	A limit, implemented in 1997, on the volume of surface water that can be diverted from rivers for consumptive use. Under the Basin Plan, the Cap will be replaced by long-term average sustainable diversion limits.
carryover	An authorisation by the Minister for Water that allows irrigators manage their water entitlement more flexibly by taking a portion of water unused in one season in the next water season.
catchment	The region from which all rainfall flows, other than that removed by evaporation, into waterways and then to the sea or terminal lake.

Term	Definition
catchment dam	A pond, lake or basin, whether natural or artificial, for the storage, regulation and control of water in an area of land where runoff from rainfall goes into one river system.
catchment management authorities (CMAs)	Statutory bodies established under the <i>Catchment and Land Protection Act 1994</i> . CMAs have responsibilities under both that Act and the Victorian Water Act for river health; regional and catchment planning and coordination; and waterway, floodplain, salinity and water quality management.
cause	An event that can lead to a threat.
climate change	An extended period (typically decades or longer) where there is a statistically significant change to the expected characteristics (averages and/or variability) of a region's climate.
commercial plantation	In the Murray-Darling Basin Plan a commercial plantation means an area of land on which perennial woody plants are planted primarily for commercial purposes (other than the production of food). Some examples of commercial purposes are the production of timber, woodchip, oil or biofuel, or the commercial exploitation of the carbon sequestration capacity of the plants.
Commonwealth Water Act	Means the <i>Water Act 2007</i> (Commonwealth). The legislation that established the Murray-Darling Basin Authority to manage the Basin's water resources and prepare the Basin Plan. It also established the Commonwealth Environmental Water Holder to manage the Commonwealth's environmental water, charged the Australian Competition and Consumer Commission to develop and enforce water charges and water market rules, and gave the Bureau of Meteorology powers to collect and publish water information.
community	Includes individuals, public and private landholders, community groups and business owners.
condition of water resource	Includes the water quality and the health of water-dependent ecosystems and condition of the physical habitats.
connectivity	Connections between natural habitats, such as a river channel and adjacent wetland areas. Connectivity is a measure or indicator of whether a waterbody (river, wetland, floodplain) has water connections or flow connections to another body.
consequence	The impact of a threat on a beneficial use of water.
consistent	Agreeing or accordant; compatible; not self-opposed or self-contradictory.
constraints	Anything that affects the delivery of environmental water. It can include physical aspects such as low-lying bridges or river channel capacity, but can also include operational aspects such as river rules or operating practices that impact on when and how much water can be delivered.
consumption	Water that is provided for all human uses; that is, non-environmental water.

Term	Definition
consumptive entitlement	A water entitlement that permits the holder to use the water taken under the entitlement for the purposes of consumption.
consumptive use	Use of water for irrigation, industry, urban, domestic and stock use, or for other private consumptive purposes.
Country	Aboriginal culture revolves around relationships to the land and water. For Traditional Owners, Country is a part of who they are, just as they are a part of it.
critical human water needs	Under the Commonwealth Water Act, the minimum amount of water required to meet core requirements of communities dependent on Basin water resources. The definition also includes non-human requirements that, if not met, would cause prohibitively high social, economic or national security costs. In Victoria, as a matter of practise, this means the amount of water required to supply stage 4 restricted demand in urban areas, supply domestic and stock needs and operate the distribution system to deliver that water.
Crown land	Land that is owned by the Crown. Often referred to as public land (although not all public land is actually Crown land).
Dam	A structure built across a river or creek to obstruct the flow of water and form a water storage.
declared water system	A water system that has been declared in accordance with section 6A of the Victorian Water Act. In these water systems, the old water rights and take and use licences have been converted into unbundled entitlements (water shares and associated products). Current declared water systems are: Broken, Bullarook, Campaspe, Goulburn, Loddon, Murray and Ovens, which were all declared in July 2007, and the Werribee and Thomson/Macalister (July 2008).
delivery bulk entitlement	Provides a set volume of water each year to the entitlement holder, subject to defined rules for restricting supply during periods of water shortages.
delivery system/network	The infrastructure or river system that enables water to get to entitlement holders. This means an irrigation area, or for a river reach for private diverters, a catchment or aquifer.
dissolved oxygen	The oxygen dissolved in water and freely available for use by aquatic organisms. It is vital for the survival of fish, invertebrates, bacteria, and underwater plants.
distribution system operating water	Water used to operate the irrigation distribution system from river off-take to the farm gate, including evaporation, seepage, leakage, outfalls and meter error (see also system operating water).
diversions	The removal of water from a waterway, for example via a pump.
domestic and stock	Water used in households and for pets, other animals, fire prevention, and for irrigating a kitchen garden.
drought response plans	Used by urban water corporations to manage water shortages, including implementation of water restrictions.

Term	Definition
Drought Support Fund	A cross-government initiative to provide support to drought-affected farmers.
ecological objective	Under the Basin Plan an ecological objective means an objective for the protection, and if necessary restoration, of a priority environmental asset or ecosystem function.
ecological target	Under the Basin Plan an ecological target means a target that must be met in order to achieve an ecological objective.
ecosystem	A dynamic complex of plant, animal, fungal and microorganism communities and the associated non-living environment interacting as an ecological unit.
efficiency measure	These measures provide more water for the environment by making water delivery systems for irrigation more efficient. This can include replacing or upgrading on-farm irrigation, or lining channels to reduce water losses within an irrigation network.
electrical conductivity	Expressed in microsiemens per centimetre ($\mu\text{S}/\text{cm}$). Water and soil salinity levels are measured by passing an electric current between the two electrodes of a salinity meter. Electrical current (EC) is influenced by the concentration and composition of dissolved salts. Salts increase the ability of a solution to conduct an electric current, so a high EC indicates a high salinity level. Freshwater above 800 EC becomes marginal for drinking, above 1,600 EC it is brackish, and above 4,800 EC it is saline.
entitlement (or water entitlement)	Authorisation to take water issued in accordance with the Victorian Water Act. It includes bulk entitlements, environmental entitlements, water shares, and surface water and groundwater licences (also known as take and use licences). In Victoria, a take and use licence is a right to take water and which may be limited by conditions. Different entitlements are necessary depending on where and how water is taken, and what it is used for. The most common types of entitlements for individuals are water shares, and take and use licences. These are included in the definition of water access right in the Commonwealth Water Act.
environment	Surroundings in which an organisation operates including air, water, land, natural resources, flora, fauna, humans and their interdependence.
environmental asset (in the context of the 'asset-based approach')	A spatially defined, biophysical component of the environment (for example, a river reach, an estuary or an individual wetland or wetland complex) that has particular values associated with it.
environmental contribution	Funds collected by water corporations under the <i>Water Industry Act 1994</i> to promote the sustainable management of water or address adverse water-related environmental impacts.



Term	Definition
environmental entitlement	A right to take water granted to the Victorian Environmental Water Holder to maintain an environmental water reserve or to improve the environmental values and health of the water ecosystems and other users depending on the condition of the environment. The <i>Water (Resource Management) Act 2005</i> amended the Victorian Water Act and created the foundation for water to be set aside to maintain environmental values of rivers and streams. The Minister for Water issues environmental entitlements under the Act so that water can be managed to meet environmental needs including fish-spawning or maintaining critical habitats during drought.
environmental flow	Any river flow pattern provided with the intention of maintaining or improving river health. In practice in Victoria this means the streamflow required to maintain appropriate environmental conditions in a waterway.
environmental flow studies	The study of the flow requirements of a particular basin's river and wetland systems used to inform policy decisions on the management and allocation of water resources.
environmental manager	The government agency, such as the Department of Environment, Land, Water and Planning or catchment management authority, responsible for environmental outcomes for a relevant waterway.
environmental water	Water to support environmental values and ecological processes.
environmental water manager	The government agency responsible for the management of held environmental water including the VEWH, CEWH, MDBA and CMAs.
Victorian Environmental Water Holder	A body established to hold and manage environmental entitlements.
environmental water requirements	The amount of water needed to meet an ecological or environmental objective.
environmental water reserve	The share of water resources set aside to maintain the environmental values of a water system and other water services that depend on the environmental condition of the system.
Environmental Watering Plan	A plan to restore and sustain the wetlands and other environmental assets of the Murray-Darling Basin and to protect biodiversity dependent on the Basin water resources.
environmental watering requirements	Under the Basin Plan, environmental watering requirements means the environmental watering requirements of a priority environmental asset or priority ecosystem function, as the case may be, identified using the methods set out in Part 5 of Chapter 8.

Term	Definition
environmentally sustainable level of take	Defined by section 4 of the Commonwealth Water Act as the level at which water can be taken from a water resource which, if exceeded, would compromise: (a) key environmental assets of the water resource, or (b) key ecosystem functions of the water resource, or (c) the productive base of the water resource, or (d) key environmental outcomes for the water resource.
estimate	To form an approximate judgment or opinion regarding the value, amount, size, weight, etc. of; calculate approximately. The key requirements for an estimate to be made are that it needs to be done by a competent and experienced person; it needs to be capable of being estimated and needs to be reasonable; and it needs to be revised from time to time in the light of available information.
evaporation	The process by which water changes from a liquid to a gas or vapour.
evapotranspiration	The sum of transpiration by plants, evaporation from soil and open water surfaces, and evaporation from the wet surfaces of plants soon after rainfall.
extraction licence	Better referred to as a works licence, or a works operating licence.
farm dam	An on-farm water storage managed by the landowner or occupier.
fit-for-purpose (water quality)	Water of a quality that is appropriate for its intended use.
floodplain	Low-lying land next to a river or stream with unique ecosystems dependent on overflow from flooding.
floodplain harvesting	The taking of water from a floodplain, including after it leaves a watercourse during a flood.
flow	Movement of water – the rate of water discharged from a source, given in volume with respect to time.
flow regime	The range of flows experienced by a waterway throughout the seasons and years, which may include base flows, low flows, high flows, overbank flow and cease to flow (drying) events.
form of take	In the Murray-Darling Basin Plan form of take means any of the following: (a) take from a watercourse; (b) take from a regulated river; (c) take by floodplain harvesting; (d) take by runoff dams; (e) net take by commercial plantations; (f) take from groundwater; (g) take under basic rights.



Term	Definition
gigalitre	One thousand megalitres or One billion (1,000,000,000) litres.
greywater	Household water that has not been contaminated by toilet discharge, and can be reused for non-drinking purposes. Typically includes water from bathtubs, dishwashing machines and clothes washing machines.
groundwater	Water occurring naturally below ground level (in an aquifer or otherwise).
groundwater basin	A groundwater basin is made up of one or more groundwater catchments within a geological basin. The basin may extend offshore or across state boundaries. In some cases, a basin may be broken into one or more sub-basins to reflect administrative management boundaries.
groundwater catchment	A groundwater catchment is an area containing a connected groundwater resource(s), bringing together the input (recharge) areas, use (demand) areas and discharge areas.
groundwater-dependent ecosystem	Natural ecosystems that require access to groundwater to meet all or some of their water requirements in order to maintain their ecological processes.
groundwater entitlement limit	The total volume of water which can be allocated in an aquifer under licences. May be defined by a permissible consumptive volume (PCV) declared by the Minister for Water.
groundwater management area (GMA)	An area where groundwater resources of a suitable quality for irrigation, commercial or domestic and stock use have been developed (or have the potential to be developed) and warrant careful management. It has a defined boundary, depth limits and a permissible consumptive volume.
groundwater management plan	A groundwater management plan is developed by rural water corporations consistent with guidelines specified by the Minister for Water, and signed off by the Minister. A groundwater management plan is for an area with a permissible consumptive volume and includes appropriate tools for management such as trading rules, triggers for restrictions and monitoring requirements.
groundwater management unit	A discrete area – either a groundwater management area, a water supply protection area or an unincorporated area – identifying an aquifer or group of aquifers.
groundwater resource	In the Murray-Darling Basin Plan a groundwater resource means a Basin water resource consisting of: (a) groundwater; or (b) an aquifer (whether or not it has water in it).
groundwater SDL resource unit	In the Murray-Darling Basin Plan a groundwater SDL resource unit has the meaning given in section 6.03.

Term	Definition
Guidelines for Managing Risks in Recreational Water	The Guidelines for Managing Risks in Recreational Water published by the National Health and Medical Research Council.
habitat	The natural home or environment of an animal, plant, or other organism.
have regard to	Discussed in the note in section 1.07 of the Basin Plan: A number of provisions of the Basin Plan require decision-makers to 'have regard to' certain matters when performing functions and making decisions. The phrase 'have regard to' and similar phrases are intended to be interpreted consistent with case law, as it develops from time to time and as applied with appropriate regard to the circumstances. This note is intended to reflect the case law and not to limit its application or development. When a decision-maker is required to 'have regard to' particular matters, it is expected that the decision-maker will give those matters proper, genuine and realistic consideration, even if not ultimately bound to act in accordance with those matters. A requirement to 'have regard to' a particular matter or matters does not mean that the decision-maker cannot have regard to other relevant matters.
headworks	Large dams, weirs and associated works used for the harvest and supply of water.
hectare	Ten thousand square metres or approximately 2.47 acres
held environmental water	Defined by section 4 of the Commonwealth Water Act as water available under: (a) a water access right, or (b) a water delivery right, or (c) an irrigation right for the purposes of achieving environmental outcomes (including water that is specified in a water access right to be for environmental use).
heritage river	A river protected in Victoria for its special features under the <i>Heritage Rivers Act 1992</i> .
high-reliability water share	An entitlement to a defined share of water as governed by the water-sharing rules. Water shares are classed by their reliability, which is defined by how often full seasonal allocations are expected to be available. Allocations are made to high-reliability water shares before low-reliability shares.
historical climate conditions	The climatic conditions for the period July 1895 to June 2009 represented by the best available records of hydrological and meteorological information for that period.
hydrogeological assessment	An assessment of the groundwater resource that has to be done before a new licence is issued or a transfer of a licence is approved.
hydrological modelling	Simplified, conceptual representations of a part of the hydrologic cycle, used primarily for prediction of water behaviour within catchments and associated water supply systems.



Term	Definition
hydrological regime	Changes with time in the rates of flow of rivers and in the levels and volumes of water in rivers, lakes, reservoirs and wetlands. The hydrologic regime is closely related to seasonal changes in climate.
hydrology	The scientific study of water and its movement, distribution and quality.
Indigenous uses	In the Murray-Darling Basin Plan Indigenous uses has the meaning given in section 10.52.
Indigenous values	In the Murray-Darling Basin Plan Indigenous uses values has the meaning given in section 10.52.
inflows	Water flowing into a storage or waterway.
instream	The component of a river within the river channel, including pools, riffles, woody debris, the river bank and benches.
integrated catchment management	The coordinated management of land, water and biodiversity resources based on catchment areas. It incorporates environmental, social, cultural and economic considerations. This approach seeks to ensure the long-term viability of natural resource systems and human needs across current and future generations.
integrated water management	A collaborative approach to planning that brings together all elements of the water cycle including sewage management, water supply, stormwater management and water treatment, considering environmental, economic and social benefits.
interception activity	Defined by section 4 of the Commonwealth Water Act as the interception of surface water or groundwater that would otherwise flow, directly or indirectly, into a watercourse, lake, wetland, aquifer, dam or reservoir that is a Basin water resource
irrigation area	A geographic area with defined boundaries where water is distributed using pipes and channels operated by a water corporation.
irrigation district	An area declared under the Victorian Water Act that is supplied with water by channels and pipelines used mainly for irrigation purposes.
levee	An embankment that is built in order to prevent a river from overflowing.
licensing authority	Administers diversion of water from unregulated waterways and extraction of groundwater on behalf of the Minister for Water. Also known as a water corporation and referred to in the Victorian Water Act as an 'Authority'.
likelihood	The combination of the probability of a cause occurring and the susceptibility of the threat to that cause
listed threatened ecological community	In the Murray-Darling Basin Plan listed threatened ecological community has the meaning given in section 528 of the <i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i> .
listed threatened species	In the Murray-Darling Basin Plan Listed threatened species has the meaning given in section 528 of the <i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i> .

Term	Definition
local management plan or local management rules	A local management plan or local management rules have been made for many areas with a permissible consumptive volume. They refer to appropriate tools such as trading rules, triggers for restrictions and monitoring requirements. Local management plans or rules are developed and adopted by rural water corporations.
local reduction amount, for an SDL resource unit	In the Basin Plan local reduction amount, for an SDL resource unit means: (a) the quantity of water identified in column 2 of Schedule 2 as the local reduction amount for the unit; or (b) if no quantity is identified – zero.
long-term annual diversion limit	Item 7 of section 22 of the Commonwealth Water Act provides the following: definition for the long-term annual diversion limit: For the water resources, or particular parts of the water resources, of each water resource plan area, the long term annual average quantities of water that may, on a temporary basis, be taken year by year from the water resources, or particular parts of the water resources, in addition to the long-term average sustainable diversion limit for those water resources or that particular part. The average is the temporary diversion provision for those water resources or that particular part. The sum of: (a) the long-term average sustainable diversion limit; and (b) the temporary diversion provision
long-term average sustainable diversion limit	Defined by section 23 of the Commonwealth Water Act (1) A long-term average sustainable diversion limit for the Basin water resources, for the water resources of a particular water resource plan area or for a particular part of those water resources must reflect an environmentally sustainable level of take. (2) A long-term average sustainable diversion limit for the Basin water resources, for the water resources of a particular water resource plan area or for a particular part of those water resources may be specified: (a) as a particular quantity of water per year, or (b) as a formula or other method that may be used to calculate a quantity of water per year, or (c) in any other way that the Authority (ie the MDBA) determines to be appropriate.
long-term watering plan	In the Murray-Darling Basin Plan long-term watering plan has the meaning given in section 8.18 of the Commonwealth Water Act.
low flow	Flows that provide a continuous flow over the bottom of the channel, but do not fill the channel to any great depth. The term is most often used in relation to baseflows that occur over the drier periods of the year that are sustained for some period (weeks to months), due to short bursts of rain.



Term	Definition
lowland	Lowland rivers and streams are slow flowing and found in relatively flat areas.
low-reliability water share	A water share with a relatively low reliability of supply. In northern Victoria, these shares are allocated from the available water once there is enough water to meet higher-reliability water shares in the current year, and, with minimum inflows, to meet higher-reliability water shares in the following year.
macroinvertebrate	An animal without a backbone that is large enough to be seen without magnification.
major storages	In the Murray-Darling Basin Plan major storage has the meaning given in clause 2 of the Murray-Darling Basin Agreement that is: "Lake Victoria, the Menindee Lakes Storage and the storages formed by Dartmouth Dam and Hume Dam".
megalitres (ML)	One million (1,000,000) litres.
Millennium Drought	The drought in Victoria from 1997 to 2009.
modelling	Application of a mathematical process or simulation framework (such as a mathematical or econometric model) to describe various phenomena and to analyse the effects of changes in some characteristics on others.
Murray Lower Darling Rivers Indigenous Nations (MLDRIN)	A confederation of Indigenous Australian nations in the southern part of the Basin.
Murray-Darling Basin cap	The climatically adjusted limit on surface water diversions in the Murray-Darling basin, agreed by a Ministerial Council under the Murray-Darling Basin Agreement.
Nephelometric Turbidity Unit	A measure of turbidity in water
net take	In the Murray-Darling Basin Plan in the context of a commercial plantation net take is the difference between the take by a commercial plantation and the take by the vegetation existing at the plantation site before the plantation commenced.
overbank flows	Flows that spill over the channel on to the floodplain.
passing flow	Flows that a water corporation must allow to pass at a dam or weir before it can take any water for consumptive use. Passing flow requirements are specified as obligations in bulk entitlements, and entitlement holders must report on their compliance with these requirements.
pathogens	Disease-causing microorganisms, such as bacteria, fungi and viruses, found commonly in sewage, hospital waste, runoff water from farms, and in water used for swimming.
percent full	The volume of water in storage as a percentage of the accessible storage capacity. Note that the percentage full may exceed 100, for example due to floods.

Term	Definition
permanent trade	Permanent transfer of a bulk entitlement, water share or licence.
permissible consumptive volume	The total amount of water that can be taken in a specified water system. A permissible consumptive volume, or PCV, is declared by the Minister by Order published in the Victoria Government Gazette. PCVs can apply to surface water, groundwater or both.
planned environmental water	Section 6 of the Commonwealth Water Act says: (1) For the purposes of this Act, planned environmental water is water that: (a) is committed by: (i) the Basin Plan or a water resource plan for a water resource plan area; or (ii) a plan made under a State water management law; or (iii) any other instrument made under a law of a State; to either or both of the following purposes: (iv) achieving environmental outcomes; (v) other environmental purposes that are specified in the plan or the instrument; and (b) cannot, to the extent to which it is committed by that instrument to that purpose or those purposes, be taken or used for any other purpose. (2) For the purposes of this Act, planned environmental water is water that: (a) is preserved, by a law of a State or an instrument made under a law of a State, for the purposes of achieving environmental outcomes by any other means (for example, by means of the setting of water flow or pressure targets or establishing zones within which water may not be taken from a water resource); and (b) cannot, to the extent to which it is preserved by that instrument for that purpose or those purposes, be taken or used for any other purpose. (3) The water may be committed to, or preserved for, the purpose or purposes referred to in paragraph (1)(a) or (2)(a) either generally or only at specified times or in specified circumstances. (4) Without limiting paragraph (1)(b) or (2)(b), the requirements of paragraph (1)(b) or (2)(b) are taken to have been met even if the water is taken or used for another purpose in emergency circumstances in accordance with: (a) the instrument referred to in that paragraph; or (b) the law under which the instrument is made; or (c) another law.
point source	Any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack.
potable	Water of suitable quality for drinking.



Term	Definition
pre-release	Controlled releases from a storage made on the expectation that forecast inflows will replenish the volume released. Pre-releases are used to control the rate of discharge and to provide some space in the dam to capture floodwaters.
priority ecosystem function	In the Murray-Darling Basin Plan priority ecosystem function has the meaning given in section 8.50.
priority environmental asset	In the Murray-Darling Basin Plan priority environmental asset has the meaning given in section 8.49.
private right	The Victorian Water Act allows individuals to take water for domestic and stock purposes from a range of surface water and groundwater sources without a licence in specified circumstances. These domestic and stock rights are defined under section 8(1) and section 8(4)(c) of the Act.
probability	The chance that a cause will occur.
qualification of rights	The Minister for Water has the power (under section 33AAA of the Victorian Water Act) to qualify rights to water temporarily to maintain essential supplies where the Minister has declared that a water shortage exists in an area or water system. Where the water shortage is due to a long-term change to water availability, a permanent qualification of rights may be declared under section 33AAB of the Act but only following a long-term water resources assessment which finds the long-term water availability will have a disproportionate effect on water allocated for consumptive purposes or the Environmental Water Reserve.
rainwater	Water that has fallen as rain or has been collected from rainfall.
Ramsar convention	Defined by section 4 of the Commonwealth Water Act as the Convention on Wetlands of International Importance especially as Waterfowl Habitat done at Ramsar, Iran, on 2 February 1971.
Ramsar site	Wetlands of international importance, designated under the Ramsar convention.
Ramsar wetlands	Wetlands of international importance, designated under the Ramsar convention.
raw water	In the Murray-Darling Basin Plan raw water is water in its natural state prior to any treatment.
reach	A length of stream, typically 20 to 30 km, which is relatively homogenous with regard to the hydrology, physical form, water quality and aquatic life.
REALM model	A computer-based water supply system model used by DELWP in the allocation of Victoria's water resources. It is an abbreviation of REsource ALlocation Model.
recharge (groundwater)	The process where water moves downward from surface water to groundwater due to rainfall infiltration or seepage/ leakage.

Term	Definition
reconfiguration or decommissioning work	Under the Murray-Darling Basin Plan reconfiguration or decommissioning work has the meaning given in section 12.29.
recovery of environmental water	Under the Murray-Darling Basin Plan recovery of environmental water means the acquisition of a water access right for the purpose of achieving an environmental outcome.
recreational benefits or recreational values	The objectives and benefits that recreational users and community members associate with the use of water, reservoirs and waterways for recreational activities. These objectives and benefits include wellbeing and enjoyment, derived from social interaction, physical activity and relaxation associated with activities including sporting events, fishing, water skiing and rowing, camping, walking and gathering with friends and family. It also includes flow-on economic benefits to local communities from visitors to regional areas to make the most of these opportunities.
recreational fishing	Fishing of aquatic animals (mainly fish) for pleasure or competition.
recreational users	Victorians and other visitors that use Victorian waters for fishing, water skiing, rowing, camping, walking, bird watching, sporting events, social gatherings and other activities on or near waterways.
recreational water	Water allocated in a regulated water system for recreational purposes.
recycled water	Water (derived from sewerage systems or industry processes) that is treated to a standard appropriate for its intended use.
refuge	Areas where plants and animals can take refuge, during times of climatic or biological stress and which support the individuals that will recolonise the surrounding landscape when conditions improve. Refuges provide conditions suitable for survival of species that may be declining elsewhere.
registration licence	A registration licence is an ongoing entitlement to take and use water from a catchment dam, spring or soak. Registration licences were issued between 1 July 2002 and 30 June 2003 based on historical use of water. Registration licences are not tradeable.
regulated flows/ systems	Systems where the flow of the river is regulated through the operation of large dams or weirs.
regulated river	A river containing structures such as dams or major diversion weirs which control the flow of water in the river for licensed diverters or users in an irrigation district.
regulated system	Systems where the flow of the river is regulated through the operation of large dams or weirs.
reliability	Water shares are classed according to their reliability, which is defined by the frequency with which full seasonal allocations are expected to be available. Most water shares are classified as high-reliability or low-reliability water shares.
reserve policy	Setting water aside on regulated water systems for use the following season before full allocations are made on all entitlements.



Term	Definition
reserve rules	Rules that govern the balance between water allocated to entitlement holders in a given year and water kept in reserve for the following year.
reservoir	Natural or artificial dam or lake used for the storage and regulation of water.
resource manager	The Minister for Water may appoint a resource manager to allocate water on regulated river systems in accordance with Victorian water sharing rules. A resource manager makes seasonal determinations for regulated water systems based on water availability and water sharing rules. The resource manager is usually the water corporation responsible for that area.
restrict	In relation to trade, includes refuse, prevent, deter, delay or impose a condition or a barrier on, and restriction has a corresponding meaning.
reticulated supply	The network of pipelines or channels used to deliver water to end users.
return flows	The portion of water that 'returns' to the river (or water supply) system after a watering event.
riparian	Refers to land or vegetation that adjoins a river, creek, estuary, lake or wetland.
risk	The product of the likelihood and consequence. For the purpose of the risk assessment conducted when developing the WRP, it is the combination of the impact of a cause on a threat and the impact of a threat on a beneficial use.
river	Large stream of water flowing to the sea, a lake, a marsh or another river.
river basin	The land into which a river and its tributaries drain. See also 'basin'.
Murray River system	The Murray River system extends from Hume Dam, at Albury, New South Wales, downstream to the Coorong, Lower Lakes and Murray Mouth in South Australia. It includes connected anabranches, creeks and major tributaries such as the Murrumbidgee, Edward-Wakool, Kiewa, Ovens, Goulburn, Broken, Campaspe, Loddon, Avoca and the lower Darling River (south of Menindee Lakes). The system is highly regulated and requires complex river management operations.
river operating water	Water used to operate regulated rivers (in accordance with bulk entitlements) and deliver water to off-take points for distribution systems, including evaporation, seepage and water to provide passing flows for riparian rights and maintain environmental and other assets.
runoff	Precipitation or rainfall that flows from a catchment into streams, lakes, rivers or reservoirs.
runoff dam	In the Murray-Darling Basin Plan a runoff dam means a dam or reservoir that collects surface water flowing over land. In New South Wales, a runoff dam may also collect water from a first or second-order stream.
salinity	The total amount of water-soluble salts present in the soil or a stream.

Term	Definition
salt interception scheme	Large-scale groundwater pumping and drainage projects that intercept saline groundwater inflowing to rivers, and dispose of the saline waters by evaporation and aquifer storage at more distant locations.
scenario	When performing the risk assessment, a range of possible future situations that affect whether a cause is realised we developed and applied. The criteria adopted include: • a plausible scenario that produces the highest risk (e.g. extreme drought); and • an extrapolation of past trends (e.g. farm dams, land use); or • scenarios that are adopted in recognised literature (e.g. median climate change).
SDL resource unit	In the Murray-Darling Basin Plan the SDL resource unit means the water resources, or particular parts of the water resources, of a Water Resource Plan area that is either a surface water SDL resource unit or groundwater SDL resource unit.
seasonal allocation	Volume of water available to an entitlement holder for a water year, as determined by the relevant water corporation and often expressed as a percentage of the entitlement volume. Sometimes shortened to 'allocation'.
seasonal determination	The percentage of water share volume available under current resource conditions determined by the resource manager for unbundled systems. Since 1 July 2012 the resource manager has used seasonal determination instead of the previously used 'seasonal allocation'. This is to distinguish between water available under current resource conditions and that which the water customers have available because of carryover.
section 40 assessment	Section 40 of the Victorian Water Act contains a list of matters that must be taken into account when a new licence is applied for or a licence transfer is being considered. For example, section 40 matters include consideration of other people's rights and the environment. Section 53 also sets out matters to be taken into account.
section 51 licence	A section 51 licences (otherwise known as a take and use licence) is a fixed term to take and use water from a waterway, catchment dam, spring, soak or aquifer. Each licence includes conditions set by the Minister for Water.
sensitivity	The strength of the relationship between a threat and a beneficial use.
sewage	The waterborne wastes of a community.
sewerage	The system of pipes and plants that collect, remove, treat and dispose of liquid urban waste.
shared benefits	Water that is managed primarily to meet the needs of the entitlement holder but provides other benefits through decision-making that deliberately targets other outcomes.



Term	Definition
significant hydrological connection	Hydrologic connectivity is the physical ability for water to move between locations, and includes the effect of the losses and constraints on flow along the way. A significant hydrological connection is one that is of consequence to the matter to be addressed through a specific requirement. Hydrologic connectivity may occur in a number of ways, including: • longitudinally along rivers and laterally between rivers and their floodplains (and associated wetlands) and anabranches • laterally and longitudinally with connected rivers • between surface water and groundwater, or between groundwater systems • by way of infrastructure that connects water resources. For the purposes of Chapter 10 of the Basin Plan, such a connection will be considered significant if the connection is of consequence to the effective management of Basin water resources and is relevant to the requirements of Chapter 10.
small catchment dam	A farm dam that is filled from its own catchment and not located on a waterway. This includes dams used for domestic and stock purposes which are not required to be licensed and dams used for commercial and irrigation use, which are now required to be registered (under the Victorian Water Act).
source bulk entitlement	A type of bulk entitlement held by water corporations to provide a share of inflows, storage capacity (if applicable) and releases.
South Australia/ Victoria Designated Area	Area extending 20 km either side of the border between South Australia and Victoria, as set out under the Groundwater (Border Agreement) Act 1985, established for the cooperative management and equitable sharing of groundwater resources between the states.
Statement of Obligations	Statements made under section 41 of the <i>Water Industry Act 1994</i> that specify the obligations of Victoria's water corporations in relation to the performance of their functions and the exercise of their powers.
storage losses	Water lost from storages through evaporation, seepage and spills.
storage manager	The water corporation that manages water storage. A storage manager may be appointed under section 122ZK of the Victorian Water Act where water in the storage is shared between entitlement holders.
stormwater	Runoff from urban areas. The net increase in runoff from urban development due to water not being able to seep into the ground because of impervious surfaces, such as roofs and roads.
stream	A body of water flowing in a bed, river or brook.
streamflow management plan	Prepared for a water supply protection area to manage the surface water resources of the area.
supply by agreement	An agreement made under section 124(7) of the Victorian Water Act between a water corporation and a person to supply water from the works of the water corporation.

Term	Definition
surface water	Under section 4 of the Commonwealth Water Act this includes: (a) water in a watercourse, lake or wetland, and (b) any water flowing over or lying on land: (i) after having precipitated naturally, or (ii) after having risen to the surface naturally from underground.
surface water resource	A Basin water resource consisting of: (a) surface water; or (b) a watercourse, lake or wetland (whether or not it has water in it).
surface water SDL resource unit	In the Murray-Darling Basin Plan Surface water SDL resource unit has the meaning given in section 6.02.
susceptibility	The strength of the relationship between a cause and a threat.
sustainable diversion limit	Generally, sustainable diversion limits are the maximum long-term average quantities of water that can be taken each year for consumptive use from the Murray-Darling Basin. The Commonwealth Water Act requires that the limits reflect an environmentally sustainable level of take. The final Murray-Darling Basin Plan agreed by all Basin States sets a sustainable diversion limit for each catchment and aquifer in the Basin, as well as an overall limit for the whole Basin. In northern Victoria (the southern Basin), this means a sustainable diversion limit is the upper limit on the amount of surface water and groundwater that can be taken for consumptive use within an unregulated river sub-catchment. Sustainable diversion limits will operate from 2019 and will replace the current cap system in the southern Basin.
sustainable diversion limit adjustment mechanism	Allows the sustainable diversion limit to be adjusted under certain circumstances.
sustainable water strategies	Regional long-term planning documents legislated under the Victorian Water Act , to address threats to, and identify opportunities to improve water security and river health outcomes.
system operating water	Water released out of storages to operate river and distribution systems (to deliver water to end users), provide for riparian rights and maintain environmental values and other community benefits (see also Storage losses, distribution system operating water, river operating water).
take	Take is the removal of water from, or the reduction in flow of water into, a water resource.
take and use licence	A take and use licence (otherwise known as a section 51 licences) is a fixed term to take and use water from a waterway, catchment dam, spring, soak or aquifer. Each licence includes conditions set by the Minister for Water.

Term	Definition
take and use licence transfer	There are two types of transfer for a take and use licence: 1. permanent transfer; and 2. temporary transfer.
target application zone	In the Murray-Darling Basin Plan target application zone has the meaning given in section 9.16.
temporary trade	Temporary transfer of a licence or, in a declared water system, transfer of a seasonal allocation.
terminal lakes	Lakes which form the end point of all surface water flow within a basin.
thermal stratification	The formation of layers of different temperatures in a lake or reservoir.
threat	A deviation from an agreed starting point initiated by a cause that may affect a beneficial use.
trading zone	Zones that make it simpler to manage trade by defining the area where trade can occur and where there may be set conditions. Zones set out the known supply source or management arrangements and the physical realities of relevant supply systems within the zone.
trading zone source	The trading zone that determines where the water share and allocation can be traded and where the allocation can be used.
trading zone use	In a bundled system, the trading zone identified in relation to a take and use licence.
Traditional ecological knowledge	For thousands of years, Aboriginal people survived in the Australian landscape relying on their intricate knowledge of the land and its plants and animals. Aboriginal people have important knowledge of ecological processes and land and water management practices.
Traditional Owners	People who, through membership of a descent group or clan, are responsible for caring for Country. Aboriginal people with knowledge about traditions, observances, customs or beliefs associated with a particular area. A Traditional Owner is authorised to speak for Country and its heritage.
transfer	Refers to the change of holder of a water entitlement.
transpiration	The process by which water that is absorbed by plants, usually through the roots, is evaporated from the plant surface into the atmosphere.
unincorporated area	An area which contains substantial and often unquantified groundwater of varying yield and quality that has not been designated as a groundwater management area or a water supply protection area.
unregulated river	A river that does not contain any dams or major diversion weirs which control the flow of water in the river.
unregulated system	A system that does not contain any major dams or diversion weirs which control the flow of water in the system.

Term	Definition
urban water cycle	The cycle of water through urban environments. Distinguished from the natural urban water cycle by the transfer of water through built infrastructure and the high runoff rates generated by impervious surfaces.
urban water strategies	All urban water corporations in Victoria are required to develop these strategies, which detail how water supplies and water demands will be balanced over the long term. These are the next iteration of Water Supply Demand Strategies first prepared in 2007.
use (water use)	The volume of water diverted from a stream or groundwater bore. It is not the same as 'use' by the end consumer of the water.
Victorian Environmental Water Holder	An independent statutory body responsible for holding and managing Victoria's environmental water entitlements.
Victorian Water Act	<i>Water Act 1989</i> (Vic). The legislation that, amongst other things, governs the way surface water and groundwater entitlements are issued and allocated in Victoria. It defines water entitlements, establishes the mechanisms for managing Victoria's water resources and sets out arrangements for the governance and operation of rural and urban water corporations.
volumetric limit	Under the Murray-Darling Basin Plan volumetric limit has the meaning given by section 12.17.
wastewater	Water that has had its quality affected by human influence, deriving from industrial, domestic, agricultural or commercial activities.
water access right	Defined in section 4 of the Commonwealth Water Act as: (a) any right conferred by or under a law of a State to do either or both of the following: (i) hold water from a water resource (ii) take water from a water resource and (b) without limiting paragraph (a), includes the following rights of the kind referred to in that paragraph: (i) domestic and stock rights (ii) riparian rights (iii) a water access entitlement (iv) a water allocation and includes any other right in relation to the taking or use of water that is prescribed by the regulations for the purposes of this paragraph.
water accounting	A systematic process of identifying, recognising, quantifying, reporting and assuring information about water, the rights or other claims to water, and the obligations against water. Water accounting applies Australian Water Accounting Standards.
water allocation	The specific volume allocated to water entitlement holders in a given season, often quoted as a percentage of the volume of each entitlement. For example, a 20% allocation in a particular season allows a water user with a 100 ML entitlement to take 20 ML of water.



Term	Definition
water authorities	Now called water corporations, although sometimes referred to as Authorities in their role as a licensing authority. The Victorian Water Act uses the term 'Authority' to mean a water corporation or catchment management authority. The use of Authority in relation to bulk entitlements means a water corporation, a power generation company, the Minister administering the Conservation, Forests and Lands Act 1987, and the Victorian Environmental Water Holder.
water balance	A statement of the water flows in a given area and time period, in which the sum of the outflows from the area equals the sum of the inflows less the water accumulated in the area.
water corporations	State organisations or agencies established under the Victorian Water Act that provide a range of water services to customers within their service areas including water supply, sewage and trade waste disposal and treatment, water delivery for irrigation and domestic and stock purposes, drainage, and salinity mitigation services. Some water corporations have a regulatory function for the diversion of water from waterways and the extraction of groundwater. Formerly known as water authorities.
water entitlement	An entitlement under the Act to take a specified volume of water from a defined water source.
water infrastructure	Facilities, services and installations needed for the functioning of a water system.
water market	Described the market in which the trade of permanent and temporary water may occur under certain conditions.
water quality	Refers to the chemical, physical, biological and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and/or to any human need or purpose.
water quality characteristic	In the Murray-Darling Basin Plan water quality characteristic means: (a) other than in Chapter 11 – means a characteristic of water quality for which Part 4 of Chapter 9 sets a target value; and (b) in Chapter 11 – has the meaning given by section 11.02.
water quality management plan	In the Murray-Darling Basin Plan water quality water quality management plans for a Water Resource Plan area made in accordance with Part 7 of Chapter 10.
Water Register	In Victoria, the Water Register is a public register that records water-related entitlements in Victoria. It holds water shares recorded by the Water Registrar, together with mortgages and limited-term transfers (leases) relevant to these water shares, records of licences to take and use surface water and groundwater, and records of works-related licences. The Register also holds records of water allocations available in the current season and tracks and reconciles volumes of water entitlements by water system and trading zone. It generates statistics and reports on levels of use, directions of trade, and prices paid.

Term	Definition
water resource	Defined by section 4 of the Commonwealth Water Act as: (a) surface water or groundwater or (b) a watercourse, lake, wetland or aquifer (whether or not it currently has water in it) and includes all aspects of the water resource (including water, organisms and other components and ecosystems that contribute to the physical state and environmental value of the water resource).
water resource assessment	An assessment (including one for the purpose of a determination under clause 102(c) of the Agreement) of the amount of water that will be available: (a) for distribution to New South Wales, Victoria and South Australia during a particular period; and (b) for holding in reserve at the end of the period; taking into account matters including: (c) the volume of water held in the major storages; and (d) estimated water use during the period; and (e) assumed or forecast inflows during the period.
water resource plan	For a water resource plan area as defined by section 4 of the Commonwealth Water Act, a plan that: (a) provides for the management of the water resource plan area; and (b) is: (i) accredited under section 63, or (ii) adopted under section 69 but only to the extent to which the water resource plan: (c) relates to Basin water resources, and (d) makes provision in relation to the matters that the Basin Plan requires a water resource plan to include.
water resource plan area	Defined by section 4 of the Commonwealth Water Act, is an area that: (a) contains part of the Basin water resources; and (b) is specified in the Basin Plan as an area that is a water resource plan area for the purposes of this Act.
water right	Previously rights to water held by irrigators. As a result of unbundling, these have now been separated into a water share, delivery share and water-use licence.
water sector	The broad range of entities with a stake or role in water management. For example, water corporations, catchment management authorities, local government and environmental water holders.
water security	The capacity of a population to access adequate quantities of acceptable quality water to sustain life, socio-economic development and human wellbeing.

Term	Definition
water share	A water entitlement issued under the Victorian Water Act. It provides for access to is a share of the water available to be taken from a declared water system. Water shares were created as part of the unbundling reforms. Water shares may be high-reliability or low-reliability, and are specified as a maximum volume of seasonal allocation that may be made against that share.
water share transfer	The transfer of ownership of a water share. When you buy a water share, you are not also buying the allocation. Transferring the water share does not transfer the allocation account or any water in it. The buyer only receives a new allocation announced to the water share after the Water Registrar has recorded the transfer.
water storages	A hydrological feature in which water is stored. Surface water storages include natural and artificial ponds, lakes, reservoirs and lagoons, also the bodies of water held behind weirs and dams.
water supply protection area	An area declared under section 27 of the Victorian Water Act to protect the area's groundwater or surface water resources through the development of a management plan which aims for equitable management and long-term sustainability.
water supply system	A body of water which is managed as a unit for the purposes of supplying water users.
water system source	River basin or groundwater management unit from where the water is sourced for regulated and unregulated systems.
water system type	Includes regulated, unregulated, groundwater, recycled, stormwater, managed aquifer recharge and wetlands.
water trading rules	A set of overarching consistent rules enabling market participants to buy, sell and transfer tradeable water rights.
water year (or hydrologic year)	A continuous 12-month period starting from July, or any other month as prescribed under the water regulation or a resource operations plan, but usually selected to begin and end during a relatively dry season. Used as a basis for processing streamflow and other hydrologic data.
water-use licence (including annual use limit)	Authorises the use of water on land for irrigation, with prescribed conditions of use to avoid or minimise the environmental and off-site impacts of irrigation.
water-use registration	An authorisation to use water for purposes other than irrigation.
waterway	The Victorian Water Act defines a waterway as a river, creek, stream, watercourse and a natural channel where water regularly flows, whether or not the flow is continuous.
waterway condition or waterway health	A term for the overall state of key features and processes that underpins functioning waterway ecosystems (such as species and communities, habitat, connectivity, water quality, riparian vegetation, physical form, and ecosystem processes such as nutrient cycling and carbon storage).

Term	Definition
waterway managers	Authorities with a waterway management district under the Victorian Water Act – the nine regional catchment management authorities and Melbourne Water in the metropolitan region.
weirs	A barrier across a river designed to alter flow characteristics.
wetland	Wetlands are areas, whether natural, modified or artificial, subject to permanent or temporary inundation, that hold static or very slow moving water and develop, or have the potential to develop, biota adapted to inundation and the aquatic environment. They may be fresh or saline.
Wimmera-Mallee Pipeline Project	In the Basin Plan the Wimmera-Mallee Pipeline Project means the water infrastructure project undertaken by Grampians Wimmera Mallee Water and funded by the Commonwealth and Victoria.
winter-fill licence	A licence that permits taking water from a waterway only during the winter months (typically July to October).
works	Works refers to infrastructure including a pump or construction designed to hold or extract water including a pump, bore and dam.
works licence	A licence that authorises the construction, alteration, operation, removal or decommissioning of any works on a waterway, or a bore or dam belonging to a prescribed class of dams.
yield	The quantity of water that a storage or aquifer produces.

Acronyms and abbreviations

ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AWRC	Australian Water Resources Council
BDL	Baseline Diversion Limit
BE	Bulk entitlement
BoM	Bureau of Meteorology
CEWH	Commonwealth Environmental Water Holder
CHW	Central Highlands Water
CMA	Catchment Management Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CW	Coliban Water
Cwlth/Cth	Commonwealth
DCNR	Department of Conservation and Natural Resources
DELWP	Department of Environment, Land, Water and Planning
DICP	Dry Inflow Contingency Planning Group
DPI	Department of Primary Industries
DRP	Drought Response Plan
DSBN	Dryland Salinity Bore Network (managed by DELWP)
DSE	Department of Sustainability and Environment
EC	Electrical conductivity
EE	Environmental entitlement
ENSO	El Niño Southern Oscillation
ESC	Essential Services Commission
ESLT	Environmentally Sustainable Level of Take
EWP	Environmental Watering Plan
EWR	Environmental Water Reserve
GL	Gigalitre
GMA	Groundwater Management Area
GMP	Groundwater Management Plan
GMU	Groundwater Management Unit

GMW	Goulburn-Murray Water Corporation
GWMWater	Grampians Wimmera Mallee Water
Ha	Hectare
HEW	Held Environmental Water
HRWS	High-Reliability Water Share
ICM	Integrated Catchment Management
IWM	Integrated Water Management
LMP	Local Management Plan
LRWS	Low Reliability Water Share
LTCE	Long Term Cap Equivalent
M&E guidelines	Modernisation and Extension of Hydrologic Monitoring Systems Program guidelines
MDB	Murray-Darling Basin
MDBA	Murray-Darling Basin Authority
MDBC	Murray-Darling Basin Commission
ML	Megalitre
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
NHMRC	National Health and Medical Research Council
NTU	Nephelometric Turbidity Units
PCV	Permissible Consumptive Volume
PEA	Priority Environmental Asset
PEF	Priority Ecosystem Function
PEW	Planned Environmental Water
REALM	Resource Allocation Models
RWMP	Regional Water Monitoring Partnership
D&S	Domestic and stock
SDL	Sustainable Diversion Limit
SEACI	South East Australia Climate Initiative
SGMS	State Groundwater Monitoring Strategy
SOBN	State Observation Bore Network
SoO	Statement of Obligations
SRW	Gippsland and Southern Rural Water Corporation

SWIMP	Strategic Water Information and Monitoring Plan
SWRA	Surface Water Resources Assessment
SWS	Sustainable Water Strategy
TAZ	Target Application Zones
TCSA	Tertiary Confined Sand Aquifer
TLM	The Living Murray
TO	Traditional Owners
UA	Unincorporated Area (Groundwater)
UWS	Urban Water Strategy
VEWH	Victorian Environmental Water Holder
VFWCC	Victorian Flood Warning Consultative Committee
VWQMN	Victorian Water Quality Monitoring Network
VWRDW	Victorian Water Resources Data Warehouse
W-M	Wimmera-Mallee
WQM Plan	Water Quality Management Plan
WRAP	Water Resources Assessment Program
WRP	Water Resource Plan
WSDS	Water Supply Demand Strategy
WSPA	Water Supply Protection Area