Australian Government

MURRAY–DARLING BASIN AUTHORITY

Handbook for Practitioners

Water resource plan requirements

October 2013

Murray–Darling Basin Authority

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Cover Image: *Lake Mulwala and Yarrawonga Weir.* Photo by Michael Bell.

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Relevant legislative framework

Division 2 of Part 2 of the *Water Act 2007* (Cwlth) (item 11 in the table in s.22(1)) states that the Basin Plan must include the requirements that a water resource plan for a water resource plan area must comply with for it to be accredited or adopted under Division 2. The requirements must relate to matters that are relevant to the sustainable use and management of the water resources of the water resource plan area.

Subsection 22(3) provides that certain matters must be included in the requirements, all of which are incorporated into Chapter 10 of the Basin Plan.

Subsection 22(3) allows other matters to be included in the Basin Plan.

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Part 1 — Introduction

The purpose of the handbook

This *Handbook for Practitioners* (the handbook) is intended to guide water planners during both the development and the assessment of water resource plans (WRPs). It aims to show how, in the view of the Murray–Darling Basin Authority (MDBA), to meet the Basin Plan requirements for WRPs set out in Chapter 10 of the Basin Plan.

The Basin Plan has been developed in accordance with the *Water Act 2007* (Cwlth) (the Act) to provide sustainable limits for the water resources of the Murray–Darling Basin (the Basin). Among other things, it provides for sustainable limits on the quantity of water taken from the Basin water resources for consumptive use, including specific limits for each water resource plan (WRP) area, and requirements for WRPs to support these limits.

The Basin Plan defines 36 WRP areas and includes accreditation requirements for the WRPs to ensure they are consistent with the Basin Plan. It is expected Basin States will develop WRPs drawing on existing state frameworks, and submit the WRPs for accreditation.

Under the Act, the MDBA and the Commonwealth Minister for Water (the Minister) have different roles in dealing with WRPs. The MDBA may advise or assist the Basin States in preparing their WRPs. This handbook is intended to support the MDBA's aim to assist Basin States. Once a proposed WRP has been prepared, the MDBA needs to consider the plan and prepare recommendations to the Minister about whether the proposed WRP should be accredited. The Minister then makes the decision whether to accredit the WRP.

Guidelines accompanying the chapters of the Basin Plan (including this handbook) deal with the interpretation of the Basin Plan and have no statutory force. The purpose of such guidelines is to provide information, advice and support in implementing the Basin Plan. In the event of any inconsistency between this handbook and the Act or the Basin Plan, the Act or Basin Plan will prevail.

Evolving the handbook

Commitments towards the ongoing collaborative improvement of the handbook have been set out as part of the Basin Plan Implementation Agreement. The MDBA will consult with Basin States through the Water Resource Planning Working Group of the Basin Plan Implementation Committee before making any changes to the handbook. The MDBA will

provide adequate time for Basin States to respond to proposed changes, and have regard to any comments made by Basin States in relation to the proposed changes.

New information about the application of the Chapter 10 requirements is likely to trigger reviews and updates of this handbook. For instance, new information may become available from:

- experience with case studies undertaken jointly with states
- experience with the development and accreditation of WRPs
- development of relevant documents such as guidelines relating to other chapters that impact on the development of WRPs
- research such as that currently being undertaken by the MDBA in relation to cultural flows
- amendments to the Basin Plan or related documents.

The MDBA will convene an annual water planners' forum for all parties to share experiences and new information relevant to the development of WRPs for accreditation. Online approaches to sharing experiences and information will also be explored.

In addition, we will develop a water planners' toolkit over time. This will be a repository of best-practice methods for a range of relevant technical matters. The aim of the toolkit would be to provide information about the types of approaches that could be applied in various circumstances across the Basin.

Discussions at the water planners' forums and the methods available through the toolkit will supplement this handbook and may be used to inform updates. As it evolves, this handbook will increasingly provide practitioners with practical, concise and user-friendly advice on how, in the view of the MDBA, to address each of the Chapter 10 requirements.

For further information on this handbook, contact:

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Water resource plans

By 1 July 2019, there will be a Basin Plan-consistent WRP for each WRP area. Each WRP will deal with all the water resources within the area consistently with the Chapter 10 requirements and in ways that are aware of the management of connected

water resources. The Basin Plan identifies 14 surface water WRP areas, 16 groundwater WRP areas and six combined surface water and groundwater areas. The maps for these areas are located on the following pages (see figures 1–3), as well as on the MDBA website at <http://www.mdba.gov.au/river-data/spatial-data-services/spatial-information>.

Under the Basin Plan WRPs will be an important means of aligning Basin-wide and state-based water resource management in each WRP area. These plans will recognise as appropriate, and build on where needed, the water planning and management currently undertaken by states. Water users will be able to undertake their business planning and water management in much the same way as they do now because these requirements, as far as possible, seek to maintain consistency with existing arrangements while facilitating implementation of relevant aspects of the Basin Plan.

Given existing arrangements in each Basin State, a WRP prepared by a Basin State is likely to consist of several documents setting out the interrelated water management arrangements for each WRP area. It may incorporate documents prepared under various state laws such as water plans and strategies, bulk entitlements, relevant regulatory instruments, water quality improvement plans, and aspects of broader strategies or plans.

States currently undertake most of the relevant arrangements through their primary water management legislation. Other laws, such as environmental protection laws for some aspects of water quality management, or broader natural resources management and catchment management arrangements, may also be relevant.

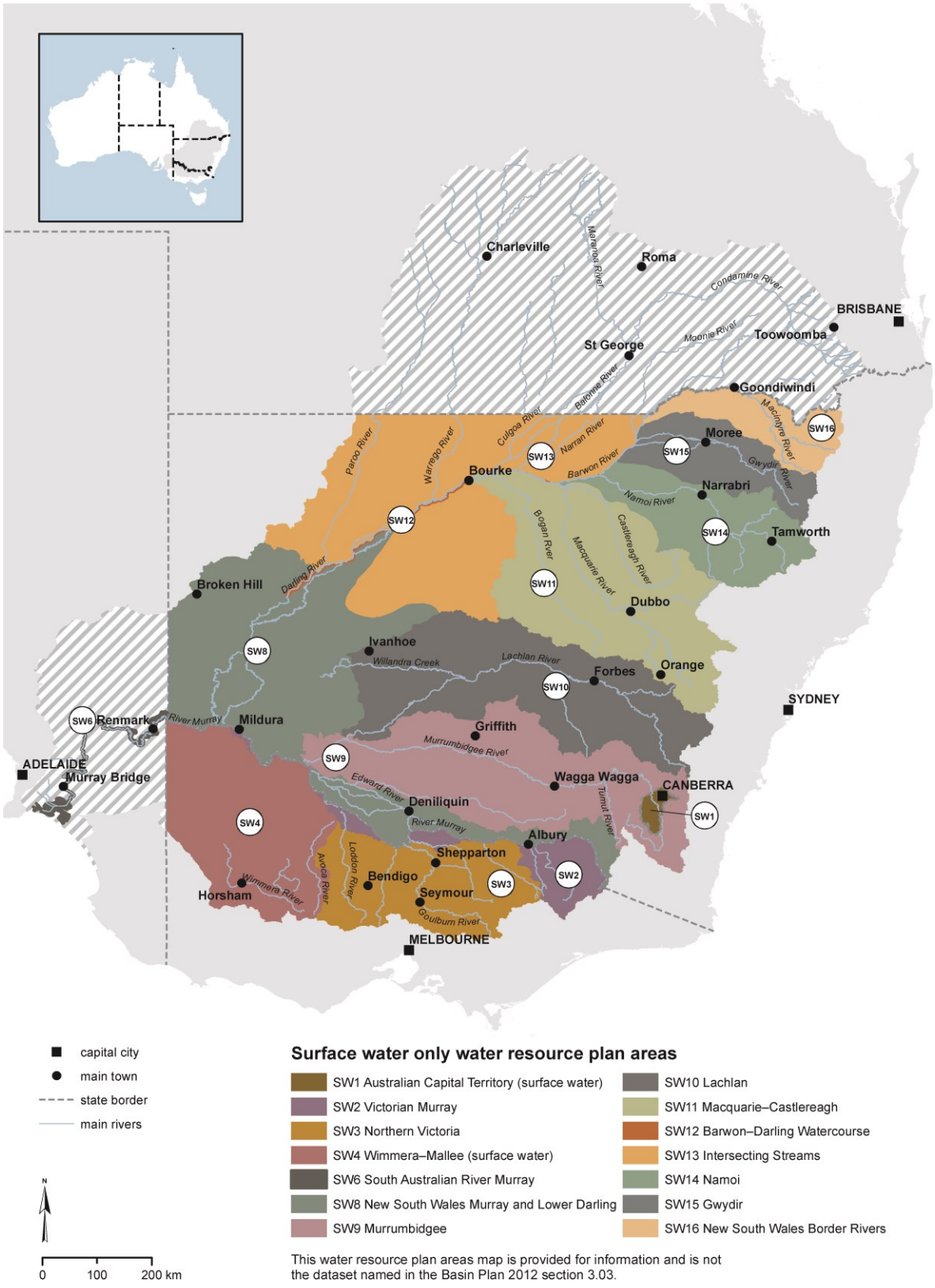

Figure 1: Map of the Basin showing water resource plan areas for surface water

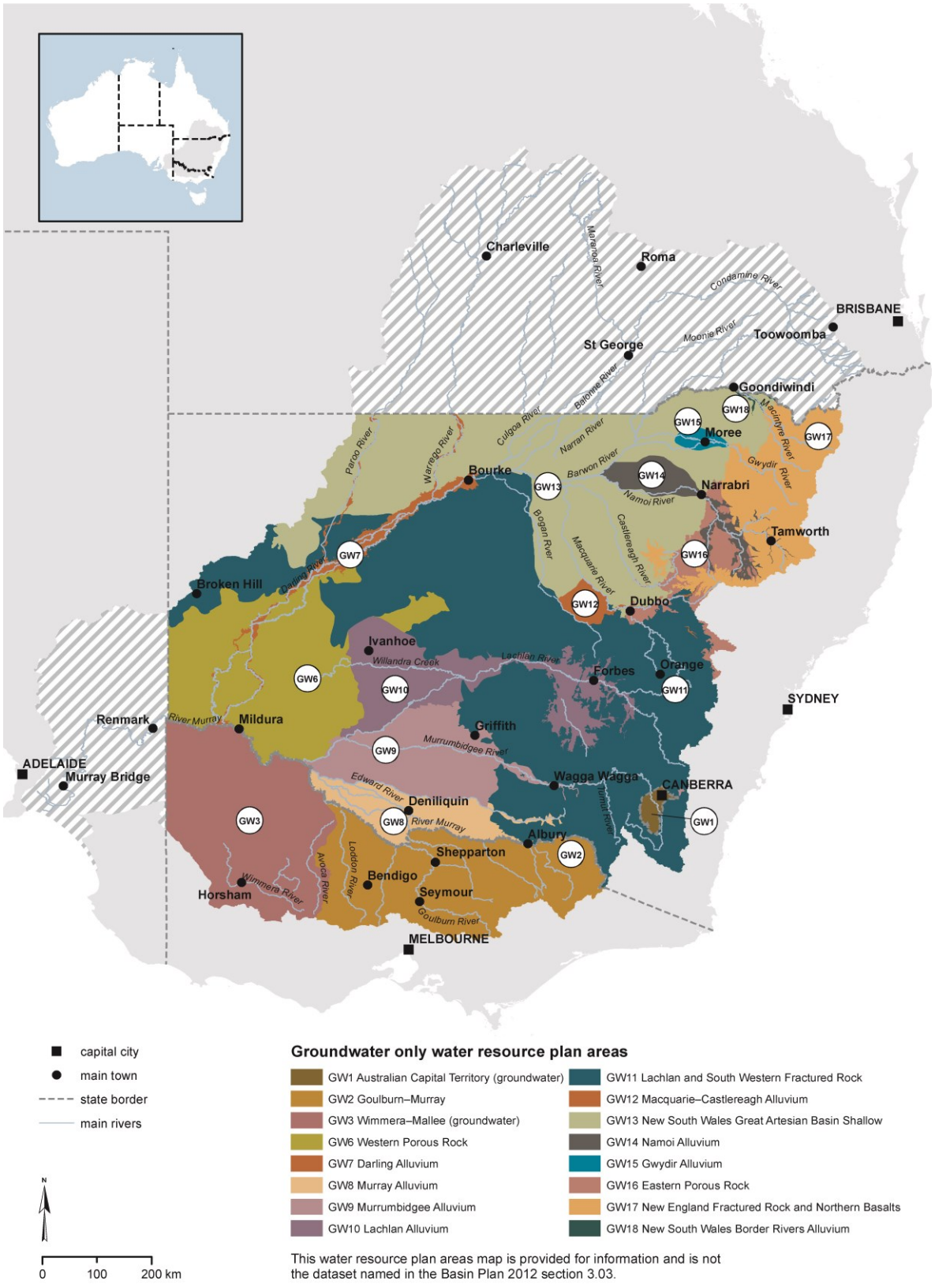

Figure 2: Map of the Basin showing water resource plan areas for groundwater

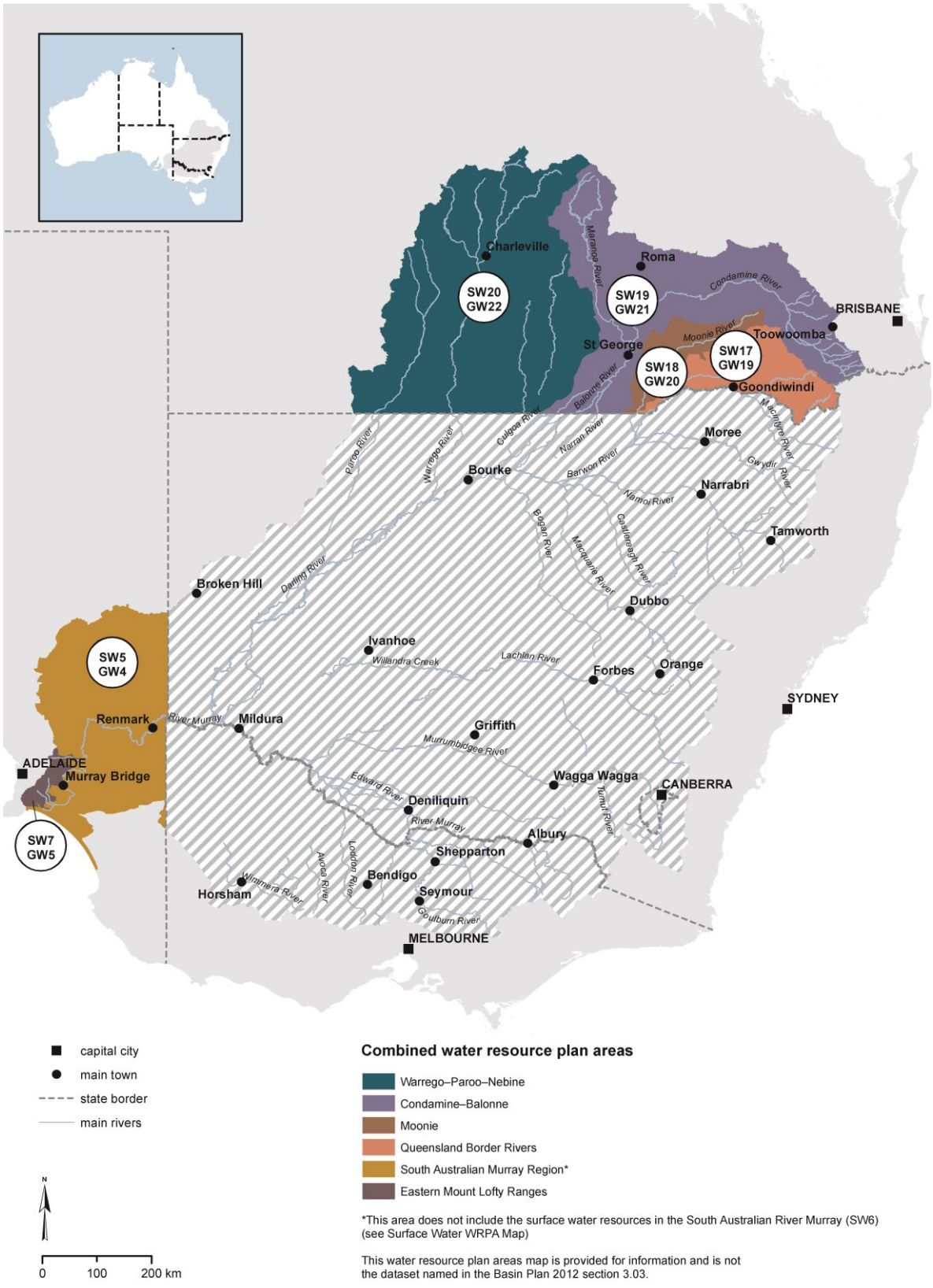

Figure 3: Map of the Basin showing combined water resource plan areas

Preparing water resource plans

Under the Murray–Darling Basin Plan Implementation Agreement, the MDBA and Basin States have agreed to collectively settle a general approach to assessment and accreditation through the Basin Plan Implementation Committee. This includes settling on the key milestones and deliverables to be addressed in the Basin State work programs for the preparation of WRPs. Individual Basin State work programs for the preparation of WRPs will then be agreed with MDBA, with a view to ensuring a progressive work flow through to 30 June 2019. The MDBA and Basin State may also agree on a WRP development program for WRP areas, which can include standards for addressing accreditation requirements, and may be informed by the risk assessment prepared for the WRP area. The approach needed to address WRP requirements will vary according to local conditions, levels of development and statutory and other arrangements in the water resource plan area.

The aim is to produce plans appropriate to the circumstances and needs of the relevant WRP areas and consistent with the Basin Plan. These areas vary widely in the nature of their resources and their level of development. They also differ in terms of the risks they face. Accordingly, WRPs should be 'fit for purpose'. This means that WRP areas with low levels of development, facing low risks, are likely to need relatively simple WRPs. However, a WRP area with higher levels of development or higher risks is likely to need a more complex and detailed WRP. The approaches outlined above are intended to assist the MDBA and Basin States to work together to achieve the most appropriate WRP for a given WRP area.

Basin States have legal requirements in place that must be undertaken when they are developing water plans and other instruments relevant for the Basin Plan WRP. The MDBA recognises that water planners will need to meet their states' own requirements as well as address the Basin Plan WRP requirements — in many cases, existing state documents or processes will meet both state and Basin Plan requirements. In some cases states may choose to more closely align their legislative requirements with Basin Plan requirements to further streamline their ability to meet both requirements.

The structure of the handbook

This handbook sets out the parts of Chapter 10 sequentially. However, practitioners should consider the chapter as an integrated unit, rather than as 14 independent parts. This involves considering how the different parts influence one another and how each relates to other chapters of the Basin Plan. Figure 4 (page 11) shows the key connections but others may also be relevant in certain circumstances.

Part 3 (Incorporation and application of long-term annual diversion limit) and Part 9 (Approaches to addressing risks to water resources) are central to the operation of the WRPs.

The requirements of Part 3 are fundamental to implementing the SDLs, which is one of the key features of the WRP, so consideration of this part early in the planning process will be useful. In addition to the application of SDLs, many of the requirements in Chapter 10 are concerned with the sustainable management of water resources within the SDL.

Undertaking a risk assessment, as is required in Part 9, will inform the development of other parts of the WRP. For this reason, it is valuable to perform the risk assessment in the initial stages of the planning process to ensure that planning approaches are appropriate and fit for purpose.

Part 1 of Chapter 10 provides an outline of the chapter. Part 2 is primarily concerned with identifying the relevant parts of the various documents that constitute the WRP. It also requires the identification of the person or organisation responsible for the various actions or measures that will be set out in the WRP.

Part 3 sets out how the WRP will ensure that the SDLs identified in the Basin Plan will be implemented in each WRP area. This includes:

- identifying each form of take, and the classes and conditions associated with each form
- identifying planned environmental water and a register of held environmental water
- the sustainable limits that are applied to take, how much water is taken on average, how much water can be taken in a given year, how allocations are made and how take is accounted for
- the determination of actual take.

The MDBA intends that arrangements build on applicable historical arrangements, particularly the surface water Cap.

Take that is within the SDL could still have negative impacts on the environmentally sustainable level of take characteristics at a local scale (e.g. if all take occurs in a very small part of the WRP area). Therefore, management arrangements that account for the local impacts of taking surface water and groundwater may be required to achieve the sustainable use of water resources for some systems (Part 4). WRPs should show that the need for such management arrangements has been considered and that, where they are necessary, such management arrangements have been included.

Part 5 ensures that a WRP identifies and provides for the monitoring of those interception activities, individually or cumulatively, that present a medium or higher risk to the

achievement of SDLs and environmental watering requirements. The WRP will also need to set out the actions for managing the effects of any unanticipated growth or changes in interception activity.

Part 6 is concerned with environmental watering; in particular, that WRPs enable the implementation of the environmental watering plan or the Basin-wide environmental watering strategy established under Chapter 8 of the Basin Plan. This part also requires that WRPs outline arrangements to ensure environmental watering is coordinated across connected resources.

Part 7 requires that the WRP will establish a water quality management plan (WQM Plan) that will encourage consideration of the impacts of wider natural resource management and land management on water quality within the WRP area. WQM Plans will identify causes of, and risks to, water quality; incorporate water quality targets, including salinity targets; and seek to provide the same or better levels of protection as those set out in Chapter 9 of the Basin Plan. The provisions link development of the WQM Plans to the objectives and targets in Chapter 9, including setting out alternative targets where necessary and providing reasons why alternative targets would be more appropriate for a particular WRP area.

Part 8 deals with trade within groundwater systems, between groundwater systems and between groundwater and surface water systems. Trading of water access rights involving groundwater are challenging because of uncertainties about the level of connectivity between locations and resources; the three-dimensional nature of aquifers and uncertainties about their boundaries; and the potential for local-scale impacts with intense groundwater abstraction, both for third-party water users and the environment. Trade rules can help to address these issues and make assumptions relating to these uncertainties clearer.

As outlined earlier, the risk assessments carried out under Part 9 will inform the way water planners go about fulfilling the requirements of Chapter 10, particularly parts 4, 5 and 7. The provisions of this part also need to be undertaken having regard to the work program for the assessment and accreditation of WRPs developed though the Basin Plan Implementation Committee that will address the arrangements and timing of risk assessments for water resources being prepared by Basin States. The overall aim of these provisions is to ensure that WRPs are fit for purpose. The WRP should include strategies to address medium and higher risks.

Part 10 requires that WRPs will provide transparent information about the nature of measurement of take in each area. It may be useful to consider these matters in conjunction with the provision of Division 1, Part 3, Chapter of 10 of the Basin Plan, particularly identifying water access rights.

Part 11 requires the WRP to incorporate processes that facilitate the communication of any reviews or amendments of WRPs to the Authority.

Part 12 requires the WRP to reference the significant sources of information, and the significant methods, models and tools, used to develop the WRP. Part 12 also calls for WRPs to be based on the best available information.

Part 13 is concerned with ensuring that plans submitted are robust and flexible enough to allow for a range of water availability scenarios, including extreme dry periods. Other extreme events, such as events with severe impact on water quality or the failure of infrastructure, can affect the operation of WRPs. It is important to have clear and transparent planning processes in place to allow water users and managers to understand and respond to risks. However, this part is not concerned with detailed emergency or incident management.

Part 14 of Chapter 10 is about consulting with and actively engaging Indigenous Australians in the preparation of WRPs and incorporating their objectives in relation to water resources. This provision recognises the importance of water and rivers to the life and identity of Indigenous people in the Basin.

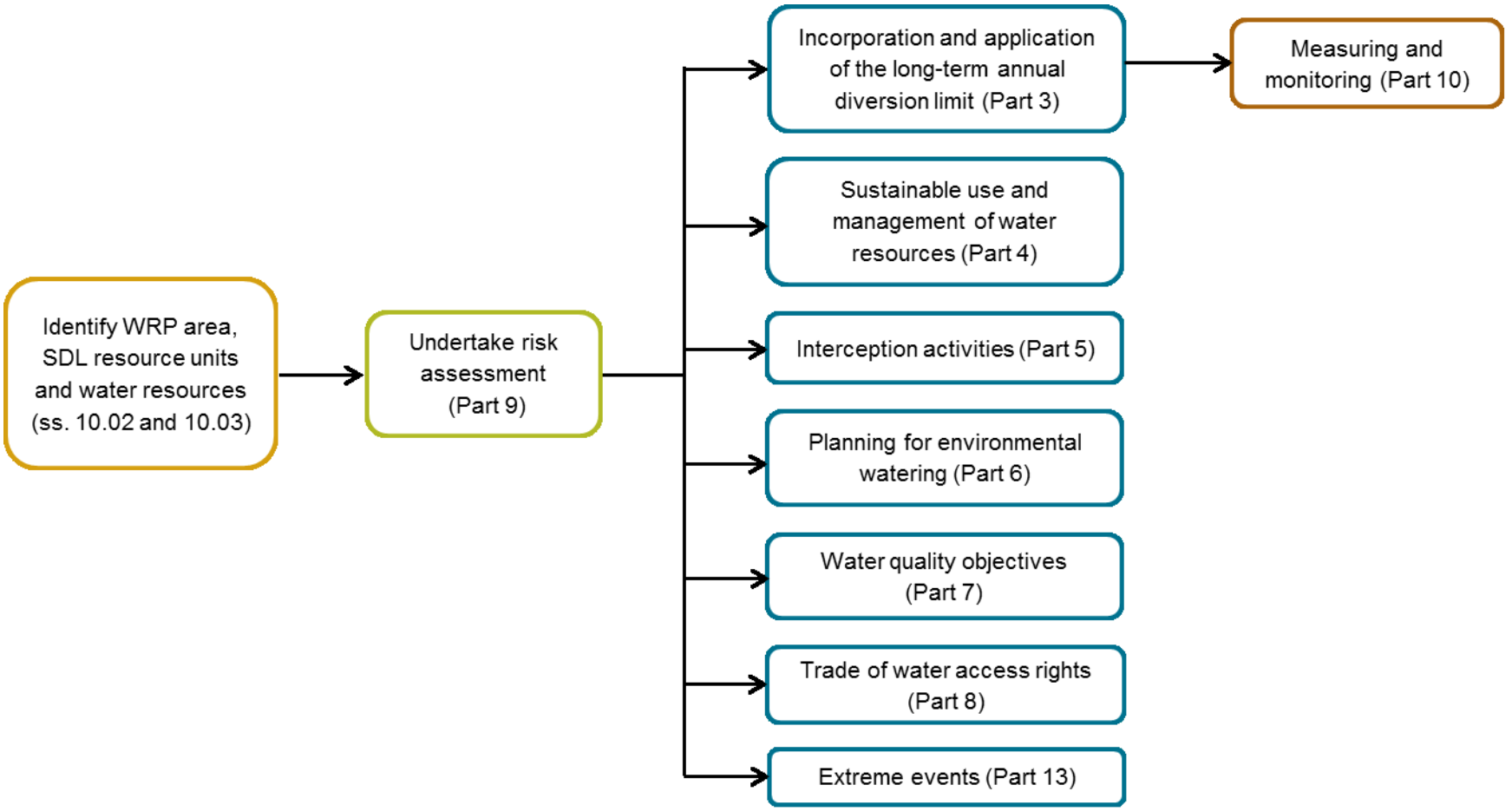

Figure 4: Key connections within Chapter 10

Water resource plan requirements and reliability

While it is important to have a WRP that meets the requirements set out in Chapter 10, the Basin Plan has been deliberately drafted so as to have no detrimental impact on the reliability of water allocations. The Authority acknowledged both the importance of this commitment as well as the challenge in identifying any possible impacts during drafting by including s. 6.14 in the Basin Plan which states:

> *Nothing in the Basin Plan requires a change in the reliability of water allocations of a kind that would trigger Subdivision B of Division 4 of Part 2 of the Act.*

This section has the effect of limiting all others to operating only to the extent they do not require any impact on reliability of water entitlements.

The Authority has sought to ensure that if a water access entitlement holder chooses not to participate in water buybacks there would be no impact upon them from the Basin Plan – in particular the water assets that they hold and that are fundamental to their businesses will not change. Under the existing water entitlement frameworks entitlement holders are already subject to a variety of risks – such as climate variability, impacts of increases in utilisation of existing entitlements through to the impacts from changes to the way water is used (e.g. timing, ordering patterns). These risks are inherent in the entitlement framework, and are a factor of the climatic variability and past policies of the various states. It is important to note that the Basin Plan does not introduce new risks, including through the implementation of the WRP requirements. This principle should be kept in mind during the development of WRPs, and any concerns about the potential reliability impacts of meeting WRP requirements should be discussed with the MDBA as soon as practicable.

Accreditation process and procedures

There are three key stages in the accreditation process:

1. The WRP is developed by the Basin State with assistance from the MDBA, including through the mechanisms set out in the Basin Plan Implementation Agreement as discussed on page 7.
2. The Authority considers the proposed WRP and prepares recommendations to the Commonwealth Minister for Water on whether the proposed WRP should be accredited, and gives the Minister the proposed WRP and the recommendations.
3. The Minister considers the proposed WRP and the recommendations and, if satisfied that the proposed WRP is consistent with the relevant Basin Plan, accredits the WRP and undertakes the necessary legislative steps to formalise the decision.

The accreditation processes for WRPs and amendments are contained in the Act at Part 2, Division 2, Subdivision D.

Under the Basin Plan Implementation Agreement, the MDBA and Basin States will agree to individual work programs for the preparation of WRPs, with the option to agree on a WRP development program as well, as discussed on page 7.

Arrangements that could be clarified as part of the work or development program include key decision points at which Basin States will seek feedback from the MDBA and the timing and nature of any such feedback. Key aspects of the work program for WRP development that could be clarified include (but are not limited to):

- the risk assessment for the WRP area and the resultant proposed standards and approaches for the WRP
- the release of draft plans or related instruments for public consultation
- revisions following public consultation
- relevant state approvals
- the level and kinds of information needed to support the WRP
- submission of the WRP package to the MDBA in accordance with s. 63 of the Act with adequate time before the proposed commencement of the WRP, to allow for:
    - formal assessment by the MDBA
    - coordination of final Commonwealth and state processes for the formal making of the plan or instrument under state water management law and accreditation under the Act.

The MDBA considers that working with states throughout the development of the WRPs is a key step for achieving a consistent, collaborative approach across the Basin. Ultimately, the Authority must provide advice to the Commonwealth Minister on whether the WRP is consistent with the Basin Plan and whether to accredit the WRP, and so will need to participate in a way that supports its impartiality.

Accreditation of amendments to transitional or interim plans

The process for accrediting amendments to transitional and interim WRPs is separate to the processes related to developing and accrediting Basin Plan WRPs. The requirements for accrediting amendments to transitional and interim WRPs are set out in ss. 65 and 246 of the Act. These arrangements apply to amendments to transitional WRPs as defined in s. 241 of the Act and interim WRPs made in accordance with s. 242 of the Act.

If a Basin State wishes to have accredited any amendments to documents that form a transitional or interim plan, the Basin State will need to provide the proposed amendment to the Authority and ask the Authority to give the proposed amendment to the Minister for

accreditation. The Basin State may also choose to consult with the Authority about the amendment before submitting the amendment for accreditation. The Authority may assist the Basin State in relation to the amendments to transitional or interim plans. This assistance will be guided by the protocols under development in relation to the accreditation of WRPs.

An amendment to the transitional or interim WRP will be accredited if the minister is satisfied that the amendment would make the relevant plan no less consistent with the Basin Plan than the original transitional or interim plan which is being amended.
A proposed amendment to a transitional or interim plan will be assessed by the MDBA on this basis. As such, this handbook does not apply to the accreditation of amendments to transitional or interim water resource plans.

Part 2 — Identification of water resource plan area and other matters

Part 2 of Chapter 10 of the Basin Plan requires a clear identification of the sustainable diversion limit (SDL) resource units, water resources and the water resource plan area to which the WRP applies consistent with how they are identified in the Basin Plan.

It is likely that in most cases a WRP will comprise a number of documents to meet the broad range of requirements in Chapter 10. These documents may include some material that is not intended to form part of the Basin Plan WRP. It is important to identify which parts of these documents are intended to be included in the Basin Plan WRP (i.e. address the requirements of Chapter 10), and which are not intended to be included.

In addition, Part 2 has a range of other requirements relevant to the making of the WRP, including in relation to consultation and the identification of the person or organisation responsible for the various actions or measures that will be set out in the WRP.

Identification of water resource plan area, water resources and SDL units (10.02–10.03)

10.02 Identification of water resource plan area and water resources

(1) A water resource plan must identify:

(a) the water resource plan area; and

(b) the water resources;

to which it applies.

(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.

(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 is set out in that Part.

10.03 Identification of SDL resource units and water resources

(1) A water resource plan must identify:

(a) each SDL resource unit in the water resource plan area; and

(b) the water resources within each SDL resource unit.

(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.

(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.

The boundaries of WRP areas have, as far as possible, been drawn to match those of existing water management areas. The WRP areas are listed in Chapter 3 of the Basin Plan (ss. 3.05–07) and the boundaries are provided in the maps and spatial data downloads available on the MDBA website at <http://www.mdba.gov.au/river-data/spatial-data-services/spatial-information>

The WRP should identify the WRP area and the water resources and SDL units within the water resource plan area consistently with the descriptions in the Basin Plan. The documentation may be a map, GIS data, text description or by reference to the Basin Plan. The minimum standard for identifying the relevant WRP area, SDL resource units and water resources is by reference to the relevant description in the Basin Plan; however, further detail or description in the form of maps or other documentation will be beneficial for those reading the WRP.

With respect to the identification of the boundary of a WRP area, there may be an exception if a segment of the boundary, as specified in a dataset mentioned in s. 3.03, is also the boundary of the Murray–Darling Basin. In that case, the WRP for the area may specify a different course for that segment within the Murray–Darling Basin, as long as the changed boundary does not result in a material change in the water resources to which the WRP area applies. This flexibility is provided for under s. 3.04.

The SDL resource units describe geographical units containing sets of water resources. They are defined in s. 1.07 as:

> *…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*

The SDL resource units are grouped together under WRP areas. Boundaries of surface water SDL resource units are generally based on catchments while boundaries of groundwater SDL resource units are based on hydrogeology and existing state planning boundaries.

The SDL resource units are described in more detail in ss. 6.02 and 6.03 and in schedules 2 and 4 of the Basin Plan. A WRP area may incorporate a number of SDL resource units. The SDL resource unit boundaries may also be found on the MDBA website provided above.

The Murray–Darling Basin Boundary is defined in the Act (s. 18A). In some cases water resources that fall inside the Basin are managed as part of state water planning areas that principally cover areas outside the Basin, and these areas have been excluded from being Basin water resources. Excluding these water resources means they no longer form water resources of the Basin and they are not required to be included in the Basin Plan, and will not need to be included in water resource plans for these areas. The excluded areas are identified on SDL resource unit maps available on the MDBA website provided above.

Form of water resource plan (10.04)

Water resource plan constituted by 2 or more instruments

(1) If a water resource plan is constituted by 2 or more instruments or texts, subsections (2) and (3) apply to it.

Note: Subsection 63(1) of the Act states that a water resource plan may be constituted by 2 or more instruments.

(2) The water resource plan must identify the instruments or texts that constitute the water resource plan.

Note: The same instrument or text may be used for more than one water resource plan.

(3) If an instrument or text applies only to 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; and

(b) include an indicative map of the water resources identified in paragraph (a).

Water resource plan to include list of requirements

(4) A water resource plan must include a list that specifies:

(a) each requirement set out in this Chapter; and

(b) the part of the plan that addresses each requirement; and

(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.

Material not forming part of the water resource plan

(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.

*Note: See paragraph (d) of the definition of **water resource plan** in section 4 of the Act.*

It is anticipated that Basin States will continue to use their own water management processes and identify where these are relevant to the Basin Plan for the purposes of accreditation. A WRP for accreditation will most likely include a number of state documents. Accreditation of a WRP applies to the extent that the WRP relates to the matters that the Basin Plan requires a WRP to include. Therefore, it is important to be clear about which documents, particularly which parts of those documents, are presented for accreditation and which are not.

It should be noted that the term **water resource plan** has a particular meaning in the context of the Basin Plan, and is defined in s. 4 of the Act, and set out in the Glossary. In short, a water resource plan for the purposes of the Act and Basin Plan provides for the management of the water resource plan area and is either accredited or adopted by the Commonwealth Minister for Water, but only to the extent that the WRP relates to Basin water resources and provides for the matters that the Basin Plan requires a WRP to include.

The MDBA expects that a wide variety of instruments or texts may be used to formulate WRPs, including documents such as:

- Acts, regulations and other statutory or legislative instruments, such as water sharing plans, water allocation plans, bulk entitlements
- broad catchment or natural resource management plans
- statewide or regional policies and strategies (e.g. a state salinity strategy; a metering policy)
- technical reports
- numerical or conceptual models
- consultation reports.

Section 10.04 sets out various requirements that seek to provide clarity regarding the interaction of the documents that comprise the WRP. It should be noted that different kinds of documents will be more suitable for meeting particular requirements. For example, some provisions have clear obligations that need to be met, and in these cases statutory or legislative instruments that have effect under state law may be the most suitable type of document to meet the requirement. Other provisions are more concerned with understanding information and analysis informing the WRP, and in these cases policies, technical reports or consultation reports may be more suitable.

A WRP constituted by two or more instruments or texts must:

- identify the instruments or texts that constitute the WRP
- if an instrument or text applies to only some of the water resources of the WRP area, the WRP must identify the water resources or parts of the water resources to which the instrument or text applies and include an indicative map of the identified water resources.

Section 10.04 also requires a WRP to include a list that specifies each requirement set out in Chapter 10, the part of the plan that addresses each requirement and 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.

It may not be necessary for every single document relevant to a WRP area to be incorporated into the plan. Rather, the level of information required will be based on what is necessary to fulfil the accreditation requirements and should be determined in consultation with the MDBA.

However, if an instrument or text that is part of the WRP contains additional material that does not address the requirements of Chapter 10, the material must be identified so that it is clear to all parties that it does not form part of the accredited WRP.

Some documents may apply to a number of WRP areas. As there must be a separate plan for each WRP area, if the same document applies to a number of WRP areas, the documents can be referenced in relation to each relevant WRP. For example, a statewide policy, such as a water quality policy, may form part of the WRP for some or all WRP areas within that state. It is also acceptable for one part of a document to meet a number of different WRP requirements — for instance, when meeting the requirements in Part 4 of Chapter 10.

While there is no specific requirement for the documents included in the WRP to be publicly available, under s. 59 of the Act agencies and other bodies must not act (or fail to act) in a way that is inconsistent with the WRP. Therefore, it is important that documents

are either publicly available, or the relevant persons are informed of the content of the WRP and their obligations.

The WRPs will contain a list of accreditation requirements cross-referenced to the specific parts of the WRP that address each requirement and the specific part of the document where it is addressed. The list must also identify the dates on which any of the documents identified cease to have effect or are scheduled to be reviewed within the proposed 10-year accreditation period. An example of what that list may look like is provided in Table 1.

The list may also be used to address the requirements of s. 10.06; that is, identifying the person or organisation responsible for each obligation established by the WRP. The list may cross-reference significant sources of information, methods, models or tools used to develop the WRP, as required in Part 12.

Table 1 Example of one approach to providing a WRP list of requirements

Requirement of Chapter 10	Title of instrument(s) (see 10.04)	End date of instrument or proposed review date	Reference: relevant sections and pages (see 10.04)	Responsible 'person' (see 10.06)
10.01	–	–	–	–
10.02	–	–	–	–
10.0X	Instrument 1 (e.g. state planning instrument 1)	30 June 2020 review date	Chapter 4 Chapter 7, Table 18 Chapter 9, pp. 113–57	Department of Water Rural water authorities
10.0X	Instrument 2 (e.g. state planning instrument 2)	1 February 2026 end date	Entire document	Water access entitlement holder
10.0X	Document 1	1 January 2020, revised annually	Entire document	N/A
10.0X	Document 2 (e.g. hydrological study)	N/A	Entire document	N/A

Regard to other water resources (10.05)

> *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; and*
>
> *(b) describe the way in which paragraph (a) was complied with.*

The Basin Plan aims to integrate the management of water resources within the Basin, in part by ensuring that each water resource is covered by a Basin Plan-consistent WRP. In addition to this s. 63(2) of the Act requires that:

> *If a water resource plan area is adjacent to a water resource plan area located in another Basin State, the proposed water resource plan must be prepared in consultation with that other Basin State.*

To achieve this, it is important that WRPs are developed 'having regard to' (see Glossary) the management and use of water resources that have a significant hydrological connection to the water resources of the WRP area.

It is expected that in preparing the WRP, proper, genuine and realistic consideration will be given to the management and use of those connected water resources.

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. Hydrologic connectivity may occur, either naturally or through infrastructure, 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.

Such a connection will be considered significant for the purposes of this requirement if the connection is of consequence to the effective management of the water resources of either WRP area and is relevant to the requirements of this chapter. For example, this requires upstream managers to consider the management and use of downstream water resources, and requires downstream managers to consider the management and use of upstream water resources. However, it does not require one WRP to include provisions that ameliorate less effective management in a hydrologically connected WRP. The

extent to which regard needs to be had to connected water resources could also be informed by the risk assessment undertaken in Part 9.

Having regard to the general or specific matters in this context might involve sharing technical information; considering relevant issues in the risk assessment; and being aware of, and acknowledging, regulatory impacts transcending the boundaries of each resource or the use of cross-boundary consultative arrangements. In many situations across the Basin there are already formalised agreements and arrangements that would be seen as fulfilling this requirement, and these can be referenced where appropriate.

In addition, if the connected WRP area is in a different Basin State, it is expected that the other Basin State will have been consulted in accordance with s. 63(2) of the Act. This requirement is applied in relation to all adjacent resources, recognising that the effect of actions will vary depending on the nature of the connection between the WRP areas.

The WRP must also describe how these matters were considered. Such a description could include:

- identification of water resources with a hydrological connection to the WRP area, including an assessment of the level and relevance of the connection
- a description of such an identification and assessment undertaken by another party
- an outline of actions taken to understand any relevant impacts of management and use of water resources outside the WRP area on the water resources of the WRP area
- a summary of consultation undertaken with another Basin State or any other parties, where relevant
- a description of any agreements in place, e.g. why these agreements were developed, and how they operate.

Matters relating to requirements of the chapter (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.*
>
> *(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.*

Actions and responsibilities set out in WRPs should be allocated to a 'person' to ensure clear responsibility and accountability. A person in this context is not necessarily an individual, but would include a body politic or corporate, an office holder or a class of persons.

It is likely that a 'person' listed under this provision will be an office holder within an organisation such as a government department or agency, irrigation company, proprietary company or incorporated association, or a person who holds a particular position (e.g. the Minister for Water). In some cases, it may also be a class of persons, such as water entitlement holders.

For instance, s. 10.15 requires that a determination of the quantity of water actually taken be made after the end of each water accounting period. The WRP will need to specify who is responsible for making that determination. Section 10.24 requires that for particular kinds of interception activities, the plan must set out a process for monitoring the impact of that activity. The WRP will need to specify the person responsible for undertaking this monitoring.

The list of requirements created under s. 10.04 may provide an opportunity to document the person or persons responsible for any obligations created by the WRP.

Consultation to be demonstrated (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.

Note: A water resource plan prepared by the Authority and adopted under section 69 of the Act is a legislative instrument. The Legislative Instruments Act 2003 *requires that the explanatory statements for such plans describe the consultation undertaken in relation to the plans.*

(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.

The WRPs prepared by Basin States and submitted for accreditation are likely to include documents prepared under state laws, which have their own consultation requirements. In addition, there are certain consultation requirements set out in other parts of Chapter 10, for instance, in Part 6 and Part 14. This provision requires that the consultation undertaken when preparing any part of the WRP must be described, but does not impose any additional consultation requirements.

Consultation could be described by providing outputs from the consultation process, such as a consultation report. Another approach would be to prepare a document outlining the consultation that was undertaken, with references to any documents produced.

The same conditions about consultation apply to amendments to the WRP that are put forward for accreditation. In the case that regulations are made under s. 66 of the Act, which allows that a particular kind of minor on non-substantive amendment can be taken to be accredited if the Basin State notifies the MDBA within 14 days after the amendment is made, then the consultation requirement would not apply to these amendments.

Part 3 — Incorporation and application of long-term annual diversion limit

Part 3 of Chapter 10 of the Basin Plan sets out how the water resource plan (WRP) will manage take within the WRP area and ensure that the sustainable diversion limits (SDLs) identified in the Basin Plan will be implemented in each WRP area. These requirements are split across three divisions in the part.

- Division 1, s. 10.08, requires a WRP to identify water access rights. This includes identifying each form of take from each SDL in the water resource plan area, as well as classes or water access rights that apply to the forms of take and the characteristics of each class of water access right. Section 10.09 requires the identification of planned environmental water (PEW) and associated rules and arrangements relating to that water. It also requires the establishment and maintenance of a register for Held Environmental Water (HEW).
- Division 2, ss. 10.10–10.14, sets out how SDLs are applied to take, how much is taken on average, how much can be taken in a given year, how allocations are made and how take is accounted for and the limits on certain forms of take.
- Division 3, s. 10.15, requires actual take to be determined; it ensures that WRPs incorporate mechanisms to determine whether limits are being met. This requirement also supports s. 71 of the Act.

Divisions 2 and 3 provide critical information feeding into the compliance method in Chapter 6, Part 4.

Division 1 — Water access rights

Division 1 of Part 3 calls for identification of the rights surrounding access to water, the identification of planned environmental water, and transparency about the ownership of held environmental water by way of public registers. The information provided in meeting the requirements of this division will also assist in establishing and maintaining the Register of Take kept by the MDBA.

Water access rights must be identified (10.08)

(1) A water resource plan must identify the following:

(a) each form of take from each SDL resource unit in the water resource plan area;

(b) any classes of water access right that apply to the forms of take identified under paragraph (a);

(c) the characteristics of each class of right including, where appropriate, the number of rights and any conditions on the exercise of the rights.

(2) A water resource plan must require a holder of a water access right to comply with the conditions of that right.

Water access regimes vary widely in the different river systems, groundwater systems, water use needs and jurisdictions in the Basin. This provision aims to ensure that each WRP clearly describes the fundamental aspects of the water access regime in the WRP area.

The first part of this provision requires that a WRP identify each form of take that occurs in each SDL unit within that WRP area. Take of water from a water resource is defined in s. 4 of the Act and includes a number of methods by which water is removed from a water resource, or the flow of water in or into the water resource, is reduced. The full definition of **take** is provided in the Glossary.

For the purposes of the Basin Plan, **forms of take** are defined in s. 1.07 as 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.

This definition is complemented by a further clarification at s. 1.11, which states that water should be accounted for in only one form of take even if it could reasonably fall into more than one category. This is to avoid double-counting of forms of take.

The second part of this provision requires that the classes of water access right operating in the WRP area be set out in the WRP. **Water access right** is defined in s. 4 of the Act, and this definition is set out in the Glossary.

The intent of this provision is that a WRP describes the classes of water access right (including the number of access rights), where they exist in a way commensurate with the level of complexity involved for that WRP area. That is, where a more complex management system is used (such as licensing), that management system would need to be described including such things as the names of the classes of licence and the types of conditions that relate to those classes (e.g. regulated river licences with different levels of security, unregulated river licences, stock and domestic rights, supplemented or unsupplemented licences, groundwater licences and managed aquifer recharge licences). There is no requirement to provide information on each individual licence. In circumstances where individual licences have unique conditions, such as flow conditions at certain locations in unregulated systems, a general description of the nature of the conditions for a class of water access rights will generally suffice.

For water access rights (such as some stock and domestic rights) which are not managed using a system of licensing individual water users, the WRP should simply include an explanation of how these rights are managed and any volumetric or other information relevant to that form of take. For instance, for some entitlements there may be a condition that water can only be taken at a particular location or at particular times (e.g. such as during high flows). For entitlements of this nature, the WRP should identify that entitlements of a certain class include a condition that is location-specific but the WRP would not be required to identify each individual entitlement and the detail of each relevant location.

Subsection 10.08(2) also requires the WRP to ensure water access right holders comply with any conditions of the rights they possess. The MDBA recognises that such arrangements might not be specified in the states' core statutory water planning instruments (e.g. water allocation plans, water sharing plans, water resource plans) and in some cases it would be appropriate to incorporate other relevant documents, such as extracts from state water planning legislation, to fulfil this requirement if needed.

Identification of planned environmental water and register of held environmental water (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.

(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.

(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.

Planned environmental water

This provision requires the identification of planned environmental water (PEW) in the WRP area, together with the associated rules and arrangements relating to that water.

Planned environmental water is important, both as a key part of the baseline used to determine the SDLs and for its contribution to maintaining and improving the health of the Basin. PEW is also generally more significant in terms of volume than held environmental water (HEW), therefore its protection is fundamental to the implementation of the Basin Plan.

Planned environmental water is water that is committed under legislation to achieving environmental outcomes and cannot be used for other purposes. PEW is not simply any water that is not made available for consumptive use. PEW is often described as 'rules-based' environmental water and for groundwater has been described in varying ways in State water sharing plans, such as a percentage of rainfall recharge. PEW should be identified in accordance with the definition in s. 6 of the Act and in the WRP area in which it is held. The full definition of **planned environmental water** is provided in the Glossary.

Planned environmental water can take many forms, such as flows released from storages, dam spills and inflows from tributaries or water in a river or groundwater source that is protected from extraction. The purpose of PEW is to protect or restore part of a natural flow pattern in rivers and streams, taking into account the timing, frequency and variability of flows, and also to protect the health of groundwater systems and ecosystems that have a level of dependence on groundwater. In doing so, PEW contributes to specific and general environmental outcomes.

Planned environmental water may not be a specified volume as it may be created by an operating rule or limit (e.g. translucency rules), although a volume may be able to be determined with models. For example, PEW underlies environmental watering in the Cotter catchment in the Australian Capital Territory to restore and deliver specific types of river flow below the dams on the Cotter River. This includes releasing flows from storage to provide a minimum volume of water as base flows; restoring different types of flooding

flows, including riffle maintenance flows, pool maintenance flows and channel maintenance flows; and providing special purpose flows to maintain the spawning of native fish.

In unregulated systems PEW is usually made up of river flows that are protected from being taken. The ways that these flows can be protected include having long-term average annual extraction limits in place; only allowing extraction when there is a certain level of flow in the river; and having limits on the total volume of water that can be extracted per day when the river is at particular flow rates.

Planned environmental water in groundwater systems may be specified as a proportion of the estimated groundwater recharge that has been reserved for the environment, or as rules that restrict groundwater take to achieve specified environmental outcomes. For water to be recognised as PEW there needs to be some formal acknowledgement that the water is reserved for environmental purposes. The MDBA recognises that there are various approaches to identifying and managing PEW across the Basin. Accordingly, different types of documents will be used in different jurisdictions and WRP areas to meet the requirement to identify PEW.

Register of held environmental water

Subsection 10.09(2) provides for the establishment and maintenance of a register of HEW. HEW should be identified in accordance with the definition in s. 4 of the Act and in the WRP area in which it is held. The full definition of **held environmental water** is provided in the Glossary.

Held environmental water is an important element in achieving the objectives of the Basin Plan. Each WRP needs to provide for or reference a register covering information about all HEW in the WRP area. The HEW register may be used by the method required in s. 10.10.

One or more such registers may already exist, in which case the WRP will identify where the register (or registers) are located. These registers must be published on a website identified in the WRP. Existing registers may need to be altered to include the information required by this provision. If no such register exists, the WRP will need to ensure that one is established, maintained and published on a website identified in the WRP.

The register will show who holds the HEW including:

- government environmental water holders
- other government agencies
- non-government organisations
- private individuals.

The MDBA recognises that privacy provisions may govern an agency's ability to publish the names and personal details of private water holders; in these cases, the MDBA will work with the agency to ensure wherever possible appropriate legal disclosures are made. However, the register must include information about HEW characteristics. This includes, but is not limited to, the quantity, reliability, security, class, licence type and limitations on the water held. Including such information helps to make clear the purpose for which the water is held, the quantity held, and who is responsible for that water.

Division 2 — Take for consumptive use

Having identified access rights and environmental water in Division 1 above, Division 2 looks at quantifying the volumes permitted to be taken for consumptive use, on average, over the long term. It also looks at the processes for quantifying the volume permitted to be taken in any given year.

This division sets out the principal provisions for how a WRP incorporates and applies the SDL for each SDL resource unit. The SDLs take effect from 1 July 2019. Although WRPs can be accredited before that date, the WRPs will not be required to give effect to the SDLs until 1 July 2019 and each will have to demonstrate that it can give effect to the relevant SDLs from 1 July 2019 to be accredited.

However, it is intended that many of the existing relevant arrangements can be continued in a manner that accounts for additional forms of take and the Australian Government's 'Bridging the gap' activities.

Annual determinations of water permitted to be taken (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.

(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.

(3) The method must:

(a) account for the matters in subsection 10.12(1); and

(b) be consistent with the other provisions of the water resource plan.

(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.

Note 1: Under the Basin Plan, the SDL is the same as the long-term annual diversion limit because the temporary diversion provision for each SDL resource unit is zero. Section 6.04 and Schedules 2 and 4 set out the SDLs for each SDL resource unit.

Note 2: Amendments under section 23B of the Act are made following proposals for adjustment under Chapter 7.

(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.

A WRP must provide a practical and reliable method to determine the quantity of water permitted to be taken for consumptive use in a water accounting period ('annual permitted take'). The method must cover all forms of take, but may be composed of various independent parts in relation to the management of different forms of take. A key element will be a demonstration that there is no double-counting of the various forms of take. Where there are various components to the overall method for determining actual and permitted take it may be useful to have a diversion formula register or equivalent.

It must also be shown that the method can reflect any SDL adjustment arising from the operation of Chapter 7 of the Basin Plan, during the life of the WRP. This means the method must be able to incorporate and apply an adjustment to the SDL resulting from amendments to the Basin Plan under s. 23B of the Act made following proposals for adjustment under Chapter 7.

SDL adjustments may occur through this mechanism as a result of a number of activities. The Authority can propose adjustment to the surface water SDLs if certain changes to infrastructure and other measures are planned by 2016 and will come into effect by 30 June 2024. Adjustments of this kind will be made in the first instance in 2016, with a final reconciliation in 2024. In some circumstances the 2016 adjustment is expected to result

in certain surface water SDLs being expressed as a formula that changes with time to reflect dates on which measures affecting the particular SDL resource unit will come into effect.

Adjustments may also be made to groundwater SDLs if better information becomes available about the groundwater resources of the SDL resource unit. The types of information that may result in an adjustment includes better information about recharge rates, connectivity with surface water, usage patterns, and policy and planning settings in the Basin State. These adjustments may be made as soon as practicable after 30 June 2016 or any time after 30 June 2019.

The way in which the ability to incorporate and apply these adjustments in WRPs will vary. In some cases this may require that the SDL is presented as a formula, while in other circumstances it may be a trigger to review the WRP if the SDL is adjusted during the life of the WRP. The manner in which this is achieved will depend on a range of factors such as the nature of the resource being managed, the likelihood of any SDL adjustment being required in that area and existing state planning arrangements.

However, if the SDL adjustment results in the SDL of a surface water SDL resource unit being expressed as a formula that changes with time, the WRP will need to reflect the SDL as it stood at the following times:

- for a water accounting period beginning on or after 1 July 2019 — the SDL as it stood on 30 June 2019
- for a water accounting period beginning on or after 1 July 2022 — the SDL as it stood on 30 June 2022
- for a water accounting period beginning on or after 1 July 2024 — the SDL as it stood on 30 June 2024.

As required under s. 7.13 of the Basin Plan, the Authority will maintain a register of the various measures that are expected to result in adjustment to the SDL by 2024. Information on the register will be updated if it is found that the anticipated outcome of any measures has changed. The information on the register will help determine the SDL at certain dates for those SDL resource units where the SDL has been expressed as a formula that changes with time.

The annual permitted take is used in two ways:

- from July 2019 to determine ongoing compliance with the SDL — as set out in Part 5 of Chapter 6 of the Basin Plan
- when calculated for each year of the historical climate period (1895–2009), the average is then calculated to demonstrate the WRP does not exceed the SDL.

This method is to be used at the end of every water accounting period to determine the quantity of water permitted to be taken during that water year under the rules of the WRP. While in some locations it may be that this volume does not vary between years (e.g. many groundwater systems), it is expected that in many WRPs, the method will provide for variation between years depending on rainfall and other factors.

These methods can vary widely in their complexity, in the factors that influence any variation between years, and in their form. While the primary difference is whether the method responds to changes in climate and water availability, secondary differences often occur in how a method responds to these changes. Figure 5 illustrates the results of four different methods, all of which have the same numeric SDL, but give different determinations of annual permitted take in different years of the historical climate period. The fixed diversion limit method does not respond to climate or water availability variations, although the other three methods do so in quite different ways.

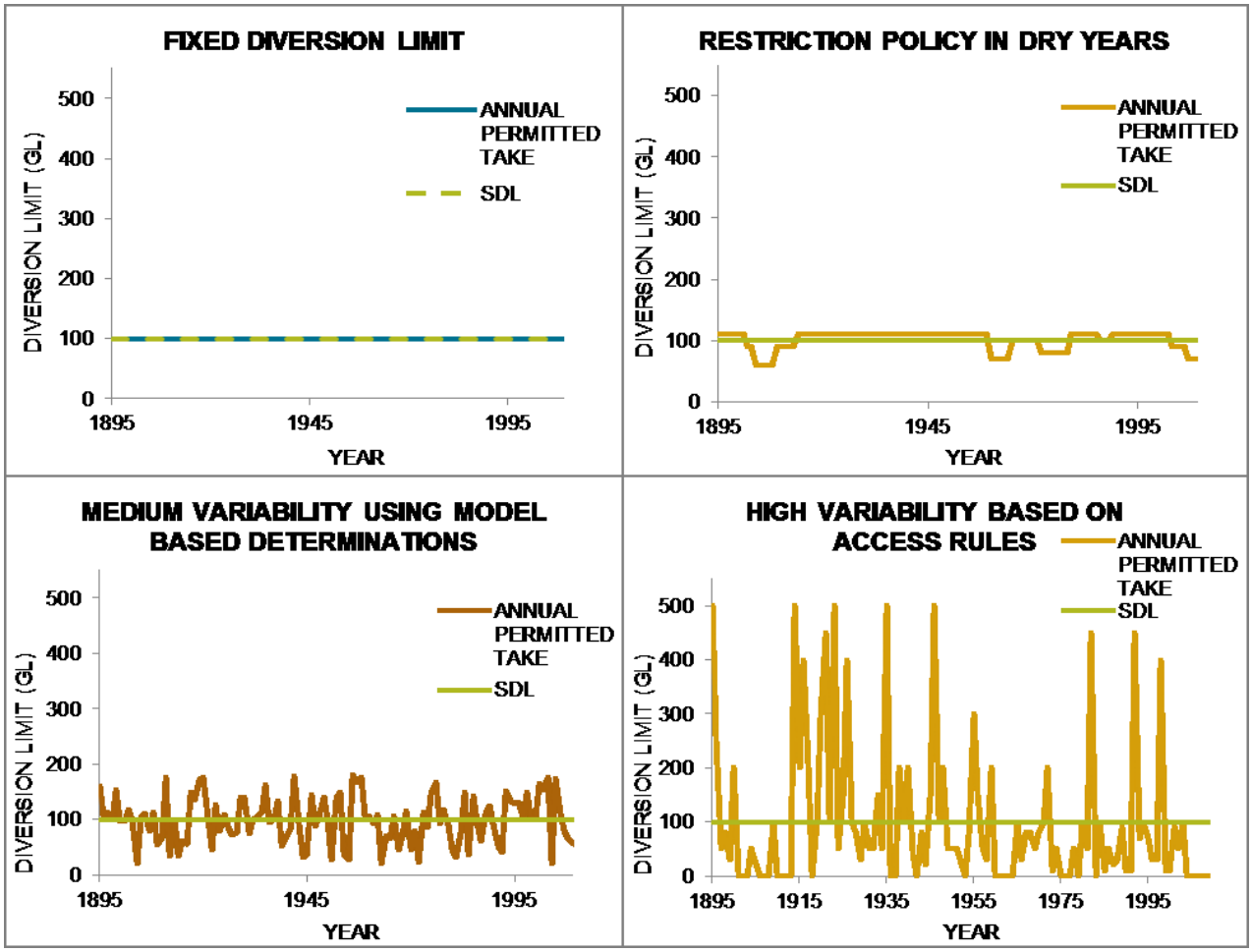

Figure 5: An illustration of four methods of determining the quantity of water permitted to be taken in a water accounting period

The method may also incorporate a number of separate components; particularly for surface water. This may include components such as a complex computer simulation model for the regulated river diversions, a regression equation for the unregulated diversions, a simple formula for basic rights and reference to several reports covering the assessment of take at 30 June 2009 for the different forms of interception. There is no requirement that these various components interact, although it will be important to ensure that there is no double-counting of any parts of the diversion limit. Depending on the method used it, may be necessary to demonstrate that the interaction of methods does not result in double-counting.

There are four key checks of any method set out in a WRP:

- Does the method account for all of the matters listed in s. 10.12 of the Basin Plan?
- Is the method consistent with all aspects of the WRP?
- When the method is applied, does permitted take not exceed the SDL over the historical climate period?
- Where applicable, can the method incorporate adjustments made to the SDL after the WRP is accredited?

Given the potential complexity of these checks, it is important that a WRP incorporate sufficient detail for these matters to be clearly determined, and all parts of the methods used must be included. Depending on how the method is constructed, it may also include or refer to the register of HEW (see s. 10.09).

From 1 July 2019 the method set out in each WRP will be required to ensure that permitted take for consumptive use is less than, or equal to, the long-term annual diversion limit. This is tested by demonstrating that when the method set out in the WRP to be used from 1 July 2019 is applied over a repeat of the historical climate (1895–2009), the permitted take for consumptive use does not exceed the relevant SDL set out in schedules 2 and 4 of the Basin Plan. The test will take into account all projects contributing to achieving the SDL — for example, Bridging the gap, supply measures and efficiency measures. The test will assess these projects based on Basin Plan policy; for example, how the baseline diversion limit has been defined in modelling.

Where the method determines a permitted take using less than full utilisation of allocated water, it needs to be demonstrated that the method will work to limit take where such utilisation increases. In these circumstances, the water allocation rules set out in s. 10.11 may allocate a volume that is higher than the annual permitted take, based on an assumption of less than full utilisation of allocation. The method for determining annual permitted take would need to make this assumption of less than full utilisation clear, and be closely coupled to the water allocation rules so that when the level of utilisation

changes the annual permitted take will also change to ensure that the SDL is not exceeded.

Item 7 of the table in subsection 22(1) of the Act defines the term **long-term annual diversion limit** (used in Chapter 10 of the Basin Plan) as the sum of the SDL and the temporary diversion provisions. The complete definition is provided in the Glossary. As the temporary diversion provisions have been set to zero, the long-term annual diversion limit is equal to the SDL.

It should be noted that the MDBA hydrologic model standard for water resource plan accreditation is eWater Source for water resource planning and operations, having regard to the modelling practices of Basin States and the nature of water resource plan areas and operational readiness of the model as it relates to a water resource plan area. Under the Basin Plan Implementation Agreement the MDBA will consult on the development of eWater Source for hydrological models used as part of the method for determining annual permitted take with the Basin Plan Implementation Committee and the committee's Water Resource Planning Working Group, and agree separately with each Basin State on the timeframes for its adoption.

Given the significance of meeting the requirements under s. 10.10 to implementing the SDL effectively, this is an area where early consultation with the MDBA is recommended.

Rules for take, including water allocation rules (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 for 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.

*Note 1: Water resource plans are not required to give effect to the long-term average sustainable diversion limits until 1 July 2019. Compliance with the long-term annual diversion limit will then be measured using the annual permitted take (see Part 4 of Chapter 6). The **annual permitted take** is defined in subsection 6.10(1).*

Note 2: Water allocations can be made during or before a water accounting period. The annual permitted take is usually worked out after the end of a water accounting period.

A water resource plan may provide for less water to be taken

(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.

In addition to setting out the method for determining annual permitted take at the end of a water accounting period (s. 10.10), a WRP must also include rules for determining the volume of water that consumptive users can actually take during a water accounting period. This may be (or include) rules such as water allocation rules or flow access rules and the rules must apply for each water accounting period commencing after 30 June 2019.

These rules are an important part of ensuring that the annual actual take does not exceed the annual permitted take, but may also be designed so as to encourage a greater percentage of the volume of water permitted to be taken to be actually taken, particularly in areas where water users historically use less than the volumes allocated to them.

In many highly regulated surface water systems these rules often include detailed water allocation policies and procedures, but all rules used to manage the temporal access to water during a water accounting period to ensure the SDL is not exceeded are relevant to this requirement.

Groundwater resources may have a significant storage component, so the amount of water available for use may be less directly related to year-to-year variations in climate. It is expected that in most cases relating to allocation of groundwater, it would suffice to specify that the limit for take in the SDL resource unit is the one that is specified in Schedule 4 of the Basin Plan (or one that is lower if desired). Many of the challenges involved in managing groundwater should be specified in response to Part 4 through the use of local management rules (e.g. specifying the proximity of bores, pumping and drawdown rates). Subsequently, the determination of actual take under s. 10.15, using metering, logbooks, estimates or other applicable methods, would confirm whether take is within the SDL.

To be clear, in some cases climatic conditions could result in restrictions on groundwater take in response to reduced water availability. In other cases restrictions may be needed — for instance, to protect base flows in unregulated systems during very dry periods – but these restrictions would fall under Part 4 of Chapter 10. This is because the desired outcome of the latter type of restriction is to protect an environmental function rather than to keep take within the SDL.

Regardless of this diversity, the WRP rules provide sufficient confidence that so long as water users operate in accordance with the WRP actual take should not exceed annual permitted take for that period. Therefore, where permitted take varies according to climatic and other factors, these rules may be designed to find a balance between a desire to see as much of the volume permitted to be taken is actually taken, and providing sufficient confidence that actual take will not exceed permitted take. The rules may also need to allow for an error margin allowing for such matters as uncertainties in estimation methods, unknown future climate and inflows, and take that is illegal, unauthorised or unaccounted for.

The rules must also be able to clearly account for any acquisition or disposal of HEW, whether the disposal and acquisition occurs within an SDL area, or the HEW is bought into or sold out of an SDL area. Subsection 10.12(3) requires a WRP to account for the disposal and acquisition of HEW separately and in a way that does not affect the method under s. 10.10.

Trade in HEW must be accounted for in a manner that does not impact inappropriately on consumptive use more generally for the relevant SDL units (see s. 10.12(3)). For example, if an owner of HEW sells water into consumptive use in a WRP area, the state will not need to reduce allocations to consumptive users so that actual take stays within permitted take. Rather, the volume of traded HEW is accounted for after the annual permitted take for that SDL resource unit is compared to the actual take through an adjustment to the cumulative balance for the SDL resource unit (see s. 6.12 of the Basin Plan).

An example of accounting for the disposal and acquisition of HEW in accordance with the various relevant provisions of the Basin Plan is presented beginning on page 39.

Matters relating to accounting for water (10.12)

(1) 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;

(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;

(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;

(d) subject to subsection (3)—trade of water access rights;

(e) water resources which have a significant hydrological connection to the water resources of the SDL resource unit;

(f) circumstances in which there is a change in the way water is taken or held under a water access right;

(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.

(h) water sourced from the Great Artesian Basin and released into a Basin water resource, by excluding that water;

(i) water resources which are used for the purpose of managed aquifer recharge.

(2) Subject to this section, the method may account for other matters.

(3) For paragraph (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.

In many parts of the Basin the method for determining permitted take can be quite complex and needs to account for many things. The Basin Plan requires that all relevant issues of movement or management of the water resources are taken into account when determining permitted take and that these be transparently set out in the WRP. The specific matters listed in s. 10.12 that must be accounted for are:

- all forms of take from the SDL resource units within the WRP area and all classes of water access right
- carryover and forward draw
- return flows (if the WRP area contains surface water)
- trade of water access rights on a temporary or permanent basis
- other water resources with a significant hydrological connection
- changes in the way water is taken, held or used under water access rights
- changes over time in the level of use of water allocations
- the exclusion of Great Artesian Basin water released into a Basin water resource
- managed aquifer recharge.

These matters must only be accounted for to the extent that each is relevant for the particular WRP area. The method should also account for any other matters relevant to accounting for the WRP area.

The MDBA expects that the accounting procedures set out accord with historically accepted water accounting procedures, or other generally accepted procedures that achieve a similar or better standard. Where there are existing and accepted systems in place for managing take (such as under the surface water Cap), these may be used for meeting this provision, although there may need to be some amendments for consistency with Basin Plan and Water Act requirements.

It should be noted that disposal and acquisition of HEW is to be accounted for separately in line with s. 6.12, which provides for step 3 of the compliance method, determining whether there has been non-compliance. Disposal and acquisition of HEW is likely to be undertaken using the existing water market, e.g. selling HEW into consumptive use, or purchasing water from consumptive use to be used as HEW. Step 3 of the compliance method requires comparing the cumulative balance of an SDL resource unit against the long-term annual diversion limit for the SDL resource unit, adjusted to account for any disposal or acquisition of HEW. Under this approach, disposal and acquisition of HEW is to be clearly accounted for.

Non-compliance occurs when the cumulative balance for an SDL resource unit is in debit, and that cumulative debit is equal to or greater than 20% of the long-term annual diversion limit for the SDL resource unit and the Basin State does not have a reasonable excuse for this excess.

Section 6.12(3) provides a Basin State may not claim that there is a reasonable excuse unless it has provided a report to the Authority setting out the reasons for the excess and the steps it will take to reduce the cumulative balance of the register to zero or a credit.

A worked example of accounting for disposal and acquisition of HEW is included below.

Example of the disposal and acquisition of HEW

The following is a worked example of how, over three water accounting periods, the cumulative water balance is adjusted to account for two environmental water disposal and acquisition events, in line with step 3 of the methodology for determining compliance (s. 6.12). The example is set out in tabular and graphic form.

In year one, there is no disposal and acquisition event. In year two, there is a disposal of 20GL from Area A to acquire 18GL in Area B. In year three, there is a second disposal of 20 GL from Area A to acquire 18 GL in Area B.

For both Area A and Area B there is compliance with the long-term annual diversion limit. It is important to note that over the course of three years, across the two areas consumptive use increases by 5 GL and HEW use decreases by 5 GL. This is because a lesser amount was acquired in Area B compared to what was disposed of in Area A. Such a situation may arise if, for instance, an environmental water holder held more water than was required to meet environmental watering requirements in Area A, but not enough to meet environmental watering requirements in Area B. In this situation the environmental water holder might choose to sell some HEW in Area A and use to proceeds to purchase water to be used as HEW in Area B. In some cases the disposal and acquisition may result in an overall change in the volume of HEW due to variation across different parts of the Basin, such as differences in security of entitlement, the value of water, the times that water is available, or the volume required to achieve an environmental outcome.

The example is concerned with entitlement trade, which necessitates tracking the movement of entitlements between environmental and consumptive use over a number of years. For allocation trades the accounting is simpler because the adjustment step occurs for one year only and does not need to be tracked across multiple years.

Table 2: A worked example of accounting for the disposal and acquisition of HEW

Accounting for disposal and acquisition of HEW	Year 1, SDL Area A	Year 1, SDL Area B	Year 2, SDL Area A	Year 2, SDL Area B	Year 3, SDL Area A	Year 3, SDL Area B
SDL	100	100	100	100	100	100
Determine annual permitted take for the SDL resource unit (10.10)[1]	100	100	100	100	100	100
Determine actual take for the SDL resource unit (10.15)	100	100	120	82	140[3]	65
Calculate annual permitted take and annual actual take (6.10; using information from 10.10 and 10.15)	–	–	–	–	–	–
Find the difference between actual take and annual permitted take (compares 10.15 to 10.10)	100–100	100–100	100–120	100–82	100–140	100–65
Record credits/debits for the SDL resource unit (6.11)[2]	0	0	–20	18	–40	35
Account for disposal and acquisition of HEW impacting the SDL resource unit (10.12(3))3	No trade in HEW	No trade in HEW	20 GL sold in A, 18 GL purchased in B	20 GL sold in A, 18 GL purchased in B	Another 20 GL sold in A, 17 GL purchased in B	Another 20 GL sold in A, 17 GL purchased in B
Adjust credits/debits for disposal and acquisition of HEW (6.12 (1)(a))	0	0	20	–18	40	–35
Adjusted credit/debit	0	0	0	0	0	0
SDL resource unit compliant (6.12)	Yes	Yes	Yes	Yes	Yes	Yes

Table 2 notes:

1 Paragraph 10.10(3)(a) requires accounting for a range of matters when determining permitted take (these matters are set out in subs. 10.12(1)). This example is only concerned with the treatment of trade between environmental and consumptives uses (paragraph 10.12(1)(d)).

2 This example demonstrates the accounting in a situation where HEW in Area A has been sold and a lesser volume purchased in Area B on the basis that this action provides a neutral or beneficial environmental outcome (i.e. the difference is not because of an exchange rate).

3 The volume of HEW that has entered consumptive use is accounted for as part of actual take each year — in year 2, 20 GL of former HEW entitlement has been permanently traded into consumptive use so there is 20 GL of actual take above permitted take, and, in year 3, a total of 40 GL of HEW entitlement has been traded into consumptive use so there is 40 GL of actual take above permitted take. It is important to keep track of the total amount of HEW that has been disposed of into consumptive use over the life of the plan because SDLs and permitted take are not adjusted for this purpose, so this information is needed to make adjustments to actual take when determining compliance each year.

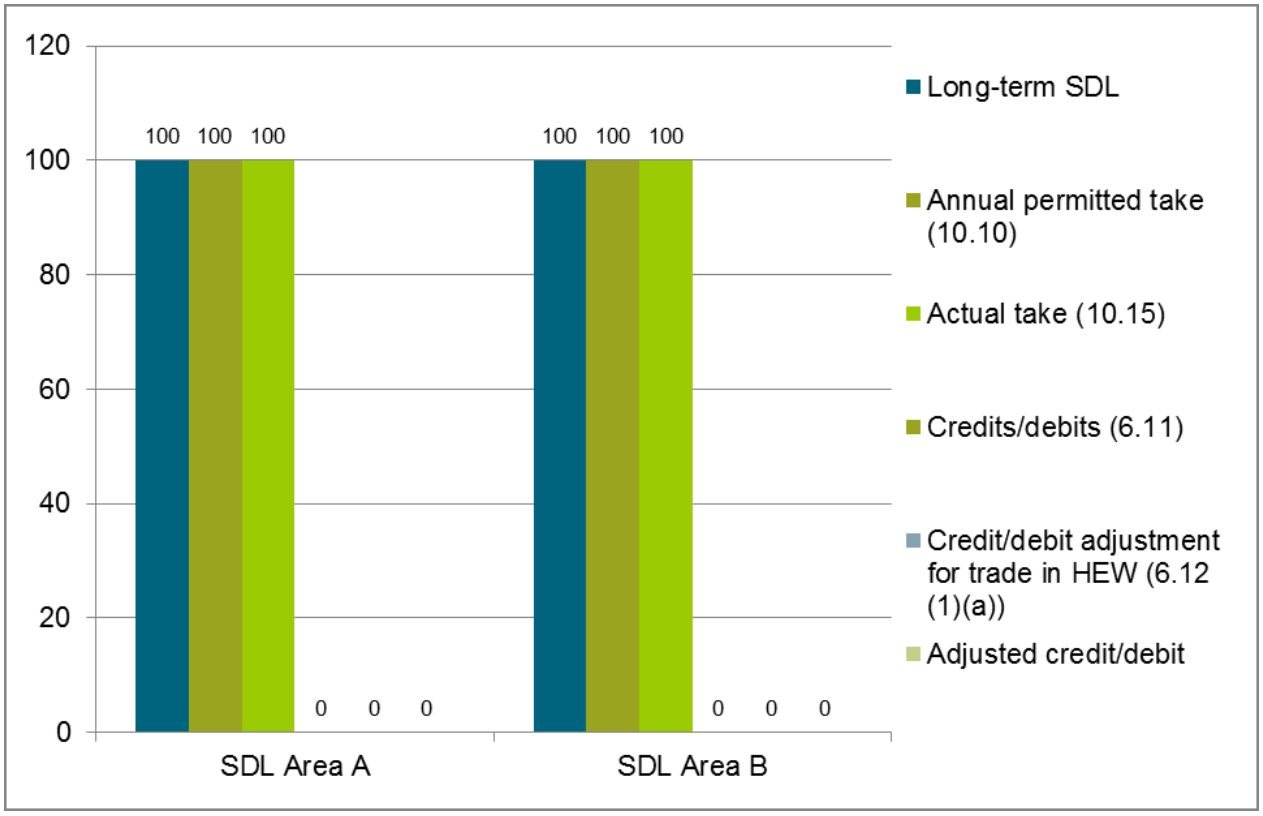

Figure 6: Accounting for the disposal and acquisition of HEW in year one

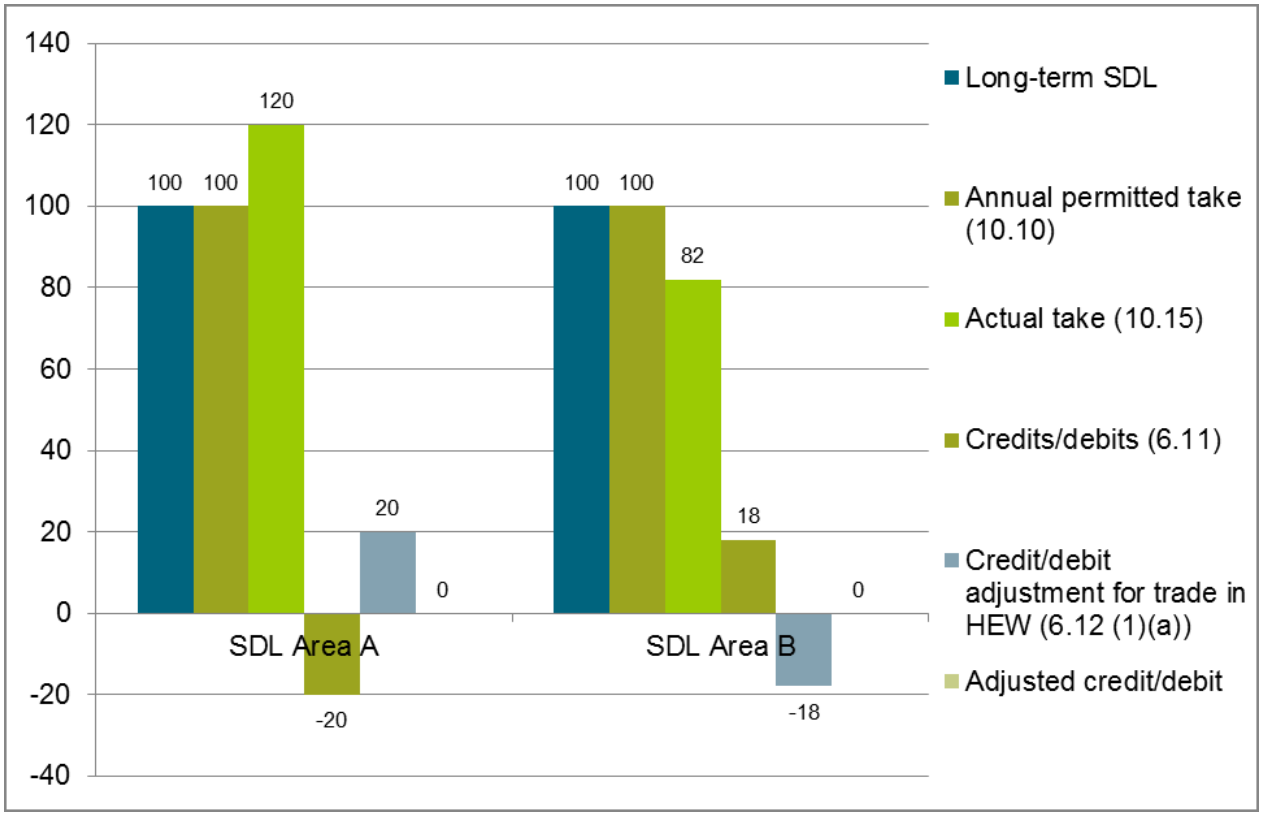

Figure 7: Accounting for the disposal and acquisition of HEW in year two

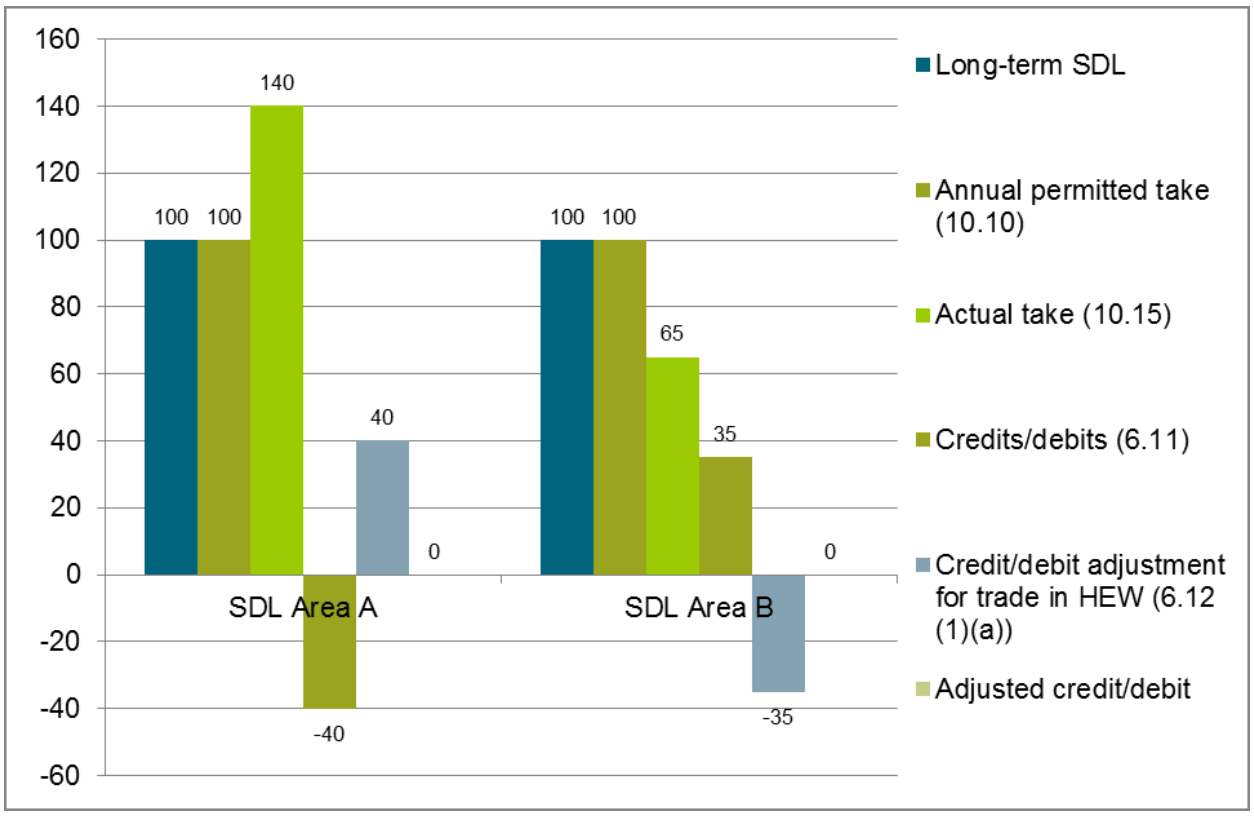

Figure 8: Accounting for the disposal and acquisition of HEW in year three

Limits on certain forms of take (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.

(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.

Some forms of take have not previously been managed within diversion limits in all areas; notably take under basic rights, take by run-off dams and net take by commercial plantations. Schedule 3 of the Basin Plan defines the components of the baseline diversion limit (BDL) for surface water SDL units. It also incorporates estimates of the volumes for these forms of take in each surface water SDL unit. Note that the term BDL is defined in s. 1.07 of the Basin Plan and the BDLs for surface water SDL units are set out in Schedule 3 of the Basin Plan.

To fulfil s. 10.13, WRPs incorporating one or more surface water SDL units will need to ensure that, for any increase in one or more of the forms of take specified above, adjustments are made to some other form of take within the SDL resource unit. These adjustments must be made to ensure there is no change to the total long-term annual average quantity of water permitted to be taken. This is most likely to be an offsetting mechanism such that permitted take from some other form of take is decreased.

Ideally the offsetting decreases would be capable of being measured accurately. However, this may not be possible in some cases, so if the form of take being increased or decreased cannot be accurately measured at the time the WRP is submitted for accreditation, the take must be reasonably estimated using the best available method.

The method should be cost-effective and fit for purpose as determined through the relevant risk identification and assessment. It is recommended that early consultation with the MDBA is undertaken about meeting this requirement.

The intent of this s. 10.13 is to avoid growth in interception activities leading to an increase in take over the SDL, while allowing some flexibility to specify limits for forms of take that are anticipated to change in future. This could allow, for example, take by basic rights to grow, as long as there are equivalent reductions in other forms of take, for instance, by purchasing and retiring entitlement. Such growth does not include improved measurement or estimates that show take as higher than previously estimated.

The WRP will also need to demonstrate that the changes are not expected to result in take from the SDL resource unit ceasing to be an environmentally sustainable level of take. Factors such as location and timing will be relevant considerations. For instance, increases in an interception activity in a particular location may adversely impact on a priority environmental asset.

Therefore, the WRP may need to address the change in relation to this impact as well as making volumetric adjustments. As such, the offset may not be linear and may vary depending on the location of the activities in the WRP area.

Effects, and potential effects, on water resources of the water resource plan area (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 pre-existing 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.

(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.

(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.

This requirement asks for the impacts on Basin water resources to be considered where those impacts arise from the use and management of non-Basin groundwater resources. If the WRP identifies an effect, or potential effect on Basin resources, the WRP must put in place appropriate monitoring and actions. It does not require any changes to the use or management of non-Basin resources.

Groundwater resources are vulnerable to changes in human activity in other water resources. The Basin boundary is based on surface water catchments, so some groundwater systems fall both within and outside the Basin boundary. The Great Artesian Basin is excluded from being a Basin water resource but underlies other Basin water resources. These factors create the potential for activities occurring in groundwater resources outside the Basin affecting Basin water resources. For example, it is possible that an increase in take from the Great Artesian Basin, which is not covered by the Basin Plan, could in effect increase the take from an overlying groundwater resource that is covered by the Basin Plan. This could, theoretically, happen if a bore allowed seepage from one system to the other or if a change in hydraulic head in the Great Artesian Basin activated a pre-existing hydrological connection. In addition, take from the Great Artesian Basin may in some instances affect springs in the Basin's headwaters.

The risk assessment undertaken to meet the requirements in Part 9 could be used to help inform the level of monitoring required, and the type of actions that will be taken to respond to any effects. An example of a possible action to respond to an effect, or potential effect, could be a requirement for a person whose activities create the effect to hold a water access right in the water resource covered by the WRP.

Division 3 — Actual take

Division 3 has one section. It is concerned with how actual take is determined annually, and that this is consistent with how the requirements of divisions 1 and 2 are implemented.

Determination of actual take must be specified (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.

*Note: The **annual actual take** for the SDL resource unit is the sum of the quantity of water actually taken by each form of take for consumptive use: see subsection 6.10(2). Paragraph 71(1)(c) of the Act requires the annual actual take to be set out in a report to the Authority within 4 months after the end of the water accounting period.*

(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.

(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.

(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

(b) exclude water sourced from the Great Artesian Basin and released into and taken from a Basin water resource.

The WRPs need to set out a process to determine the actual take at the end of each water year. Under s. 71 of the Act, Basin States must report this information to the Authority within four months of the end of the water year (although the Authority may extend this period in writing). This requirement is reiterated in Division 2, Part 4 of Chapter 6 of the Basin Plan.

Section 10.15 requires a WRP to 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.

Annual actual take is defined in ss. 1.07 and 6.10 to be the sum of the quantity of water actually taken by each form of take for consumptive use from the SDL resource unit for the relevant water accounting period. Consistent with the definition of take, this should, as far as possible, include all known and estimated illegal, unauthorised and unreported take. The MDBA recognises that there may be practical constraints to incorporating the latter, but will be seeking a demonstration that states will use their best endeavours to incorporate these matters when determining annual actual take.

The WRP must provide for the determination to be made using the best information available at the time. This requires use of the best information already available, including any improvements to this information over time. Where take is measured, this data should be used, with the most reliable data source to be used if multiple measurements of the same take are available. If take cannot be accurately measured, actual take must be determined by using a method (consistent with the method for s. 10.10(1)) or by estimating the take using the best information and method of estimation available at the time.

It is expected that the actual take in most WRP areas will be determined using a combination of measurement data, methods and estimates — the take by different forms of take in the same WRP area and SDL unit may be measured or estimated in different ways.

The appropriate means of measuring take should be fit for purpose and determined considering cost-effectiveness assessed in light of the risk identification and assessment undertaken in accordance with Part 9 of Chapter 10. It is useful to note the error margins of this information where they have been determined.

The determination of the quantity of water actually taken must include HEW which was disposed of and then taken for consumptive use and exclude HEW which was acquired from the consumptive pool. An example of accounting for disposal and acquisition of HEW is included beginning on page 39 of this handbook.

In addition, the determination should exclude water sourced from the Great Artesian Basin and released into, and taken from, a Basin water resource. This includes take by active intervention (e.g. pumping) but not base flow.

This provision does not require that all take be measured or that only one approach is used to determine all actual take from an SDL resource unit. What it does require is use of the best information available at the time using a robust estimation method that is consistent with the method for determining permitted take.

Part 4 — The sustainable use and management of water resources

Part 4 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.

Part 4 ensures that a broad range of factors that contribute to the sustainable use and management of water resources are considered when developing water resource plans (WRPs).

Sustainable diversion limits restrict take to a level that will not compromise the environmentally sustainable level of take (ESLT) characteristics for the SDL resource unit as a whole.

For surface water, this means that the environmental watering requirements for priority environmental assets (PEAs) — including water-dependent ecosystems, ecosystem services and sites of ecological significance — and priority ecosystem functions (PEFs), which are the processes that occur between organisms and within and between populations and communities, are not compromised.

For groundwater, this means the groundwater system should not be compromised in regards to the ESLT characteristics described in Division 3 of Part 4.

For both surface water and groundwater, there is potential for take that is within the SDL to have negative impacts on the ESLT characteristics at a local scale. Therefore, the sustainable use of water resources for some systems will only be achieved if SDLs are supported by management arrangements that account for the local impacts of surface water and groundwater take. Part 4 requires such management arrangements to be considered and addressed. There are many approaches that can be taken to meeting the requirements in Part 4, however these actions are not required to be of a nature that would result in reliability impacts to water users under s. 6.14 of the Basin Plan.

The risk assessment carried out under Part 9 will strongly influence the ways in which individual WRPs will need to address the requirements in Part 4. Each WRP will show how the Basin State intends to respond to the identified risks to water resources that can be addressed through the WRP. It is likely that in many circumstances these requirements will need a technical report to demonstrate that the need to include rules has been properly considered, and the rules proposed are appropriate to manage the relevant risks.

A key concept in meeting the requirements in Part 4 is **having regard to** whether it is necessary to include rules. A discussion of the meaning of this phrase is included in s. 1.07 of the Basin Plan, and is reproduced in the Glossary. It is strongly recommended

that water planners understand and keep this meaning in mind in their approach to Part 4.

Section 10.22 requires a WRP to describe how each requirement in Part 4 has been met. A WRP must explain decisions not to introduce rules to address relevant risks identified in s. 10.41(1) in Part 9. Accreditation will depend on this information being provided.

The accreditation requirements that apply to ss. 10.17–21 are highlighted here and discussed in more detail below. To meet the requirements in Part 4, the WRP must show that genuine, proper and realistic consideration has been given to including rules that ensure:

- the operation of the WRP does not compromise the environmental watering requirements of PEAs and PEFs (including those dependent on groundwater) or of groundwater that has a significant hydrological connection to surface water
- no structural damage to an aquifer arising from take within the SDL
- maintenance of hydraulic relationships and properties in groundwater sources
- prevention of elevated levels of water quality degradation, including salinity.

Regard should be had to the need for such rules based on the assessment of risks and the effectiveness of actions that may be taken to address the relevant medium or higher risks. Consideration may also be given to other relevant factors.

If rules are considered appropriate, they should be prescribed in WRPs.

Division 1 — Sustainable use and management

This division requires that management arrangements to ensure that water use within the SDL occur in a sustainable manner are considered and, where necessary, implemented.

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.*

Division 2 — Surface water

Division 2 of Part 4 is concerned with rules for managing PEAs and PEFs in surface water systems. A WRP 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 for PEAs and PEFs.

Priority environmental assets and priority ecosystem functions (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.

Note: The environmental watering requirements of priority environmental assets and priority ecosystem functions will be set out in long-term watering plans and may also be set out in the Basin-wide environmental watering strategy. Long-term watering plans are required to use the methods in Part 5 of Chapter 8 to identify those requirements.

(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.

(3) If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.

Under s. 10.41 current and future risks to meeting environmental watering requirements need to be identified and assessed. Where there are medium or higher risks to the environmental watering requirements of PEAs and PEFs that are relevant to the operation of the WRP, the inclusion of rules may be an appropriate approach to managing those risks.

The method outlined in Part 5 of Chapter 8 is to be used to identify PEAs and PEFs along with their environmental watering requirements. PEAs are identified on the basis that they can be managed with environmental water and meet one or more identifying criteria (detailed in Schedule 8), which includes:

- being formally recognised in international agreements, or with environmental watering can support the species mentioned in the international agreements listed in s. 4 of the Act
- being in a natural or near-natural state, rare or unique
- providing vital habitat
- supporting Commonwealth-, state- or territory-listed threatened species or communities
- supporting, or being capable of supporting with environmental watering, significant biodiversity.

The ecological objectives for PEAs should be consistent with the identifying criteria they fall under, with the ecological objectives informing the ecological targets. The targets are in turn used to determine the environmental watering requirements of the PEA.

The PEFs are also identified on the basis they can be managed with environmental water and meet one or more identifying criteria (detailed in Schedule 9), including that the ecosystem function:

- supports the creation and maintenance of vital habitats and populations
- supports the transportation and dilution of nutrients, organic matter and sediment
- provides connections along a watercourse
- provides connections across floodplains, adjacent wetlands and billabongs.

As with PEAs, the ecological objectives for PEFs should be consistent with the identifying criteria they fall under, and the ecological objectives inform ecological targets. These targets are then used to determine the environmental watering requirements for the PEF.

Water resource plans are an important mechanism for achieving the objectives of the long-term environmental watering plan and allowing for watering priorities to be set each year that are consistent with the Basin-wide watering priorities. In most cases the Basin-wide environmental watering strategy and the long-term watering plan for the WRP area will be developed before, or at the same time as, the WRP for accreditation. As such, the Basin-wide environmental watering strategy and the long-term watering plan may inform consideration of appropriate approaches to this provision. However, meeting this WRP requirement is not meant to be an environmental watering plan, rather the aim is for the WRP to manage consumptive use in a way that does not negatively affect PEAs and PEFs.

The kinds of rules that could be used include rules that specify the times, places and rates at which water can be taken. More specific examples could include cease-to-pump rules that operate based on the level of flow in an unregulated system, or having a winter take rule on licences to protect PEFs during summer low-flow periods. However, there are many other management arrangements that could also be used to meet this requirement.

Division 3 — Groundwater

Division 3 of Part 4 has four sections, all related to the sustainable use and management of groundwater.

These requirements have been included to ensure that the ESLT characteristics for groundwater are not compromised, as groundwater take that is within the limit of the SDL can still have localised adverse impacts on ESLT characteristics.

Priority environmental assets dependent on groundwater (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.

Note: The environmental watering requirements of priority environmental assets and priority ecosystem functions will be set out in long-term watering plans and may also be set out in the Basin-wide environmental watering strategy. Long-term watering plans are required to use the methods in Part 5 of Chapter 8 to identify those requirements.

(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.

(3) If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.

It is important that the way a WRP operates does not result in the environmental watering requirements of groundwater dependent PEAs and PEFs being compromised.

Under s. 10.41 current and future risks to meeting environmental watering requirements need to be identified and assessed. Where there are medium or higher risks to the environmental watering requirements of groundwater dependent PEAs and PEFs relevant to the operation of the WRP, the inclusion of rules may be an appropriate approach to managing those risks.

There are a number of different kinds of groundwater dependent ecosystems. For example, Eamus et al.[1] classify groundwater dependent ecosystems into three different categories:

- aquifer and cave ecosystems
- ecosystems dependent on the surface expression of groundwater; for example, mound springs, baseflow rivers, and estuarine seagrass beds
- ecosystems dependent on the subsurface presence of groundwater; for example, where vegetation has roots accessing groundwater.

As in Division 2, s. 10.17 above, it is expected that the method outlined in Part 5 of Chapter 8 would be used to identify the environmental watering requirements of environmental assets that depend on groundwater. A useful resource is the Atlas of Groundwater Dependent Ecosystems, available on the Bureau of Meteorology website, <http://www.bom.gov.au/water/groundwater/gde/index.shtml>

The principles detailed in Part 5 of Chapter 8 for identifying PEAs can still be used for identifying groundwater dependent assets. For an asset to be considered a PEA, it must be able to be managed by environmental watering and meet one or more of the criteria listed below. For groundwater dependent PEAs, environmental watering can be interpreted as leaving sufficient groundwater in the aquifer of an appropriate quality to meet the needs of the groundwater dependent asset. Another way of phrasing this is abstracting groundwater in a way that does not compromise the condition of the groundwater dependent PEA. The criteria include:

- being formally recognised in international agreements, or with environmental watering able to support the species listed in international agreements
- being in a natural or near natural state, rare or unique
- providing vital habitat
- supporting Commonwealth-, state- or territory-listed threatened species or communities
- supporting, or being capable of supporting with environmental watering, significant biodiversity.

The ecological objectives for PEAs are based on the identifying criteria they fall under, and the ecological objectives inform the ecological targets. The targets are in turn used to determine the environmental watering requirements of the PEA.

In some cases, the long-term watering plan for the WRP area or a connected WRP area may have identified relevant PEAs and PEFs. As such, a long-term watering plan may inform consideration of appropriate approaches to this provision.

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[1] Eamus D, Froend R, Loomes R, Hose G & Murray B 2006, A functional methodology for determining the groundwater regime needed to maintain the health of groundwater-dependent vegetation; *Australian Journal of Botany* vol. 54 pp. 97–114.

The kinds of rules that could be used include resource condition limits, and rules about the times, places and rates at which water may be taken. A more specific example might be restrictions on the placement of a groundwater abstraction bore within a certain distance of a groundwater dependent environmental asset.

Resource condition limits (as mentioned in s. 10.18(2)) define an acceptable upper limit to the impact of groundwater extraction and are typically described as water levels at key monitoring sites, which might be near key environmental assets for this requirement.

Groundwater and surface water connections (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).

(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.

(3) If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.

There are varying levels of connection between groundwater and surface water systems within the Murray–Darling Basin. In some groundwater systems there is a significant connection between groundwater and surface water. In gaining streams, groundwater provides base flow to surface water, while in losing streams surface water contributes to groundwater recharge.

The most comprehensive assessment of the MDBA's understanding of surface water – groundwater connectivity in the Basin can be found in the Recharge Risk Assessment Method reports for each of the Basin States; these reports can be found by searching the MDBA website's Knowledge and Information Directory <http://www.mdba.gov.au/kid> (or using the following links):

- http://www.mdba.gov.au/kid/files/1042-SDL-derived-from-RRAM-NSW-part1.pdf
- http://www.mdba.gov.au/kid/files/1042-SDL-derived-from-RRAM-NSW-part2.pdf
- http://www.mdba.gov.au/kid/files/1042-SDL-derived-from-RRAM-NSW-part3.pdf
- http://www.mdba.gov.au/kid/files/1043-SDL-derived-from-RRAM-Vic.pdf
- http://www.mdba.gov.au/kid/files/1044-SDL-derived-from-RRAM-Qld.pdf
- http://www.mdba.gov.au/kid/files/1047-SDL-derived-from-RRAM-ACT.pdf
- http://www.mdba.gov.au/kid/files/1046-SDL-derived-from-RRAM-SA.pdf

Other sources of information about the connectivity between groundwater and surface water are also available. For example, the Murray–Darling Basin sustainable yields project has contributed surface water – groundwater connectivity knowledge including mapping and a quantitative analysis of connectivity across the Basin. The relevant reports can be found on the MDBA and CSIRO websites (or through using the following links):

- http://www.csiro.au/Organisation-Structure/Flagships/Water-for-a-Healthy-Country-Flagship/Sustainable-Yields-Projects/SurfaceGroundwaterConnectivityMDBSY.aspx
- http://www.csiro.au/Organisation-Structure/Flagships/Water-for-a-Healthy-Country-Flagship/Sustainable-Yields-Projects/GroundwaterManagementUnitMDBSY.aspx

Excessive groundwater abstraction in areas with significant connections between groundwater and surface water can result in a reduction of base flows or an increase in induced recharge from the rivers and streams and thereby compromise the environmental functions provided by these connections. Both these outcomes can have negative impacts on low flows in the surface water stream, compromising an environmental function (i.e. providing connections along the watercourse, and supporting and maintaining vital habitat including during periods of low precipitation).

Under s. 10.41 current and future risks to meeting environmental watering requirements need to be identified and assessed. Where there are medium or higher risks to the environmental watering requirements related to a significant hydrological connection between surface water and groundwater, and those risks arise from groundwater take, the inclusion of rules in the WRP may be an appropriate approach to manage those risks.

A hydrological connection is ‘significant’, in this context, if the take of groundwater has, is forecast to have, or has potential to have impacts on an environmental asset or function that is dependent on the connection between groundwater and surface water, or if the connection could affect the environmental assets and ecosystem functions in any of the WRP areas.

Examples of rules that could be used include resource condition limits (as defined for s. 10.18), limits on the times, places and rates at which groundwater can be taken, and

restrictions on take that prevent resource condition limits being exceeded. A more specific example of a rule that could be used to meet this requirement is to use winter-take licences to maintain and protect base flows in summer.

Productive base of groundwater (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:

(a) there is no structural damage to 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

(b) hydraulic relationships and properties between groundwater and surface water systems, between groundwater systems, and within groundwater systems are maintained.

(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.

(3) If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.

This requirement is concerned with protecting the productive base of groundwater systems, which is the ability to continue productive use of groundwater into the future. This recognises that high levels of groundwater abstraction at a local scale can have significant negative impacts even if this take is within the SDL.

The impacts include — but are not limited to — structural damage to the aquifer, such as subsidence, which is usually irreversible; long-term declines in water levels; and changes in hydraulic properties and relationships. Changes in hydraulic properties and relationships include impacts such as changes in pressure heads causing water from an upper aquifer to leak into a lower aquifer; confined parts of aquifers becoming unconfined; intrusion of water from areas of poor quality groundwater into areas of good quality groundwater; and poor bore construction allowing the movement of water between previously unconnected systems.

In non-renewable groundwater resources, such as those in the South Australian – Victorian Border Zone, continued abstraction would necessarily result in long-term declines in groundwater levels, as they are no longer receiving significant recharge. In these systems, it is still desirable that declines in groundwater levels occur in a planned fashion, in a manner that has been agreed upon by the community through the water planning process. In these cases, the planned rate of decline in groundwater levels and the anticipated groundwater level 50 years after the commencement of the WRP can be specified.

Under s. 10.41 current and future risks to the maintenance of desirable groundwater levels, structural integrity and hydraulic relationships arising out of the management of the groundwater system need to be identified and assessed. Where there are medium or higher risks to these matters relating to the operation of a WRP, the inclusion of rules may be an appropriate approach to managing those risks.

The kinds of rules that could be used to meet this requirement include:

- rules about the times, places and rates at which water can be taken
- trigger points that reduce groundwater abstraction
- specification of the zones where continued abstraction will cause long-term declines in groundwater levels (i.e. ‘hotspots’)
- measures to prevent long-term declines in those hotspots
- planned rates of decline
- resource condition limits
- rules to prevent the resource condition limits from being exceeded.

More specific examples of rules that could be used to meet this requirement are to declare a local management zone in an area where abstraction is causing a long-term decline then using trading rules to prevent further entitlements being traded into the area; or to use allocation announcements to limit groundwater take in the local management zone until groundwater levels stabilise.

Environmental outcomes relating to groundwater (10.21)

(1) A water resource plan must be prepared having regard to whether it is necessary for it to include rules to prevent elevated levels of salinity and other types of water quality degradation within a groundwater SDL resource unit.

(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 from the groundwater SDL resource unit will result in an elevated level of salinity or another type of water quality degradation; 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; and

(d) a requirement to establish and maintain a register which identifies the sites of bores used to monitor salinity or other water quality characteristics in the groundwater SDL resource unit.

(3) If the outcome of the requirement in subsection (1) is that such rules are necessary, the water resource plan must include those rules.

This requirement is closely related to s. 10.20, protecting the productive base of groundwater, because groundwater quality has a strong influence on its productive value. However, ensuring elevated levels of salinity and other contaminants do not occur in groundwater systems is also important for maintaining the watering requirements of groundwater dependent PEAs and PEFs.

Take from groundwater systems can reduce water pressure in aquifers. Reduced water pressure can result in intrusion from neighbouring water systems. If these neighbouring systems are more saline or if their water quality is more degraded in other ways, the result can be reduced water quality in a groundwater SDL resource unit. Similarly, changes in hydraulic gradient can also result in salty water from one part of a groundwater system being drawn into a previously fresh part of the same system. Faulty bore construction can also result in water quality degradation, with contaminants from the surface or from other aquifers making their way into aquifers though this artificial hydrological connection.

Under s. 10.41 current and future risks arising from elevated levels of salinity and other types of water quality degradation need to be identified and assessed. Where there are medium or higher risks arising from these matters that are related to operation of a WRP, the inclusion of rules may be an appropriate approach to managing those risks.

The types of rules that could be used to meet this requirement include:

- rules about the times, places and rates at which groundwater can be taken
- bore construction standards
- resource condition limits
- rules to prevent those resource condition limits being exceeded
- rules to require a register of salinity monitoring bores.

A more specific example of a rule that could meet this requirement is to specify trigger salinity levels at the salinity bores in the register, and once this trigger has been reached or exceeded, a review of the operation of the plan must take place.

Division 4 — How requirements have been met

Division 4 of Part 4 contains a single provision regarding the need to set out how the requirements of this part have been met.

Description of how requirements have been met (10.22)

> *A water resource plan must:*
>
> *(a) describe what was done to comply with the requirements in this Part; and*
>
> *(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.*

Water resource plans need to provide context around the considerations called for in Part 4. They also need to describe what was done to consider these issues and be able to explain transparently why rules were judged necessary for the management of some risks and unnecessary for the management of others.

These are all matters for judgement and it is important to be transparent about those judgements so that the relevant trade-offs can be understood.

The MDBA encourages the development of WRPs that consider a range of options for the management of risks to the condition and continued availability of water resources. The provisions in this part relate certain specified risks with respect to the operation of the WRP.

A variety of documents could contribute to meeting this requirement, such as models, monitoring data, modelling reports, descriptions of the resource, technical reports, consultation reports, long-term watering plans and other water resource planning documents.

Section 10.41 — risk identification and assessment methodology — includes, among other things, a requirement to describe the data and methods used to identify and assess the risks. This information may help to describe what was done to comply with the requirements in this part.

Part 5 — Interception activities

The growth in interception activities has been recognised as presenting a potential risk to the achievement of environmental objectives and to the future integrity of water access entitlements. The Basin Plan includes estimates of water use from run-off dams, floodplain harvesting and commercial plantations as interception activities under baseline diversion limits and sustainable diversion limits (SDLs), as these have previously been identified as of risk across the Basin.

Part 5 ensures that a water resource plans identifies and provides for the monitoring of interception activities, individually or cumulatively, that present a medium or higher risk to the achievement of SDLs and environmental watering requirements. The WRP will also need to set out the actions that would be taken to manage the effects of any unanticipated growth or changes in interception activity.

Listing types of interception activity (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.

(2) If there are any such types of interception activity, the water resource plan must list those types.

(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.

Note: The following are types of interception activity which may have the potential to have a significant impact on the water resources of a water resource plan area:

(a) interception by runoff dams;

(b) interception by commercial plantations;

(c) interception by mining activities, including coal seam gas mining;

(d) interception by floodplain harvesting.

Water planners will need to assess whether any interception activities have the potential to have a significant impact either on the water resources of the WRP area or water resources that have a hydrological connection to the water resources of the WRP area.

The following types of interception have the potential to have a significant impact on certain water resources:

- interception by run-off dams
- interception by commercial plantations
- interception by mining activities, including coal seam gas mining
- interception by floodplain harvesting.

The test for the significance of impacts includes impacts arising from interception on an activity-by-activity basis or cumulatively. The test should also take into account the level of risk and availability of data.

The types of activity to be listed for an area will be informed by the risk identification and assessment undertaken in accordance with Part 9.

In addition to deciding which types of interception activity need to be listed for each WRP, potential impacts of the interception activities need to be assessed. These include:

- the location of particular activities of that type in the WRP area
- the significane of the impact of the type of activity on the availability of:
  - the water resources of the WRP area
  - water resources that have a hydrological connection to the water resources of the WRP area
- the projected growth of the type of activity over the period for which the WRP will have effect.

Consideration should be given to the relevant forms of take listed in s. 1.07 of the Basin Plan and any other forms of take that may arise from the interception activity.

Monitoring impact of interception activities (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.*

It is important to understand, at the WRP area scale, the rate of change in those interception activities assessed (including through the methodologies outlined in Part 9 of Chapter 10) to be a medium or higher risk to the achievement of SDLs or environmental water requirements.

The Basin Plan contains estimates for three forms of interception — floodplain harvesting, run-off dams and commercial plantations — at 30 June 2009. Interception by these activities is built into the surface water baseline diversion limit, which forms the basis for surface water SDLs. To avoid the volume of water taken creeping up and causing the SDL to be exceeded, s. 10.13 requires that any increase in the long-term annual average quantity of water that can be taken by one of the forms of take is accompanied by a change in the long-term annual average quantity of water that can be taken by another form of take in the same SDL resource unit. Knowledge about the rate of change will inform the development of any arrangements deemed necessary under s. 10.13 to offset any increases. In addition, this information will inform whether any other actions will need to be taken in accordance with s. 10.25.

Examples of the kinds of monitoring that could be used to determine the impact of interception activities include:

- collecting data from stream gauges, whether in the same WRP area as the interception activity or in an adjacent WRP area
- administrative procedures, such as licensing arrangements, for tracking any changes in interception volumes so these changes can be incorporated into models (i.e. growth in floodplain harvesting or mining interception)
- monitoring water levels in bores in the vicinity of groundwater interception activities, including aquifers above or below the aquifer where the interception is occurring where there is a risk of induced connectivity and leakage
- remote sensing of structures such as farm dams, or the area of plantation forestry.

The MDBA intends that the level of investment in monitoring activities is commensurate with the risks. The extent to which the impacts of interception activities should be

estimated, modelled or measured would depend on the expected benefits relative to the expected costs. It is expected that the location, nature and extent of the monitoring will be informed by the risks relevant to this part as identified and assessed in accordance with Part 9.

Actions to be taken (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.

(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).

Note 1: This section provides a mechanism to address unanticipated effects of, or changes in, interception activity.

Note 2: Section 10.13 sets out the circumstances in which a water resource plan may allow for an increase in anticipated take by an interception activity.

This provision is intended to address unanticipated effects of, or unanticipated changes in, interception activity.

It is expected that where relevant interception activities are listed and monitored in accordance with this part, the WRP will identify actions to be taken if monitoring shows that:

- an impact of a type of interception activity compromises the meeting of an environmental watering requirement, or
- an impact of several types of activity together compromise the meeting of an environmental watering requirement, or
- there is an increase in the quantity of water being intercepted by a type of activity after commencement of the WRP.

The types of actions to be identified will depend on the circumstances and extent of any effects or changes, and may be quite broad. The types of action to be considered will likely be commensurate with the risk posed by the impact of the interception. Examples of actions that could be taken include:

- adjustments of the kind that can be made under s. 10.13(2) (another form of take in the SDL unit is reduced by the same amount, providing that the forms of take can be measured or reasonably estimated and the substitution will not result in take ceasing to be an environmentally sustainable level of take)
- a review of the WRP, which may result in changes to the way the plan operates, such as requiring licences for certain interception activities or changing the way those interception activities occur — for instance, the times, places or rates at which they take water
- requiring an entitlement to be held
- limiting further expansion of a class of interception or identifying a trigger or ceiling for further development
- implementing make-good requirements, such as reinjection or virtual reinjection (substituting co-produced water for water that would otherwise be abstracted from a productive aquifer) of water associated with coal seam gas developments
- restricting the occurrence of certain activities in areas where they are likely to have a significant impact on environmental watering requirements.

It may also be useful for the WRP to set out thresholds at which the relevant identified actions may be taken.

Additional actions will not need to be identified if the relevant impacts are already accounted for by the method for determining the maximum quantity of water that the WRP permits to be taken for consumptive use for a particular SDL resource unit (under s. 10.10). This provision is intended to address unanticipated effects of, or unanticipated changes in, interception activity.

Section 10.13 (see page 45) sets out the circumstances in which a WRP may allow for an anticipated increase in take by an interception activity with respect to the forms of take defined in s. 1.07 of the Basin Plan.

Part 6 — Planning for environmental watering

The purpose of the Environmental Watering Plan (EWP) detailed in Chapter 8 of the Basin Plan is to achieve the best possible environmental outcomes using the increased, but still finite, amount of water made available for the environment by the Basin Plan and associated water recovery programs. It is intended to ensure that the size, timing and nature of river flows will maximise benefits to the environment. It aims to protect, enhance and nourish the Basin's rivers, wetlands and floodplains together with their plants and animals.

The EWP coordinates the planning, prioritisation and use of environmental water on a long-term basis through the Basin-wide environmental watering strategy and on an annual basis through the related Basin-wide annual environmental watering priorities.

Each Basin State will need to prepare a long-term watering plan and annual environmental watering priorities consistent with the Basin-wide environmental watering strategy — ensuring that environmental water is used as effectively as possible.

The WRPs have a facilitative role in achieving the objectives of the EWP. The way water is managed at the WRP level has the ability to affect the degree of ease, efficiency and effectiveness with which the EWP is implemented. Thus, the WRP needs to be prepared in a way that contributes to the objectives in Chapter 8.

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.

(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.*

Water resource plans must provide for environmental watering to occur in ways that are consistent with the Basin-wide environmental watering strategy and annual watering priorities. They will also help to achieve the objectives in Chapter 8 (Part 2). Broadly, these objectives are:

- to protect and restore the Basin's water-dependent ecosystems
- to protect and restore the ecosystem functions of water-dependent ecosystems
- to ensure that water-dependent ecosystems are resilient to risks and threats.

Further detail on the objectives can be found in Chapter 8 of the Basin Plan.

When providing for environmental watering, the most recent version of the long-term watering plan must be considered, as should the views of local communities, including bodies established by a Basin State to express community views about environmental watering. Previous consultation with local communities undertaken during the development of the State's long-term environmental watering plan and annual watering priorities may be relevant when meeting this requirement. These requirements are included to ensure that the measures included in the WRP are consistent with the wider Chapter 8 requirements and the principle of localism.

Localism in water management is about governments partnering with — and using and improving the capacity of — local and regional communities to manage water and other natural resources in an integrated way. Localism includes involving communities in developing and implementing reforms so that they have ownership of decisions and actions. It also allows local knowledge and solutions to be drawn on to meet local needs, while recognising those that fit within Basin and catchment scale strategies and actions.

In most cases the long-term watering plan for the WRP area will be developed before or at the same time as the WRP for accreditation. To maintain an appropriate level of consistency, Chapter 8 provides that the relevant long-term watering plan be reviewed and updated:

- within three months of the accreditation or adoption of a WRP
- within three months of the accreditation of an amendment to a WRP
- within three months of an update of the Basin-wide environmental watering strategy
- if it has been five years since the last time the plan was reviewed.

Water resource plans significantly influence the management of planned environmental water, so the intention of the MDBA under s. 10.26 is to ensure that WRPs continue to

play an active and constructive role. The aim is to ensure that the way WRPs are written and operated contributes to environmental watering consistently with the EWP and the Basin-wide environmental watering strategy, and the achievement of the environmental watering objectives in Chapter 8.

A number of actions could assist in meeting this requirement – however these actions are not required to be of a nature that would result in reliability impacts to water users, as per s. 6.14. Potential actions include, but are not limited to:

- providing for sufficient flexibility in planned environmental water rules to allow for WRPs to respond to the needs in the EWP
- providing accounting arrangements that assist in tracking the movement of environmental water and protect environmental flows from extraction for consumptive use such as water shepherding and return flow arrangements
- ensuring that rules in WRPs do not compromise key objectives
- providing for administrative arrangements that enable coordination at the WRP area scale of environmental flows with releases for irrigation to maximise benefits
- supporting the coordination of planned and held environmental water.

In many cases, the work done to meet the requirement under s. 10.17 to protect the environmental watering requirements of priority environmental assets and ecosystem functions will assist in meeting this requirement.

The environmental watering arrangements are intended to build on existing environmental watering strategies so in some cases institutional arrangements for allowing environmental watering will already exist.

Enabling environmental watering between connected water resources (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.

(2) The water resource plan for each of the areas must provide for the co-ordination of environmental watering between the 2 areas.

For some environmental assets and functions, it will be necessary to coordinate the use of environmental water in a number of connected systems to meet an environmental outcome.

Section 10.05 requires consideration of the management and use of connected water resources. For a WRP with a surface water connection with another WRP area, each WRP must be able to demonstrate that consideration has included having regard to the

environmental watering conditions and arrangements of the WRPs. Each of the connected WRPs must demonstrate that they 'talk' to each other. The requirement in s. 10.27 builds upon the requirement in s.10.05.

For s. 10.27, the WRP should facilitate managers and operators from connected WRP areas to work together in an operational context to provide for the coordination of environmental watering to occur.

The WRP should include mechanisms to enable the coordination of environmental water between connected WRP areas. For example, establishing committees and agreeing on arrangements to share information about environmental watering would help enable environmental watering between connected water resources.

Examples of coordination of environmental water include:

- coordinated releases from connected systems to water multiple sites along the River Murray (i.e. the Lower Goulburn floodplain, Barmah–Millewa Forest and Chowilla)
- coordination between states to enable watering of the Narran Lakes.

For illustrative purposes, successful water management of the Barmah–Millewa Forest is based on strong cross-border cooperation between State government agencies, the MDBA, catchment management authorities and local community groups. Coordinated environmental watering occurred during the late spring and summer of 2010–11 through a series of large-scale watering events.

An opportunity was seized to maintain flooding of the Barmah–Millewa Forest by coordinating the release of environmental water from the Hume Reservoir to reinforce strong flows from the Ovens and Kiewa rivers. This example highlights the importance of sharing information — flows from the unregulated rivers are unable to be controlled, but information exchange about flows in unregulated rivers provided the opportunity for these kinds of flows to be reinforced using held environmental water from storages.

About 428 GL of planned and held environmental water was released from Hume Reservoir between September 2010 and February 2011. The environmental water comprised 10 GL of New South Wales held environmental water, 199 GL of The Living Murray held environmental water and 219 GL of planned environmental water from the Barmah–Millewa Forest Environmental Water Allowance (owned by New South Wales and Victoria).

No net reduction in the protection of planned environmental water (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.*

The Act (s. 21(5)) provides that:

> *The Basin Plan must ensure that there is no net reduction in the protection of planned environmental water from the protection provided for under the State water management law of a Basin State immediately before the Basin Plan first takes effect.*

Section 10.28 has been included for the WRPs to ensure a minimum level of protection for PEW applies at the WRP area level because many of the rules and arrangements related to the management and protection of PEW operate at this level. To establish that there is no net reduction, the MDBA needs to understand any changes from previous arrangements and an explanation of the impact of those changes.

For example, meeting this requirement may involve showing that the rules in a plan have not changed the volume or characteristics of the PEW between the version of the plan in place before the Basin Plan and the version that is submitted for accreditation as a Basin Plan–consistent WRP. This could be achieved by having identical rules (and no changes to other parts of the WRP that would change the effect of these rules). If the rules have changed, the protection of PEW could be displayed by showing that any changed rules still deliver PEW of the same volume and characteristics (e.g. by modelling both sets of rules over the historical climate and comparing the volumes delivered).

Part 7 — Water quality objectives

Chapter 9 of the Basin Plan sets out an integrated water quality and salinity management plan for the whole of the Murray–Darling Basin, providing a framework of objectives, targets, planning and management actions that, when implemented, will contribute to the maintenance and improvement of water quality. The water quality and salinity objectives referenced at Part 3 of Chapter 9, and the targets referenced at Division 3 of Part 4 of Chapter 9 are relevant to the water resource plans. Under certain specified circumstances outlined in s. 10.32, the WRP may identify alternative targets.

Part 7 of Chapter 10 requires a WRP to establish a water quality management plan (WQM Plan) that has been developed with consideration of the impacts of wider natural resource management and land management on water quality within the WRP area. The WQM Plans will identify causes of water quality degradation and risks to water quality, and will incorporate water quality and salinity targets. The water quality target values may be the 'default' values from Division 3 of Part 4 of Chapter 9. Alternative values may be specified in the WQM Plan, provided that these give the same or better levels of protection as those set out in Chapter 9. In addition, a key requirement is that WQM Plans incorporate measures that will contribute to the achievement of the water quality objectives provided in Chapter 9, unless there are no such measures that can be undertaken cost-effectively.

A key concept in meeting the requirements of ss. 10.30, 10.33 and 10.35 is **having regard to** certain matters. A discussion of the meaning of this phrase is included in s. 1.07 of the Basin Plan, and is reproduced in the Glossary. It is strongly recommended that water planners understand and keep this meaning in mind in their approach to Part 7.

The National Water Quality Management Strategy aims to deliver a nationally consistent approach to water quality management. Of the suite of documents released as part of the strategy, the *Implementation guidelines* provide a series of steps that could be undertaken to develop a WQM Plan. This document can be found at <http://www.environment.gov.au/water/policy-programs/nwqms/index.html>

A number of states also have well-established water quality planning mechanisms or frameworks. Many of the documents prepared using these arrangements could meet, or contribute to meeting, the requirements of this part.

Water quality management plans will be expected to identify types of water quality degradation in the WRP area, particularly where these are identified as a risk to the condition and continued availability of the water resources in that WRP area. Note that, while s. 1.07 of the Basin Plan defines water quality to include water salinity, in some cases chapters 9 and 10 specifically use the term 'salinity' for clarity; however, this does not affect the application of the definition, which means that salinity is always included where the term 'water quality' is used.

Water resource plan to include WQM Plan (10.29)

> *A water resource plan must include a water quality management plan (**WQM Plan**). The WQM Plan must be made in accordance with this Part.*

Each WRP must include a WQM Plan for the WRP area set out in line with Part 7 and a number of the requirements in Chapter 9. The relevant references to Chapter 9 are discussed below. In many cases, State water quality legislation and policies already provide for water quality management in a manner that would fulfil many of the requirements in this part. The WQM Plan may not be part of the State's primary water planning documents relating to water access regimes; relevant material may form part of the Basin Plan WRP in accordance with s. 10.04. Some states may also manage salinity separately from broader water quality management; however both matters should be included for the WQM Plan.

WQM Plan to identify key causes of water quality degradation (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.*

Water quality management plans will need to identify the causes, or likely causes, of water quality degradation in the WRP area.

Part 2 of Chapter 9 lists types of water quality degradation in the Murray–Darling Basin. These include:

- elevated levels of salinity
- elevated levels of suspended matter
- elevated levels of nutrients, including phosphorous and nitrogen
- elevated cyanobacteria cell counts or biovolume, toxins and odour compounds
- water temperature outside natural ranges
- dissolved oxygen outside natural ranges
- elevated levels of pesticides, heavy metals and other toxic contaminants
- pH outside natural ranges
- elevated pathogen counts.

Key causes for each type of degradation are detailed in Schedule 10 of the Basin Plan.

In preparing the WQM Plan, water planners and decision-makers must consider these key causes and any other causes that they consider relevant for the area.

Measures addressing risks arising from water quality degradation (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.*

Part 9 of Chapter 10 requires all risks to the condition and continued availability of the water resources of the WRP area to be identified and assessed. Risks arising from elevated salinity or other types of water quality degradation are identified in s. 10.41(2)(d). Section 10.41(6) also requires that the level of risk is defined for each risk. Section 10.43 requires that those risks identified as being at medium or higher level must have strategies for addressing risks, or an explanation why the risk cannot be addressed. Section 10.31 is a provision concerning information rather than action, and requires an explanation for why measures addressing the risks arising from elevated salinity or other types of water quality degradation have or have not been included in the WRP.

Section 10.31 intends that the water quality requirements in the WRP take into account the risks identified for that WRP area and that any measures are fit for purpose and cost-effective — for instance, consideration should be given to the costs of addressing a particular risk and whether the costs exceed any expected benefits. Similarly, if the only measures available to achieve a particular target at a specific location conflict with other policies or targets (as may be the case for meeting dissolved oxygen or salinity targets, and environmental watering objectives), it is likely that such measures would not be undertaken or that alternative measures would be incorporated. In instances where policy objectives or targets are in conflict the measures implemented should not ignore the conflicting objectives but should seek to minimise or reduce any adverse impacts. In such cases, it is expected that judgements will be made based on the risk assessment and the best available information. Applying adaptive management in these situations will allow lessons learned from implementing measures to be used to improve measures in the future.

WQM Plan to identify water quality target values (10.32)

> *(1) The WQM Plan must identify the water quality target values for the water resource plan area.*
>
> *(2) The water quality target values are the following:*
>
> *(a) for fresh water-dependent ecosystems—the applicable target values referred to in section 9.16;*
>
> *(b) for irrigation water—the target values for water quality characteristics set out in section 9.17;*

(c) for water used for recreational purposes—the values set out in section 9.18.

Note: The ADWG sets out standards for the quality of raw water for treatment for human consumption.

(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.

Note: See the objective in section 9.08.

(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.

To help maintain appropriate water quality for environmental, social, cultural and economic activities, the WQM Plan will identify water quality target values for freshwater-dependent ecosystems, irrigation water and recreational water for that WRP 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 WRP area.

Basin water quality target values are set out in Chapter 9 in ss. 9.16–18.

In some cases, water resources are already at better levels of water quality than the target values specified in Chapter 9. In such cases, the better value prevails and the objective is to maintain that better quality of those water resources — they should not be allowed to degrade to the lower target levels or beyond. This objective is set out at s. 9.08 of Chapter 9. The better value should be an objectively determined actual value — determining such values requires a common sense approach, and will differ depending on the type of target, the kinds of data available, the period of the data and other factors.

The water quality target values for freshwater-dependent ecosystems within target application zones are set out in Schedule 11. The target application zones are biogeographical constructs for which different water quality target values apply. These zones are generally the montane, upper or lower zones of the major river valleys.

Schedule 11 sets out the type of water-dependent ecosystem, water quality characteristics and certain other information for each target application zone. The targets specified in the relevant zones will need to be considered when establishing water quality target values for a WRP area. These target values are default values and have been derived using the *Australian and New Zealand guidelines for fresh and marine water quality* which can be found at <http://www.environment.gov.au/water/policy-programs/nwqms/index.html>. The targets in Schedule 11 apply to surface water, so they only apply to groundwater to the extent that groundwater contributes to the relevant surface water resource (i.e. as baseflow or discharge), which would be measured though surface water quality.

Water quality target values for irrigation water and recreational water are at s. 9.17 and s. 9.18 respectively. The water quality targets for irrigation water apply at sites where water is extracted by an irrigation infrastructure operator for the purpose of irrigation (s. 9.17(2)). Section 10.34 requires that these sites are identified in the WRP, and the definition of irrigation infrastructure operator is given in the discussion of s. 10.34 below.

A WQM Plan may set alternative target values to those in Chapter 9 by following the procedures set out at s. 10.32(4). This arrangement allows consideration of the most up-to-date scientific information when developing water quality targets for the WRP area.

If an alternative target value relates to a water resource that is also covered by the WRP area of another Basin State, that Basin State must be consulted in relation to the alternative target value.

WQM Plan to identify measures (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.

(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.

(3) The measures may include land management measures.

Note 1: Chapter 9 contains both water quality objectives and water quality targets. A WQM Plan must specify measures that contribute to the achievement of the objectives. The targets are relevant only to the extent that subsection (2) requires that the measures be prepared having regard to the targets. This section does not require a WQM Plan to set out measures designed to achieve the targets.

Note 2: See also subsections 22(9) to (12) of the Act.

The WQM Plans must specify measures that will contribute to the achievement of the specified water quality objectives set out in Part 3 of Chapter 9, unless no such measures can be undertaken cost effectively. The Basin water quality objectives set out in Chapter 9 relevant to this provision relate to:

- declared Ramsar wetlands and other water-dependent ecosystems
- raw water for treatment for human consumption
- irrigation water
- recreational water quality
- maintaining good levels of water quality.

When developing these measures, water planners and decision makers must have regard to the causes or likely causes of water quality degradation relevant to the WRP area and discussed in s. 10.30 (page 74). Planners and decision makers must also have regard to the relevant water quality and salinity target values discussed in s 10.32 (page 75), and the targets in s. 9.19 (Division 4 of Part 4 of Chapter 9).

In addition, the risk identification and assessment undertaken under Part 9 of Chapter 10 will help inform preparation of the measures. The Authority considers that this approach will result in cost-effective and fit-for-purpose measures. The rationale for the inclusion or non-inclusion of measures addressing one or more specific risks is to be outlined under s. 10.31 (page 75).

The Basin Plan does not specify the nature of the measures to be included, but these can relate to both water and land management actions. The provisions of the Basin Plan have effect only to the extent that they relate to a matter relevant to the use or management of Basin water resources (s. 22(9)). The Act precludes the Basin Plan from directly regulating land use or planning in relation to land use, controlling pollution or managing natural resources other than water (s. 22(10)). This means that for measures triggering these matters, or any activity triggering these matters, the Basin Plan itself is not an instrument which controls or governs these matters or activities, or which they can be assessed against. Implementing land management measures, by way of regulation or otherwise, is not mandatory but a State can choose to do so where such measures are appropriate to address particular water quality issues, and these measures could be recognised for this requirement.

Examples of such measures include the use of salt interception schemes to reduce the levels of salinity in rivers; having regulations around the placement and management of intensive livestock operations, such as feedlots, to prevent wastes entering watercourses and increasing nutrient levels and pathogen counts; changing operating rules or infrastructure for dams to minimise thermal pollution and decreased dissolved oxygen levels downstream of dams; and protecting riparian vegetation to prevent erosion leading to elevated levels of suspended matter.

The intention of these provisions is to allow sufficient flexibility to provide for the most appropriate measures in a given circumstance, where such measures are necessary, to contribute to the achievement of the water quality objectives.

WQM Plan to identify locations of targets for irrigation water (10.34)

> *The WQM plan must identify the sites in the water resource plan area at which the target values for irrigation water apply.*

Section 9.17(2) of the Basin Plan specifies that the water quality targets for irrigation water apply at sites in the Murray–Darling Basin where water is extracted by an irrigation infrastructure operator for the purpose of irrigation. A WRP needs to identify

the sites where the water quality targets for irrigation water apply. This is required so that the targets do not apply at all points in a water resource, but only at the relevant extraction points. An irrigation infrastructure operator is defined in s. 7 of the Act, set out below:

> *(1) This section applies if a person owns or operates infrastructure for one or more of the following purposes:*
>
> *(a) the storage of water;*
>
> *(b) the delivery of water;*
>
> *(c) the drainage of water;*
>
> *for the purpose of providing a service to another person.*
>
> *(2) The person is an infrastructure operator.*
>
> *(3) The infrastructure is water service infrastructure.*
>
> *(4) If the infrastructure operator operates the water service infrastructure for the purposes of delivering water for the primary purpose of being used for irrigation:*
>
> *(a) the operator is an irrigation infrastructure operator; and*
>
> *(b) the infrastructure is the operator's irrigation network.*

Impact of WQM Plan on another Basin State (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.*
>
> *Note: See also the consultation requirement in subsection 63(2) of the Act.*

Section 63(2) of the Act provides that if a water resource plan area is adjacent to a water resource plan areal located in another Basin State, the proposed water resource plan must be prepared in consultation with that other Basin State. One outcome of this consultation should be to ensure that any measures in the WQM Plan are developed having regard to any impact of those measures on the ability of another Basin State to

implement its WQM Plan and on any adverse impacts on the water resources of the other State. Consideration of the impact of measures on another State should assume comparable levels of management in the adjoining area, and does not require one WRP to include measures that offset less effective management in a connected WRP area. The consideration should also include any impact that may occur because a measure has not been put in place, or the measures put in place are inadequate.

Consideration of these matters may arise from consultation with the other State, as indicated above, or from technical assessments of the impacts of the measures, or on existing knowledge and agreements about the management of known impacts. For example, representatives of two or more Basin States may agree to meet regularly to consider issues of mutual concern (e.g. joint investment in research, works and measures) — in short, to take a ‘no borders’ approach.

Part 8 — Trade of water access rights

Part 8 of Chapter 10 applies to water access rights that can be traded under State water management law. This is specifically for trade within groundwater SDL resource units, between groundwater SDL resource units and between groundwater and surface water SDL resource units. Chapter 12 of the Basin Plan sets out more detailed provisions relating to water trade.

As trade of water access rights involving groundwater is challenging due to the uncertainties surrounding the level of connectivity between locations and resources, the three-dimensional nature of aquifers and uncertainties about their boundaries, and the potential for local-scale impacts with intense groundwater abstraction, the Basin Plan does not require groundwater trade to be possible. However, if a Basin State does allow groundwater trade, it must operate consistent with the requirements set out in Chapter 12.

The water trading rules are contained in Chapter 12 of the Basin Plan and come into effect on 1 July 2014, in accordance with s. 1.04(2) of the Basin Plan. The provisions discussed here, which sit within Chapter 10, come into effect when the Basin Plan is made and apply to each WRP area when the relevant WRP is accredited.

Rules pertaining to trade involving groundwater have been included in the WRP requirements because the conditions dictating groundwater trade will be specific to particular water resources, and relate to resource condition limits that are specified at this scale. The intent of these requirements is to ensure trading rules around groundwater are clear and transparent, and that they adequately consider the potential for third-party and environmental impacts.

If trading rules that are not required under Part 8 (e.g. rules applying to the trade of surface water) are included in the documents submitted as part of the WRP for accreditation, s. 10.04(5) applies and this material must be identified and will not be considered for accreditation. However, the MDBA may consider and provide a Basin State with additional advice on these matters alongside the accreditation process.

Application of part (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.*

Section 10.36 is an exclusion provision that states that Part 8 does not apply to water access rights that cannot be traded under State water management law.

Circumstances in which conditions in s.12.24, s.12.25 and s.12.26 are met (10.37, 10.38 and 10.39 respectively)

10.37 Circumstances in which conditions in section 12.24 are met

(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.

(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.

10.38 Circumstances in which conditions in section 12.25 are met

(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.

(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.

10.39 Circumstances in which conditions in section 12.26 are met

(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.

(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.

The requirements in ss. 10.37–9 are very similar, with small differences in the requirements depending on the type of trade. For this reason, they are addressed together here, but the differences between the requirements will be highlighted. Section 10.37 applies to trades of water access rights between locations within a groundwater SDL resource unit; s. 10.38 applies to trades of water access rights between groundwater SDL resource units; and s. 10.39 applies to trades of water access rights between groundwater and surface water SDL resource units. In all cases, these trades are prohibited, unless a number of conditions in Chapter 12 of the Basin Plan are met. For s. 10.37, these requirements are in s. 12.24; in s. 12.25 for s. 10.38; and s. 12.26 for s. 10.39.

If all the conditions are met, the WRP will set out the circumstances in which trade between two locations or units is permitted.

The conditions that must be met in order for trade to occur in all three situations are:

- There is sufficient hydraulic connectivity between the two locations or units.
- Resource condition limits in the SDL resource unit as defined in the WRP for that area will not be breached because of the trade. Resource condition limits at the WRP level may be specified when meeting the requirements of Part 4 of Chapter 10, so consideration of the outcomes of Part 9 will help to inform the trading rules for a SDL resource unit.
- Either:

    a. the water access rights in the two locations or units have substantially similar characteristics in terms of the timing, reliability and volume of the rights; or
    b. there are measures in place to ensure the water access right that is traded will maintain these characteristics.

- There are measures in place to address the impact of the trade on the reliability of water access rights held by third parties.

In addition to these requirements, for trades that occur between two resource units — that is, trades between two groundwater SDL resource units (s. 10.38) and trades between groundwater and surface water (s. 10.39) —measures need to be in place to account for the trade. This will ensure that trades between units do not result in non-compliance with the SDL.

Sufficient hydraulic connectivity is an especially important in the case of trade between groundwater SDL resource units. In systems that are fully allocated, water users can secure extra water through trade of entitlement or allocation. When a trade occurs between groundwater SDL resource units, *permitted* take for the destination SDL resource unit will be increased, and the *permitted* take for the origin SDL resource unit will be decreased, accounting for the trade. However, the SDL in both resource units will remain the same (the same permitted take accounting mechanisms also exist for surface water SDL resource units).

As the adjusted *permitted* take will be above the SDL, which is determined as being the environmentally sustainable level of take, it is important that there is sufficient hydraulic connectivity between the two groundwater units to ensure there are not negative environmental or third party impacts due to the increase in take above the SDL in the destination SDL resource unit.

The guidelines for Chapter 12 — Water trading rules will be released after this handbook, and will provide further detail on the requirements in ss. 12.24–6, including definitions of key terms. An additional guideline relating specifically to the groundwater trading rules will also be published by the MDBA.

If the measures to address third-party impacts include applying a conversion rate to the trade, either the conversion rate or the method used to determine the conversion rate needs to be set out in the WRP. If the method is set out in the WRP, then actual rate resulting from the application of the method needs to be made publicly available (e.g. on a website).

Part 9 — Approaches to addressing risks to water resources

Chapter 4 of the Basin Plan identifies the risks to the condition or continued availability of Basin water resources, and sets out high-level strategies to manage or address those risks.

The high-level strategies include the development of WRPs and the promotion of a risk-based approach to water resource planning and management throughout the Basin. These strategies are supported by the requirements of Chapter 10, including requirements for WRPs to be prepared having regard to risks to the condition and availability of water resources and the strategies to manage or address those risks (see s. 10.41(1) and s. 10.43(3)).

There are large differences in the risks that affect the different water systems and ecosystems in the Basin. Each WRP will need to identify and assess risks in the WRP area, and include planning and management strategies for medium and higher risks.

The risk assessments carried out under Part 9 will inform the way water planners go about fulfilling the requirements of Chapter 10, particularly parts 4, 5 and 7.

Undertaking a risk assessment is fundamental to determining the way the rest of the WRP will be developed and is an important first step in the WRP development process. Undertaking the risk assessment early in the WRP development process will ensure that the Basin State and the MDBA continue the process of WRP development and assessment with a common understanding of the approach that will be taken to risk assessment, the level of complexity in the area and the level of identified risk. This importance is recognised in the Implementation Agreement, in which the development of WRP development program by a Basin State and MDBA may be informed by the risk assessment prepared for the area. Risk assessments can also be shared through the Basin Plan Implementation Committee – Water Resource Planning Working Group to ensure continuous mutual improvement.

Effective risk management enables the cost-effective allocation and use of planning resources along with improvements to operational effectiveness and efficiency. In the context of water resource planning, this is expected to lead to WRPs that meet the requirements of Chapter 10 in a manner that reflects the nature and complexity of issues and potential threats in each WRP area. This will involve incorporating strategies to address medium and higher risks at a scale appropriate for a WRP and that WRP area.

Where State water planning and management arrangements currently address the relevant issues, it may be that all that is needed for accreditation is evidence of the risk identification and assessment that has informed those arrangements and a description of how the strategies, actions or measures are intended to address those risks. It is noted that in many WRP areas this work is already being undertaken but may not be

termed a risk assessment or may not be completely documented. In such cases, the inclusion of specific information regarding these processes and conclusions may be sufficient to fulfil the requirements of Part 9.

Definitions (10.40)

> *In this Part:*
>
> ***risk** means a risk listed in a water resource plan in accordance with subsection 10.41(4).*
>
> ***level of risk** has the meaning given in AS/NZS ISO 31000:2009 Risk Management—Principles and Guidelines.*

Section 10.40 contains a definition of risk and defines level of risk as the one that is given in AS/NZS ISO 31000:2009 Risk Management—Principles and Guidelines.

It should be noted that while this part has been developed with reference to the Australian and international standards for risk management, it does not require that these standards be followed but does require the meaning of level of risk to be the same as the one used in the standard mentioned above. These standards do, however, provide a useful framework that could be applied for the risk assessment.

Risk identification and assessment methodology (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.*
>
> *(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.*
>
> *(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.

(4) The water resource plan must list the risks identified for the purposes of subsection (1).

(5) The water resource plan must assess each risk.

(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.

(7) The water resource plan must describe the data and methods used to identify and assess the risks.

(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.

This provision aims to ensure that WRPs apply a systematic approach to the identification and assessment of risk. The practical outcome is intended to be a list of risks to water resources in the WRP area.

In addition, the WRP must define each risk as low, medium, high or any additional category considered appropriate.

While no specific methodology is required for accreditation, guidance can be found in such documents as:

- AS/NZS ISO 31000:2009 Risk management — Principles and guidelines
- ISO 31010:2009 Risk management — Risk assessment techniques
- National Water Initiative Policy Guidelines for Water Planning and Management, particularly the risk assessment module
- various supporting handbooks produced by Standards Australia and others.

The MDBA used a more complex method of risk assessment for the Basin Plan, and has also produced a version of this method that can be used for WRP development, and may be of interest to water planners. Detail of the method can be found by searching for ‘Developing a Bayesian Network’ in the MDBA’s Knowledge and

Information Directory on our website <http://www.mdba.gov.au/kid/files/737-Developing-Bayesian-Network-WRP-ICAM.pdf>

Many methods are available to assist in risk identification and assessment, such as brainstorming sessions, structured interviews with experts, Delphi method, Bayesian networks, scenario analysis, cost-benefit analysis and comparative risk analysis.

Although a specific methodology is not required, the data and methods used to identify and assess the risks need to be identified under s. 10.47. For the purposes of this part, the definition of "level of risk" is that given in the AS/NZS ISO 31000:2009, as identified in s. 10.40, and this should be kept in mind when defining the level of risk under s. 10.41(6).

Risk assessments generally take a common form. *Figure 3 – Risk management process* in the AS/NZS ISO 31000:2009 Risk management — Principles and guidelines document reflects a typical process of defining the purpose of the risk assessment, identifying the risks, analysing and evaluating the risks, and defining any management of those risks.

The risk identification and assessment methodology should consider all risks to water resources in the WRP area, including as appropriate the risks identified in s. 4.02 of the Basin Plan:

> *(1) The risks to the condition, or continued availability, of Basin water resources, including the risks to the availability of Basin water resources that arise from the matters specified in item 3 of the table in subsection 22(1) of the Act are:*
>
> *(a) insufficient water available for the environment; and*
>
> *(b) water being of a quality unsuitable for use; and*
>
> *(c) poor health of water-dependent ecosystems.*

In considering which method is most appropriate for the WRP area in question, it is useful to consider factors such as the size of the resource, the level of development and potential development, and the environmental, cultural and economic values at stake. Consideration of the best available information and the resources available for this part of the WRP development is also relevant. The data and methods used to identify and assess the risks must be included, together with a description of any quantified uncertainties about the level of risk.

In particular, if a sensitivity analysis has been undertaken, the results of that analysis should be included. It will be important to explain clearly how the level of risk has been determined.

Understanding all relevant risks for the WRP area will help to determine appropriate strategies for addressing those risks under s. 10.43 and other relevant provisions. There are some specific links with other parts of Chapter 10, described below.

Part 4 (page 50) provides for management arrangements that account for the local impacts of surface water and groundwater take to be included, if and where necessary. The risk assessment undertaken in Part 9 will inform the way these impacts are managed at the local scale.

Part 5 (page 63) requires that the types of interception activity within the WRP area that have, or may have, an impact on relevant water resources are identified. In addition, s. 10.23 also requires that certain factors must be considered when making this assessment.

Part 7 (page 73) includes reference to risks arising from elevated levels of salinity or other types of water quality degradation. Where such risks have been identified, Part 7 requires an explanation as to why measures to address those risks have or have not been included in the WRP.

Part 13 (page 101) requires consideration of certain extreme events and flexibility to deal with new knowledge, including with respect to climate change.

Part 14 (page 104) requires consideration of the risks to Indigenous values and uses arising from the use and management of water resources.

Consideration should be given to those links when undertaking the risk identification and assessment. While the parts above contain specific reference to risk, consideration of risk is not limited just to those parts. The risk assessment can also be used to inform a number of other aspects of the WRP requirements, e.g. parts 3, 6 and 8.

The Authority may at times publish guidelines, under s. 4.04, in relation to risk identification and risk assessment and, if available, the information in these should be considered. No such guidelines have been prepared at the time of preparation of this handbook.

Description of risks (10.42)

> *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; and*
>
> *(b) factors that contribute to those risks.*

Section 10.43 requires that risks be identified as having a medium or higher level of risk have mitigation strategies. This provision prepares for this by isolating the medium and

higher risks, describing these risks and identifying the factors that contribute to each of them.

Factors that affect both consequences and likelihood of the risk should be identified and can include a broad range of matters.

Strategies for addressing risks (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.

(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.

(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.

Note: The Authority may publish guidelines in accordance with section 4.04 in relation to the implementation of strategies to manage or address risks identified in section 4.02.

This provision requires the inclusion of strategies to address the medium or higher level risks identified above. The strategies identified here will inform the way the WRP addresses other parts of Chapter 10. If a risk is identified that relates to another part of Chapter 10, the strategy will need to take account of that requirement. For instance, the strategies may incorporate:

- rules such as those contemplated in Part 4
- monitoring of certain types of interception activity, and other relevant actions, under Part 5
- cost-effective measures that contribute to achieving certain water quality objectives in accordance with Part 7.

When developing the strategies, regard must be had to the strategies listed in s. 4.03(3) of the Basin Plan. This may include, for instance, consideration of whether these or similar strategies should be applied at the WRP level.

In addition, it would be appropriate to consider the compatibility of any proposed strategies with those outlined in the Basin Plan.

The aim is to produce WRPs that include management arrangements that address the relevant issues for the particular water resources in a way that is feasible within the context of the WRP.

Some risks may not be able to be addressed by strategies that can be implemented through the WRP. If this is the case, the WRP should include an explanation of the reasons why the risk cannot be addressed at this level. The explanation may relate to the factors identified under s. 10.42 that may be beyond the scope of the WRP, or it may reference broader State or national strategies that address the risk (although such strategies may be devolved at an appropriate scale to the regional or local level where appropriate).

An example of where risks may be addressed outside the WRP is the risk that bushfires pose to water quality. This risk is largely managed though interventions that affect the likelihood and severity of bushfires, such as controlled burns and bushfire response strategies. Therefore, the WRP could refer to such documents as managing the water quality risk posed by bushfires rather than including measures to address this risk in the WRP itself.

Part 10 — Measuring and monitoring

Part 10 requires that WRPs will provide transparent information about the nature of any measurement undertaken in each area, particularly in identifying what is being measured at the time the plan is made.

Information relating to measuring take — water access entitlements (10.44)

> *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;*
>
> *(b) the best estimate of the total long-term annual average quantity of water taken that is not measured;*
>
> *(c) how the quantities under paragraphs (a) and (b) were calculated;*
>
> *(d) 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.*

This provision seeks information about the nature of measurement of take in the WRP area at the beginning of the plan period. This includes the best estimate of how much take is measured and how much is estimated. All forms of take need to be included, such as take from a watercourse, a regulated river, by floodplain harvesting, by run-off dams, from groundwater, under basic rights and net take by commercial plantations. This also includes take that is under licensed entitlement, basic rights, interception and unauthorised take. The provision does not impose new or additional measurement and metering requirements, it is seeking to clearly identify what is and what is not measured.

Information about measurement and monitoring at this scale will help to establish confidence levels for SDLs. It will also provide transparency around the methods used to estimate take where measurement is not in place.

Subsection 10.44(d) also requires information regarding the proportion of the quantity of water taken that is measured in accordance with standards for measuring agreed by the Basin States and the Australian Government. At the time of writing, standards for measuring were yet to be agreed. However, it is anticipated that standards relevant to the implementation of Chapter 10 will be developed.

Supporting measuring (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; and

(b) the standard to which take is measured.

(2) The water resource plan must specify the timeframe for implementing the measures.

The MDBA expects existing measurement activities to be maintained and, if practicable, improved. As such, the WRP should specify measures for maintaining the proportion of take that is measured in the WRP area and the standard to which take is measured (if any is undertaken). If practicable to improve either the proportion of take measured or the standard to which take is measured, measures to provide for that improvement may also be included.

The WRP must also specify a period of time for implementing the measures.

The provision does not require the introduction of new and improved measurement activities, and it is acknowledged that some forms of take cannot be directly measured.

Examples of ways that the proportion and standard of take that is measured in a WRP area could be provided for include:

- providing details about proposed improvements to measurement, such as improvements made under the National Water Initiative
- providing information about how the level of measurement will be maintained, such as schedules and budgets for maintenance, or details of any cost recovery mechanisms that the State may have in place
- identifying any regulatory requirements within the State regarding the maintenance (or improvement) of measuring devices.

Monitoring water resources (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 13.14.

(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.

Chapter 13 requires Basin States to contribute to monitoring and evaluation of the effectiveness of the Basin Plan, with detail of the matters to be reported given in Schedule 12 of the Basin Plan.

Guidelines are being developed to inform Basin States and other parties regarding the monitoring requirements set out in Schedule 12 of the Basin Plan.

Some of the matters to be reported on by the states under Schedule 12 do not fall within the scope of the WRP requirements, and so it is not expected that such matters will be included in the WRP. However, where the WRP or information resulting from its implementation could contribute to the monitoring and evaluation required under Schedule 12, these relationships should be identified and consideration given to how this information will be communicated.

Basin States already undertake monitoring and evaluation activities and, in many cases, this monitoring will go beyond what is required in this provision. States are able to carry out monitoring activities in addition to, or in more detail than, those required by Chapter 13 of the Basin Plan.

Part 11 — Reviews of water resource plans

An accredited WRP, including any document that may form part of the WRP, may be reviewed by the relevant Basin State at any time. The WRP needs to contain processes to ensure that a report of any review undertaken is provided to the Authority. If the State intends to amend the WRP, the reasons for the amendment also need to be provided. These provisions need to be read together with s. 65 of the Act regarding the accreditation of amendments to WRPs.

Review 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.*

As discussed under s. 10.04, WRPs are likely to consist of several documents. Within the life of the WRP, one or more of those documents may need to be reviewed. While this provision does not require any reviews to be undertaken, where a State chooses to review one or more of the instruments comprising the WRP (including where it is a legislative requirement), the MDBA should be kept up to date with the findings of such a review.

The WRP should incorporate a commitment to ensure that the Authority is provided with a copy of the review within 30 days of its completion. In this context, the date of the completion of the report can be taken as the day on which it receives final approval from the highest level required under internal State processes (e.g. approval from a minister or head of department).

This provision does not prevent the Basin State from providing drafts of the report to the Authority for information or comment before it is finalised.

Amendment of water resource plan (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.*
>
> *Note: See also section 65 of the Act.*

If, because of a review described in s. 10.47, a State wishes to amend a WRP, it will propose an amendment to the Authority. It will also provide the Authority with reasons for the amendment. Submitting amendments to the Authority for assessment, and ultimately accreditation by the minister, ensures that a WRP remains consistent with the Basin Plan and continues to meet its Basin Plan obligations. Unaccredited amendments do not have this protection, and have the potential to create conflicting requirements for water users and operators.

The WRP amendments can be accredited under s. 65 of the Act. Processes for accrediting amendments to WRPs are being developed and will be incorporated into this document in the future. The accreditation of amendments to WRPs is based on the minister being satisfied that the WRP, as amended, would be consistent with the Basin Plan. Any consultation carried out before submitting an amendment must be documented in accordance with s. 10.07.

Part 12 — Information used to prepare water resource plan

Part 12 provides for WRPs to be based on the best available information. It also calls for the identification and description of significant methods, models or tools used to develop the WRP. These may be recorded on the list called for under s. 10.04.

Best available information (10.49)

(1) A water resource plan must be based on the best available information.

(2) The water resource plan must identify and describe the significant sources of information on which the water resource plan is based.

A WRP will be based on best available information. The MDBA recognises that a decision as to which information is 'best' will be a matter for judgement on the part of those involved in the preparation and accreditation of the WRP, drawing on a wide range of information, and therefore recommends that this matter is discussed throughout the development of WRPs. Ultimately the Authority and the Minister need to make an independent assessment of whether the information used was the best available.

Information may be extracted from a wide range of sources, including but not limited to, scientific and technical research papers, data (e.g. monitoring data), expert advice, results of consultations and evaluations, peer-reviewed journal articles, conference papers, theses, outputs of modelling runs, policies, Australian and international standards and risk assessments. The MDBA Knowledge and Information Directory, available at <http://www.mdba.gov.au/kid/> is also a good source of information.

Water resource plans often take a long time to develop, so discretion will be used during the preparation and accreditation of WRPs in deciding which information can reasonably be considered during the development of the WRP.

It is recognised that in some cases there may be little or no information available in relation to a WRP area. This provision does not require that new information be collected or obtained. However, it may be necessary to collect or obtain new information to fulfil other requirements in this chapter.

Parts of Chapter 10 where the identification of information sources will be particularly pertinent are:

Part 3 — Incorporation and application of long-term annual diversion limit

Part 4 — The sustainable use and management of water resources

Part 5 — Interception activities

Part 6 — Planning for environmental watering

Part 7 — Water quality objectives

Part 8 — Trade of water access rights

Part 9 — Approaches to addressing risks to water resources

Part 10 — Measuring and monitoring

Part 14 — Indigenous values and uses.

A clear reference, hyperlink or copy of the information would also help assessment for accreditation. In the interests of transparency, it would be good practice to reference each significant information source with a short description of the contents, how it was compiled, by whom and when.

The best available information and methods are those judged to be the most appropriate and technically sound for the purpose. The approach to making such a judgement will vary and it is strongly recommended that key sources of information are discussed with the MDBA during development of the WRP. Relevant considerations in such a judgement would include:

- Is the source of information peer reviewed (such as from a high-quality academic journal)?
- Is the source an Australian, New Zealand or international standard?
- Is the source endorsed and/or used by a professional association or community of practice?
- Is the type of information relied upon commensurate with the complexity and range of issues encountered in the WRP area?
- Has the source of information been subject to external audit (e.g. for models)?
- Does the source have general acceptance in the relevant field of expertise?

The key to this assessment is to decide whether, on balance, the information considered and used in developing a WRP is the best available given the nature of the resource, the level of risk, and the complexity of issues to be managed. In circumstances where two or more valid sources of information provide conflicting views or approaches, it would be useful to include an explanation about why the information used was preferred.

Information is considered significant if it has materially influenced the development of the WRP. In addition, information that was considered in 'having regard to' particular matters in accordance with various requirements of Chapter 10 may need to be included, even if consideration of that matter did not result in a rule, measure or action being taken.

Methods used to develop water resource plan (10.50)

> *A water resource plan must identify any significant method, model or tool that has been used to develop the water resource plan.*

In addition to listing information sources, the WRP will also identify all significant methods, models and tools that have been applied to develop the plan. 'Significant' in this context relates to methods, models and tools that materially influenced the content of the WRP. As with significant sources of information, it is useful to identify these methods, models and tools in the list made under the requirement for s. 10.04. Other parts of the WRP requirements also ask for a method to be identified and described (e.g. ss. 10.10, 10.13, 10.15, 10.41). One piece of information can be used to meet multiple requirements, as long as this is clearly articulated in the list made under s. 10.04. In some cases it will be necessary for the method or model to be part of the WRP, not just referenced (e.g. when meeting the requirements in s. 10.10).

Some of the methods, models or tools that could be identified include models relating to surface water, groundwater, surface water – groundwater interaction, climate, precipitation and recharge. It should be noted that eWater Source modelling has been adopted by the MDBA as the standard for water resource planning and operations, having regard to the modelling practices of Basin States and the nature of water resource plan areas and operational readiness of the model as it relates to a water resource plan area, as part of the Basin Plan Implementation Agreement.

Methods could include those used to estimate certain forms of take, such as interception by farm dams or stock and domestic licences; methods used to undertake risk assessments; methods used to determine environmental watering requirements; and methods for determining the conversion rates used for groundwater trades.

Part 13 — Extreme events

Part 13 is concerned with ensuring that plans submitted are robust and flexible enough to allow for a range of water availability scenarios, including extreme dry periods. There are other extreme events that can affect the operation of WRPs, such as events that have a severe impact on water quality, or the failure of infrastructure. It is important to have clear and transparent planning processes in place to allow water users and managers to understand and respond should these extreme events occur.

Measures in response to extreme events (10.51)

(1) 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;

(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;

(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).

(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.

(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.

Historically the climate in the Basin has been highly variable. Climate change may result in even greater variability, including the more frequent occurrence of extreme events. This provision intends to ensure that the potential for extreme events and how water resources will be managed during and after these events have been considered. This includes learning from past instances that have resulted in the suspension of a regional water plan (including statutory plans, subordinate legislation and non-statutory instruments).

Extreme events to be considered are extreme dry periods (e.g. a dry period that is outside the range of experience contained in the 114-year historical climate baseline),

and extreme water quality events that result in water being acutely toxic or unable to be used for its established values and uses (e.g. a blackwater event or outbreak of blue-green algae). Management of extreme wet events (flooding) is related to emergency response planning more than water resource planning, so it not covered by this section. Extreme events in the River Murray System that compromise critical human water needs are dealt with using an additional range of actions. Extreme events in the River Murray System that trigger Tier 2 or 3 water sharing arrangements will be managed in accordance with Schedule H to the Murray Darling Basin Agreement and Chapter 11 of the Basin Plan.

Including measures in the WRP to allow water resources to be managed during extreme events will assist in addressing such events in a timely, efficient and transparent manner. It will also help to avoid delays caused by the need to amend a WRP to manage water resources during an extreme event or to suspend its operation, although these avenues are still available. Scenario development and testing using models is a potential area for further work, and will help define best practice in the management of water resources in response to extreme events.

In particular the WRP needs to contain measures for meeting critical human water needs during extreme events. Critical human water needs are defined under s. 86A(2) of the Act 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; and*
>
> *(b) those non-human consumption requirements that a failure to meet would cause prohibitively high social, economic or national security costs.*

Information that could be used to satisfy this requirement includes:

- roles and responsibilities relating to the management of water resources during the identified extreme events (e.g. the powers of the minister to declare an extreme event)
- the water management actions that will be implemented to respond to extreme events (e.g. restrictions on take, the policies for determining the level and timing of those restrictions, and how water will be provided to the point of use)
- a demonstration of how the WRP will perform under extreme circumstances
- alternative water management rules to manage water resources during extreme events (e.g. changes in the way that water allocation rules are applied)
- estimates of the volume of water required to meet critical human water needs

- the indicators that will be used to assess whether an event (i.e. dry period or water quality event) is classified as ‘extreme’ and determine the type or level of action to be taken (e.g. specifying the duration or severity of an extreme event)
- circumstances in which a WRP can be suspended and the extent of temporary rules that could be put in place while the plan is suspended.

It should be noted that this requirement is only concerned with the implications of extreme events for the management of the water resources of the WRP area. The information provided should be at a high level and should be specific to the concerns of a WRP. This requirement should not be interpreted as requiring existing emergency management plans to be submitted as part of a package for accreditation.

In some cases, new scientific information will emerge that will change our understanding of the nature of extreme events — for instance, events that were once considered extreme and unusual are recognised as occurring more regularly. The WRP needs to contain structures that allow these changes in information to be taken into account, including considering the need to manage water resources differently. This may then lead to a review of the existing WRP and amendments to manage water differently, which would need to be accredited according to the requirements in the Act to have standing under the Basin Plan.

Part 14 — Indigenous values and uses

The Authority recognises and acknowledges that the Traditional Owners and their Nations in the Murray–Darling Basin have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. The Authority understands the need for recognition of Traditional Owner knowledge and cultural values in natural resources management associated with the Basin.

Part 14 requires that water resource plans (WRPs) are developed in consultation with Indigenous people and provide a basis for Indigenous people to play an active role in identifying their own relevant objectives and outcomes. The views of Indigenous people on a range of other issues must also be considered. These other issues include cultural flows, protection of indigenous values and uses, identified heritage and identification of risks arising from the use and management of the water resources.

The note at the beginning of Part 14 in the Basin Plan outlines the MDBA's commitment to consult with the relevant Indigenous organisations for that area in relation to whether the requirements of Part 14 have been met. This will include the Murray Lower Darling Rivers Indigenous Nations or Northern Murray–Darling Basin Aboriginal Nations if the nations in that WRP area are represented by MLDRIN or NBAN. If MLDRIN or NBAN do not represent nations in that WRP area, the MDBA will consult with the relevant Indigenous organisations. The structures and timelines for undertaking this consultation will be developed by the MDBA with the input of Indigenous organisations and the Basin States.

A key concept in meeting the requirements in Part 14 is **having regard to** certain matters. A discussion of the meaning of this phrase is included in s. 1.07 of the Basin Plan, and is reproduced in the Glossary. It is strongly recommended that water planners understand and keep this meaning in mind in their approach to Part 14.

Objectives and outcomes based on Indigenous values and uses (10.52)

(1) 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; and

(b) the outcomes for the management of the water resources of the water resource plan area that are desired by Indigenous people.

(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.

(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.

These provisions require the identification of relevant objectives and outcomes through consultation with Indigenous people. This consultation will take place within the context of the social, spiritual and cultural values and uses of the nations of that WRP area.

When having regard to the matters in this provision, creating and retaining appropriate documentation of relevant decisions will help to provide evidence that proper consideration has been given to the views expressed.

Indigenous organisations with an interest in water management will vary within each WRP area. For some WRP areas this may include initial consultation with either MLDRIN or NBAN, where those two bodies already play a representative role. However, it may also be appropriate to consult with other representative groups in a given area.

The MDBA recognises that states have existing Indigenous networks and consultation processes. Additional organisations may be contacted through a number of networks including, but not restricted to, Indigenous health services providers, National Native Title Tribunal, local Aboriginal land councils, Aboriginal corporations, catchment management authorities and the Office of the Registrar of Indigenous Corporations.

The MDBA looks forward to working with Basin States to identify opportunities to strengthen the protection of Indigenous values and Indigenous uses. Where opportunities are identified that would enable this to happen, the WRP must specify those opportunities. Note also that s. 10.55 requires that the level of protection already provided for these values and uses should at least be retained.

Consultation and preparation of water resource plan (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 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 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.

Note: For examples of the principles that may be applied in relation to the participation of Indigenous people, see the document titled 'MLDRIN and NBAN Principles of Indigenous Engagement in the Murray–Darling Basin'.

(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).*

Consultation with the relevant Indigenous organisations should seek views with respect to a range of matters, in addition to those indicated above. The MDBA anticipates there is likely to be different levels of consultation required in different WRP areas depending on the particular circumstances in each area. In some cases, there will be existing Indigenous consultation processes and these processes can be used and built upon where necessary.

Preparation of the WRP should demonstrate awareness of any matters related to native title rights, native title claims and Indigenous Land Use Agreements under the *Native Title Act 1993* (Cwlth). Consultation and preparation of the WRP must also have regard to any registered Aboriginal heritage related to the water resources in the WRP area, in accordance with the relevant heritage legislation. Note that s. 10.53(2) gives a meaning to registered Aboriginal heritage for these purposes.

The document *Principles to engage Indigenous people in the Murray–Darling Basin*, endorsed by MLDRIN and NBAN, gives examples of the principles that can be applied to Indigenous participation. This is available on the MDBA website <http://www.mdba.gov.au/kid/files/1564-IndigenousEngagementPrinciples.pdf>. There may be other relevant principles or agreed processes that can be followed depending on specific circumstances in different areas.

Cultural flows (10.54)

> *A water resource plan must be prepared having regard to the views of Indigenous people with respect to cultural flows.*

This provision is about making clear that a WRP should be prepared in ways that elicit Indigenous peoples' views on cultural flows, and have regard to these views. The Basin Plan does not define the term cultural flows, and the term may hold different meanings for different groups of Indigenous people. One definition of cultural flows as used by NBAN and MLDRIN is in paragraph 31 of Schedule 1 of the Basin Plan:

> *Water entitlements that are legally and beneficially owned by the Indigenous Nations and are of sufficient and adequate quantity to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations. This is our inherent right.*

The concept of cultural flows helps translate the relationship between Indigenous people and the landscape into the language of water planning and management. The National Cultural Flows Planning and Research Committee's cultural flows research program will help to better identify and quantify the nature of cultural flows as an input for water planning. As these research outputs emerge, the Authority will work closely with states to incorporate cultural flows into WRPs and environmental water planning and priorities.

Retention of current protection (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.*

Under section 10.55 a WRP must provide at least the same level of protection of Indigenous values and Indigenous uses as provided in a transitional or interim WRP. Evidence to support this could be in the form of a document that shows the development of rules relating to Indigenous values and uses between iterations of a WRP.

Glossary

This glossary is advisory and intended to explain some commonly used phrases and concepts in this handbook and Chapter 10 of the Basin Plan. In the event of any inconsistency between this glossary and the Water Act or the Basin Plan those legal instruments take precedence.

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 in 2000.

best available information and methods
Those methods expertly judged to be the most appropriate and technically sound for the purpose. These judgements may be informed by peer review. If there is no available knowledge or analysis, it is expected that water planning agencies will either use their own expertise to reach a position or seek expert advice from reputable sources.

consistent
Defined by the *Macquarie dictionary* as meaning agreeing or accordant; compatible; not self-opposed or self-contradictory. A secondary meaning is 'constantly adhering to the same principles, course'.

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.

environmentally sustainable level of take
Defined by section 4 of the 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
Defined by the *Macquarie dictionary* as 'to form an approximate judgement or opinion regarding the value, amount, size, weight, etc., of; calculate approximately'.

The key requirements for an estimate to be made are that 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

eWater Source
Australia's first national river basin-scale water modelling system. The Source modelling platform allows users to build on, rather than replace existing models. It has been developed to take a holistic approach to water management including human and ecological impacts. This includes integrating policy, addressing water savings and sharing for a whole river and connected groundwater systems including cities, agricultural and environmental demands.

groundwater
Defined by section 4 of the Act as:

(a) water occurring naturally below ground level (whether in an aquifer or otherwise), or
(b) water occurring at a place below ground that has been pumped, diverted or released to that place for the purpose of being stored there

but does not include water held in underground tanks, pipes or other works.

have regard to
Discussed in the note in s. 1.07 of the Basin Plan as follows

> A number of provisions of the Basin Plan require decision-makers to 'have regard to' certain matters when performing functions and making decisions. The phrases '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, for example, the benefits and costs of taking a particular action. See section 1.07 of the explanatory statement in relation to the Basin Plan for further information about the phrases 'have regard to', 'having regard to' and 'regard must be had'.

In addition to the note contained in s. 1.07, creating and retaining appropriate documentation of relevant decisions will assist decision makers to provide evidence of compliance with requirements to 'have regard to' specified matters and would be considered best practice. The Basin Plan contains reporting obligations relating to certain requirements to 'have regard to' specified matters and further guidance in relation to appropriate documentation may be provided in guidelines issued by the Authority.

held environmental water
Defined by s. 4 of the 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).

interception activity

Defined by s. 4 of the 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

long-term annual diversion limit

Item 7 of section 22 of the Act, provides the following:

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

for those water resources or that particular is the ***long term-annual diversion limit*** for those water resources or that particular part.

long-term average sustainable diversion limit (SDL)

Defined by s. 23 of the Act as:

(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 determines to be appropriate.

Murray Lower Darling Rivers Indigenous Nations (MLDRIN)

A confederation of 24 Indigenous Australian nations in the southern part of the Basin, comprising representatives of the Barapa Barapa, Barkindji, Dhudhuroa, Dja Dja Wurrung, Latji Latji, Maraura, Mutti Mutti, Nari Nari, Ngarrindjeri, Ngintait, Nyeri Nyeri, Tatti Tatti, Taungurung, Wadi Wadi, Wamba Wamba, Waywurru, Wegi Wegi, Wergaia , Wiradjuri, Wolgalu, Wotjobaluk, Yaitmathang, Yita Yita, and Yorta Yorta peoples.

Northern Murray–Darling Basin Aboriginal Nations (NBAN)
A confederation of 21 Aboriginal nations in the northern part of the Basin, comprising representatives of the Barkindji, Barunggam, Bidjara, Bigambul, Budjiti, Euahlayi, Gamilaroi, Githabul, Gunggari, Jarowair, Guwamu (Kooma), Kunja, Kwiambul, Malangapa, Mandandanji, Mardigan, Murrawarri, Ngemba, Ngiyampaa, Wailwan and Wakka Wakka peoples.

objectively determined
Means substantiated and proven with impartiality, without bias.

planned environmental water
Planned environmental water is defined in s. 6 of the Water Act as:

(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.

Ramsar Convention
Defined by s. 4 of the Act as the Convention on Wetlands of International Importance especially as Waterfowl Habitat done at Ramsar, Iran, on 2 February 1971.

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, either naturally or through infrastructure, 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 which 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. The term is used in a number of places in the chapter and is discussed further in this handbook with specific application to the relevant requirements.

surface water
Defined by s. 4 of the Act, 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.

take water from a water resource
Defined by s. 4 of the Act, means to remove from, or to reduce the flow of water in or into, the water resource including by any of the following means:
(a) pumping or siphoning water from the water resource
(b) stopping, impeding or diverting the flow of water in or into the water resource
(c) releasing water from the water resource if the water resource is a wetland or lake
(d) permitting water to flow from the water resource if the water resource is a well or watercourse
and includes storing water as part of, or in a way that is ancillary to, any of the processes or activities referred to in paragraphs (a) to (d).

water access right
Defined in s. 4 of the Act, water access right:

(a) means any right conferred by or under a law of a State to do either or both of the following:
  (i) to hold water from a water resource
  (ii) to 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) stock and domestic 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 resource

Defined by s. 4 of the 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 plan

For a water resource plan area as defined by s. 4 of the Act, means a plan that:

(a) provides for the management of the water resource plan area; and
(b) is either:
  (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 s. 4 of the Act, means 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.

Abbreviations and acronyms

the Act	*Water Act 2007* (Cwlth)
BDL	baseline diversion limit
CEWH	Commonwealth Environmental Water Holder
Cwlth	Commonwealth
ESLT	environmentally sustainable level of take
EWP	environmental watering plan
HEW	held environmental water
MDBA	Murray–Darling Basin Authority
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
NBAN	Northern Murray–Darling Basin Aboriginal Nations
PEA	priority environmental asset
PEF	priority ecosystem function
PEW	planned environmental water
SDL	long-term average sustainable diversion limit
WQM Plan	water quality management plan
WRP	water resource plan
WRP area	water resource plan area