Queensland Section 71, Cap and Matter 9.1 & 9.2 Reporting for 2015-16

Water resource management overview for the State

Surface water

Surface water in the Queensland section of the Murray-Darling Basin (QMDB) is divided into four separate SDL resource units: Warrego-Paroo-Nebine, Condamine-Balonne, Moonie, and Queensland Border Rivers water resource plan areas. The Basin Plan requires local reductions in the Queensland Border Rivers and the Condamine-Balonne water resource plan areas, with a gap of 8 GL and 100 GL, respectively, identified in the Plan. The Commonwealth's Water for the Future initiatives of Healthy Headwaters (to provide infrastructure related investment) and buyback continue to target water in these catchments, with the in-catchment reduction met in the Queensland Border Rivers and over half of the in-catchment reduction bridged in the Condamine-Balonne.

Queensland has transitional water resource plans in place for the management of overland flows and water in watercourses, lakes and springs within all catchments in the QMDB. These water resource plans are taken to have been accredited under the Commonwealth Water Act and are to be replaced by 2019.

The Warrego-Paroo-Nebine Water Resource Plan is currently being assessed by the MDBA and some documents in the water resource plan package are being updated in response to the MDBA's comments. It is expected that the water resource plan may be accredited in late 2016. Queensland has also initiated the review of the transitional water resource plans for the Condamine and Balonne, Border Rivers and Moonie catchments under the Queensland *Water Act 2000* (Qld). Statements of Proposals to prepare draft water resource plans were released on 6 July 2016. These outlined the issues that would be considered as part of the review of the plans and invited submissions from stakeholders.

Groundwater

In the QMDB, groundwater managed under the Basin Plan includes water in all formations above (and one formation below) the Great Artesian Basin (GAB). Water in aquifers in the GAB is managed separately to water in aquifers managed under the Basin Plan. In Queensland they are managed under the Water Resource (Great Artesian Basin) Plan 2006. Management of groundwater under the Basin Plan is now divided into 15 resource units based on groundwater aquifers that underlie various surface water catchments. These units more comprehensively cover the QMDB area than those reported on prior to 2012, consequently there has been an increase in the aquifers reported on since 2011/12.

The current focus for Queensland's groundwater systems in the MDB is to meet the Basin Plan SDL in 2019. There are two key groundwater systems (Central Condamine Alluvium and the Condamine Tributary Alluviums) where the SDL is below the BDL, requiring water to be recovered through buyback of entitlements. There were two tender rounds announced in the 2015/16 water year for buyback of entitlement in the Central Condamine Alluvium and the Condamine Tributary Alluviums. Previous rounds did not include the Condamine Tributary Alluviums as trading rules were still under development in these areas. A number

of entitlements were purchased by the Commonwealth Environmental Water Holder (CEWH) through these two rounds.

To ensure ongoing sustainable management of the groundwater systems in line with the Basin Plan, various other management tools have been implemented over time. These include the amendment of water sharing rules in relevant areas to allow relocation of water licences and to facilitate water recovery by the Commonwealth.

The Central Condamine Alluvium has a Water Management Plan which is considered to be an Interim Water Resource Plan under the Commonwealth Water Act. The Condamine and Balonne, Border Rivers and Moonie water resource plans were amended in December 2014 to include arrangements for the management of the remaining groundwater systems not connected to the Great Artesian Basin. This provides a transitionary step towards meeting the accreditation requirements of the Basin Plan.

The take of water from an aquifer for stock and domestic purposes by the owner of the land overlying the aquifer is managed under the *Water Act 2000*. Access for these purposes has previously been limited under the Act (by moratorium) in the Upper Condamine Basalts and the Upper Condamine Alluvium (both Central Condamine and Tributaries) to restrict growth of groundwater use in the expanding peri-urban areas. These provisions have transitioned into the amended water resource plans for the Condamine and Balonne, Border Rivers and Moonie catchments. The current restrictions help ensure a 'no-growth' position in the higher risk area of peri-urban expansion. In short, the limitation restricts stock and domestic take to those who either have existing bores or who are located outside town water reticulation areas. Within town water areas, no new take of groundwater for stock and domestic purposes is permitted.

Cap compliance

Diversions from watercourses and floodplain harvesting reached 77% of the Cap target for the Condamine and Balonne catchment, 16% for the Warrego, 2% for the Paroo and 25% for the Nebine catchment for the 2015/16 water year. Diversions in the Moonie exceeded the Cap target by 0.3 GL. Queensland is investigating whether this was due to non-compliance with water entitlement conditions or legitimate pump down of the entitlement holder's weir, which is not simulated by the model.

Actual take in the Border Rivers catchment exceeded the permitted take as determined by the model by 13 GL but did not trigger the requirement for a special audit (the cumulative debit recorded in the Cap register will not exceed 20% of the long-term diversion cap). A review of the Border Rivers model identified that pump down licences in the Weir River (which accounted for 10 GL of actual take) are not included in the modelled permitted take as they are not simulated well. In the Granite Belt, the volume estimated as actual take under area-based licences was substantially greater than the permitted take estimated by the model. It is unknown how close either the estimates of actual take or permitted take are to reality as no metered use is available for validation and these water users take a mixture of watercourse water, overland flow water and groundwater, making it difficult to estimate how much of the water used on the property has been taken under the area-based licence. Queensland will be reviewing the methods used to determine annual permitted take and annual actual take of water from a watercourse during the development of Basin Plan compliant water resource plans.

Transition period section 71 reporting

Surface water

This section presents a summary of the key section 71 clauses of the *Water Act 2007* for surface water resource plan areas (and SDL resource units where appropriate):

- Available water *(the quantity of water available from the water resources of the water resource plan area during that water accounting period)*

  Flow volumes across all catchments of the QMDB were well below average for the 2015/16 year. There were no significant rainfall events across any of the catchments; consequently, there were no major flow events that provided volumes sufficient to make any impact further downstream into New South Wales. The year has been characterised by a few minor events during late spring and through summer, with some early winter rain in June providing runoff in some catchments.

River and gauging station location	Average annual flow (GL)[1]	Total volume 2015-2016 (GL)	Percentage of average
Condamine and Balonne catchment			
Condamine River @ Chinchilla	565	8	1
Condamine River @ Cotswold	723	16	2
Balonne River @ Weribone	1236	161	13
Maranoa River @ Cashmere	164	109	66
Balonne River @ St George	1204	125	10
Border Rivers catchment			
Macintyre River @ Goondiwindi	949	241	25
Weir River @ Talwood	154	15	10
Barwon River @ Mungindi	599	79	13
Moonie catchment			
Moonie River @ Fenton	159	1	1
Warrego catchment			
Warrego River @ Cunnamulla	476	116	24
Paroo catchment			
Paroo River @ Caiwarro	525	153	29
Nebine catchment			
Nebine Creek @ Roseleigh Crossing	26	20	78

[1] Average annual flow is the average for the period of record for that gauging station. It varies from 9 years of record at Roseleigh Crossing to 75 years at Goondiwindi. The numbers are indicative only.

In the Warrego, flow volumes have been about a quarter of annual averages with flow events in January/February and June accounting for virtually all runoff volumes.

Runoff in the Moonie catchment was minimal, with the volume passing Fenton being the second lowest on record at a little over 1 GL.

The trend continued in the Macintyre River and tributaries with a quarter of the average volume passing the gauging station at Goondiwindi for the second year in a row. However, despite the low annual flow, there was sufficient rainfall and subsequent runoff to provide opportunities to water harvest in July, August and November 2015 and February 2016.

Tributaries in the Granite Belt area of the Border Rivers experienced poor runoff, with the gauging station on the Dumaresq River at Farnbro recording its second lowest annual runoff since the start of records. Glenlyon Dam started the water year at 30% capacity, remained relatively stable through the year and finished at 26% capacity. Coolmunda Dam on the Macintyre Brook started the water year at 62% capacity and steadily declined, finishing the year at 31% capacity.

The situation was no better for the Condamine and Balonne system with volumes at gauging stations from the upper catchment to the lower Balonne distributary being well below the historic average annual mean flows. Water held in dams at the start of the water year in the Condamine and Balonne catchment varied from 24% of capacity in Leslie Dam to over 90% in Beardmore Dam and Chinchilla Weir. Both Leslie Dam and Chinchilla Weir steadily declined to 14% and 31%, respectively. The inputs to Chinchilla Weir in 2015/16 included 12.6 GL of treated coal seam gas (CSG) water discharged into the weir under an approval of a resource for beneficial use. As per licence requirements, the entire volume of treated CSG water was taken within the limits of the Chinchilla Weir Water Supply Scheme. The diversion of treated CSG water is not accounted for under section 71 as this water is sourced from the Great Artesian Basin, not from water resources of the Murray-Darling Basin.

Beardmore Dam declined to around 30% capacity in December but benefitted from inflows from the Maranoa River in January and February, which enabled the dam to refill and triggered water harvesting in the Lower Balonne. Beardmore Dam finished the year at 69% capacity.

- Permitted take *(the quantity of water permitted to be taken from the water resources of the water resource plan area during the water accounting period)*

The take of water from watercourses under an entitlement[2] and by floodplain harvesting

Take of water from watercourses is managed through limits stated on entitlements and by water sharing rules in resource operations plans (which implement the provisions of Queensland's water resource plans). The take of overland flow water (including

[2] Entitlement is used in this document as a generic term referring to water access entitlements (called water allocations in Queensland) and water licences (authorities to take water which are attached to land).

floodplain harvesting) is managed through a combination of regulation of works and limits on entitlements.

Annual permitted take from watercourses under an entitlement, including permitted take under entitlements held by the CEWH, is determined using a hydrologic model. The permitted take by the CEWH is then subtracted from the total. Annual permitted take by floodplain harvesting is not able to be modelled with any confidence and so is based on estimated take supported by storage measurement in the Lower Balonne.

In the 2015/16 water year, medium flow event management rules (under section 279(1)(b) of the Condamine and Balonne Resource Operations Plan) were activated in the Lower Balonne, as it had been more than three years since a flow event with a peak flow of greater than or equal to 100,000 megalitres per day at Jack Taylor Weir. Accordingly, the rate of take under unsupplemented water access entitlements was reduced to 90% of the maximum permitted take for a total of 5 days over the flow event in February 2016. The annual permitted take has been reduced accordingly. The flow event management rules for managing low flows under section 277 of the Condamine and Balonne Resource Operations Plan did not apply as it was less than 12 months since the previous flow through event finished.

The take of water from watercourses under basic rights

The take of water from a watercourse, lake or spring for basic rights (stock and domestic purposes) by the owner of the land adjoining the water source is permitted under the *Water Act 2000*. Potential increase in take is limited due to the right to take water being limited to properties with riparian access to water. The annual permitted take of water from a watercourse for basic rights is not currently estimated.

The take of water by runoff dams (including take under basic rights)

The take of overland flow water for basic rights by an owner of the land on which the water collects is permitted (within limits) under the Queensland regulatory framework. Any increase in take for basic rights will be related to rural population growth and/or an increase in stock numbers.

Under water resource plan provisions, no increase in overland flow take is permitted for uses other than basic rights, except for certain limited cases, such as where capture of overland flow water is necessary to satisfy the requirements of an environmental authority.

The annual permitted take of water by runoff dams is currently considered to be the long-term annual average limit estimated by the Authority and which is listed in the Plan.

The take of water by commercial plantations

In Queensland, the take of water by commercial plantations is not regulated under any legislation. There are few commercial plantations in the QMDB.

The annual permitted take of water by commercial plantations is currently considered to be the long-term annual average net take estimated by the Authority and which is listed in the Plan.

- Water allocations *(details of the water allocations made in relation to the water resources of that area in relation to that water accounting period)*

Under the Commonwealth Water Act and for the purposes of the Basin Plan, water allocation[3] means the specific volume of water allocated to water access entitlements in a given water accounting period.

In Queensland, water allocations apply only to supplemented water (water provided through water supply schemes) managed under a mixture of *announced allocation* and *continuous sharing*.

Announced allocations

Water access entitlements in the Upper Condamine and Chinchilla Weir water supply schemes in the Condamine-Balonne water resource plan area are managed under an annual announced allocation system. At the start of the water year, water in the scheme's storage/s is first set aside for 24 months' supply for high priority users (mainly town water supply and associated water losses during storage and distribution). The medium priority entitlement holders are then granted the remaining water as a percentage of their water access entitlement, taking into account losses associated with storage and distribution for the remainder of the water year.

The announced allocation is recalculated each month but only reset if the announced allocation would increase by 5 or more percentage points or would increase to 100% (due to more water becoming available through inflows into the scheme). The usage in a water year may be no greater than 100% of the entitlement.

There is no high priority water in the Cunnamulla Water Supply Scheme in the Warrego catchment. Otherwise, announced allocations are made in a similar way to those in the Upper Condamine and Chinchilla Weir water supply schemes.

Continuous share schemes

The St George Water Supply Scheme in the Condamine-Balonne water resource plan area and the Macintyre Brook Water Supply Scheme in the Queensland Border Rivers water resource plan area provide management options which include both announced allocation and continuous share. Most of the entitlements in the scheme are managed under continuous share arrangements. All medium priority entitlements in the Border Rivers Water Supply Scheme are managed under continuous sharing rules.

In a continuous accounting system, water users have storage accounts, which are proportional to their share of the total entitlement in the scheme. The storage account increases when distributions are made (i.e. there is inflow into the water storage) and decreases with water use, evaporation and seepage losses.

[3] In Queensland, a *water allocation* refers to a water access entitlement (which is defined by the Commonwealth Water Act as 'a perpetual or ongoing entitlement, by or under a law of a State, to exclusive access to a share of the water resources of a water resource plan area'). Basin Plan terminology is used in this report.

In any water year, the volume available under an entitlement managed as an individual continuous share is the volume in the storage account at the start of the water year plus any water distributed to the account under the rules in the relevant resource operations plan following an inflow into the scheme, capped at 100% of the nominal volume of the water access entitlement (plus any carry over or forward draw made available in the St George Water Supply Scheme).

The volume of water entitled to be taken in water supply schemes in the QMDB in 2015/16 is shown in the table below. In the continuous share schemes, the announced allocation shown in the table applies to water allocations managed as part of the bulk share.

Water supply scheme	Announced Allocation – high priority (%)	Announced Allocation – medium priority (%)	Volume entitled to be taken[4] (GL)	Comments
Condamine and Balonne catchment				
Upper Condamine	100	32	16.5	
Chinchilla Weir	100	71	3.2	
Maranoa River	N/A	N/A	0.8	Announced allocations do not apply to this scheme.
St George	N/A	91	84.6	Announced allocations only apply to entitlements managed as part of the bulk share.
Border Rivers catchment				
Border Rivers	N/A	N/A	25.3	
Macintyre Brook	100	100	25.0	Announced allocations only apply to entitlements managed as part of the bulk share.
Warrego catchment				
Cunnamulla	N/A	100	2.6	

- Actual take (*the quantity of water actually taken from the water resources of the water resource plan area during the water accounting period)*

The take of water from watercourses under an entitlement and by floodplain harvesting

Diversion in the QMDB is generally characterised by much greater volumes of unsupplemented water compared to supplemented water (water provided through water supply schemes). The take of supplemented water in 2015/16 was 36% of the total take, take of unsupplemented water was 48% and overland flow (floodplain harvesting) 17%.

[4] The total volume entitled to be taken in the water supply scheme, including high priority and medium priority water access entitlements and entitlements held by the Commonwealth Environmental Water Holder.

The works of the major water users in the QMDB have been metered to improve reliability in monitoring use. The installation of instruments to measure offstream storage levels in the Lower Balonne was completed in the 2012/13 water year. Combined with measurement of direct take from the watercourse, this informs estimates of floodplain harvesting take in the area. A combination of estimates and measurement of water use are provided for all watercourse take and significant areas of floodplain harvesting.

The take of water from watercourses under basic rights

Water taken from watercourses under basic rights is not measured and is currently not included in annual estimates of take.

The take of water by runoff dams (including take under basic rights)

Water taken by runoff dams is not measured and is currently considered to be the long-term annual average limit estimated by the Authority and which is listed in the Plan.

The take of water by commercial plantations

The annual actual take of water by commercial plantations is currently considered to be the long-term annual average net take estimated by the Authority and which is listed in the Plan.

There are no commercial plantations in the Moonie, Warrego, Paroo and Nebine catchments.

Summary of surface water take

Diversions from a watercourse and by floodplain harvesting reached 265 GL (77% of the water permitted to be taken) for the Condamine and Balonne catchment, 3 GL (17%) for the Warrego, 0.0 GL (2%) for the Paroo and 1.4 GL (25%) for the Nebine catchment for the 2015/16 water year. Diversions in the Border Rivers (89 GL) and the Moonie catchment (0.8 GL) were above permitted take as estimated by the relevant model. See section on 'Cap compliance' for further details.

- Decisions affecting permitted take *(details of any other decisions made by, or under the law of, the Basin State, that permit the taking of water from the water resources of that area during that water accounting period)*

Less than 35 ML was made available in the QMDB for short-term use under water permits.

- Trade details *(details of the trading or transfer of tradeable water rights in relation to the water resources of that area during that water accounting period: within the area; and into the area; and from the area)*

Temporary and permanent trading of unsupplemented water access entitlements within a water management area and of supplemented water access entitlements within a water supply scheme (subject to specific rules in the water resource plan and resource operations plan) may occur in all water resource plan areas in the QMDB.

Permanent trade between water management areas within a water resource plan area may occur if modelling demonstrates that there are no impacts on the environmental flow objectives listed in the water resource plan or the reliability of existing entitlements (assessed by modelling effects of the change on water allocation security objectives). Resource operations plans prohibit some trades where it has already been assessed that trade cannot occur without impacts.

Out of 62 GL of water permanently traded in the QMDB in 2015/16, 29 GL was traded separately from land and 32 GL traded with land, with the largest percentage of the total volume of permanent trades occurring in the Condamine-Balonne water resource plan area.

The New South Wales – Queensland Border Rivers Intergovernmental Agreement 2008 (the IGA) provides for permanent and temporary interstate trade of supplemented and unsupplemented water. This applies to water access entitlements in the Border Rivers water supply schemes and the Border Rivers Water Management Area. Take of water through works that are permanently linked to an entitlement for supplemented or unsupplemented water in the other state is not reported as trade for section 71 purposes. Water traded from Queensland to New South Wales is accounted for as actual and permitted take under Queensland water access entitlements in accordance with the IGA.

In the Border Rivers catchment in 2015/16, there was net trade of 8 GL of supplemented water into Queensland from New South Wales and 7 GL of unsupplemented water from Queensland to New South Wales.

There was no temporary trade between consumptive and environmental entitlement pools in 2015/16 and no environmental entitlements were traded back for consumptive use.

Groundwater

This section presents a summary of the key section 71 clauses of the *Water Act 2007* for groundwater resource plan areas (and SDL resource units where appropriate):

- Available water *(the quantity of water available from the water resources of the water resource plan area during that water accounting period)*

For reporting purposes there is not considered to be any change to the available water overall; however, the access to this water is subject to announcements based on small changes to local availability. This year has again tended towards being drier, and the more connected groundwater systems are starting to show signs indicative of a reduction in benefit from recharge (due to limited localised rainfall and flow events), especially the basalt and alluvial systems along the Great Dividing Range. While a rapid rise in water levels occurred in many of these groundwater systems after the exceptionally wet 2010/11 water year, the levels have now begun to fall.

- Permitted take *(the quantity of water permitted to be taken from the water resources of the water resource plan area during the water accounting period)*

The take of water from aquifers under an entitlement

Entitlements to take water from aquifers in the QMDB are in the form of water licences (or water permits) and these include conditions that identify the nominal entitlement (limit) and the particular aquifer (source).

Access to the nominal entitlement for any entitlement holder can be limited when the groundwater systems are under stress/decline either longer-term (e.g. the Central Condamine Alluvium) or seasonally (e.g. tributary catchments). There were no reductions to the levels of access for entitlement holders from the previous (2014/15) year.

The take of water from aquifers under basic rights

Permitted take for basic rights is estimated using the method outlined in the Queensland Murray Darling Basin Methodology for Estimating the Take of Groundwater for Stock and Domestic Purposes (Parsons Brinckerhoff, 2011).

- Water allocations *(details of the water allocations made in relation to the water resources of that area in relation to that water accounting period)*

There was no change to the announced access across the QMDB area from last (2014/15) water year. The majority of aquifers and management areas were able to take 100% of their nominal entitlements. The more closely managed Central Condamine Alluvium Groundwater Management Area (GMA) is an exception, with the licensees in this area either limited to 50% or 70% depending on their location within the system. The Oakey Creek Alluvium GMA remained limited to 80% across all four subareas.

- Actual take (*the quantity of water actually taken from the water resources of the water resource plan area during the water accounting period)*

The take of water from aquifers under an entitlement

In many highly developed groundwater systems, the works of entitlement holders have been metered to improve the reliability in monitoring use. In those systems that are unmetered, the nominal entitlement, adjusted for any limitations, is considered to represent the actual use. Estimated data are combined with the metered data to provide a picture of the total water use.

The diversion of water taken under licensed entitlements for 2015/16 is 145 GL from a combination of metered and estimated use.

The take of water from aquifers under basic rights

Queensland does not require works for the take of water for the purpose of basic rights to be metered. Accordingly, use volumes have been estimated. A report has been completed by Parsons Brinckerhoff which outlines a methodology tailored specifically for this purpose.

A total of 42 GL is estimated to have been taken using the methodology available at the time of the release of the Basin Plan. Based on the newer methodology as outlined in the Parsons Brinckerhoff report referenced above, a total of 23 GL of water is estimated to have been taken for stock and domestic purposes.

Summary of groundwater take

Diversion of groundwater in the QMDB in 2015/16 for all resource units was higher than last year though still within the respective SDLs, as will be required from 2019. Diversions in the key Central Condamine Alluvium (GS64a) were measured at 90% of SDL for water access excluding stock and domestic. This has been achieved by limiting take to 50% and 70% of nominal entitlement as without these lowers levels of announced entitlement diversions would be in excess of the SDL. Diversions in this system should move into alignment with the SDL as buyback progresses. Queensland's other three most developed systems (Upper Condamine Alluvium (Tributaries), Upper Condamine Basalts and Queensland Border Rivers Alluvium) were around 80 to 90% of the respective SDL.

- Decisions affecting permitted take *(details of any other decisions made by, or under the law of, the Basin State, that permit the taking of water from the water resources of that area during that water accounting period)*

There were some minor changes to permitted take that resulted from processes to effectively split existing multiple source (aquifer) entitlements and determine volumes for licences without one. Very few of these entitlements now remain in the QMDB area. There were no other decisions affecting permitted take.

- Trade details *(details of the trading or transfer of tradeable water rights in relation to the water resources of that area during that water accounting period: within the area; and into the area; and from the area)*

Trading (relocation) of water licences has occurred during the year in the Central Condamine Alluvium area, with a total of nearly 3 GL of temporary trade and 3.9 GL of permanent trade. Both temporary trade and permanent trade (where it is available) in the other groundwater management areas was minimal. The amended Water Sharing Rules which allowed relocation of water licences in the Dalrymple Creek and Oakey Creek alluvial groundwater areas as of 1 July 2015 generated greater water entitlement flexibility for licensees and enabled the buyback of entitlements by the Federal Government to proceed in these areas. The Federal Government released two tender rounds seeking interest from entitlement holders in the Central Condamine Alluvium area and purchased a number of entitlements.

2015/16 Snapshot of Water Diversions in the QMDB

Resource	Diversion 2015/16 (GL)	Permitted take 2015/16 (GL)	Diversion 2014/15 (GL)
Surface water (take from a watercourse and by floodplain harvesting)	360	444	468
Groundwater	187	262	178

Environmental water – held and planned

In Queensland, water resource planning incorporates provisions for balancing the often competing interests in water between human consumptive needs and the environment. Environmental water requirements are primarily met through the various water sharing rules specified in the water resource plans. In addition, there is held environmental water consisting of water access entitlements gifted by the Queensland Government to the Commonwealth and water which has been recovered by the Commonwealth from entitlement holders through the Water for the Future programs of buyback and investment in on-farm water use efficiency works.

Water gifted to the Commonwealth has been provided from unallocated water set aside in the Warrego, Nebine, Moonie and Border Rivers catchments. This previously unallocated water has never been included in the Cap target. Water recovered by the Commonwealth from entitlement holders has previously been included in the Cap target as irrigation water and the Cap target is reduced by the modelled volume of held environmental water entitled to be taken.

Information about the volume of held environmental water and its use can be found at http://www.environment.gov.au/water/cewo/catchment.

For the purposes of reporting under Matter 9.2 (volume of planned environmental water), Queensland has reported the volume of water provided for environmental purposes under specific flow event management rules in the relevant resource operations plans. These rules include: flow event management arrangements and preservation of tributary inflows in the Border Rivers; low, medium and Narran Lakes flow event management arrangements in the Lower Balonne; and flow event management arrangements in the Warrego. In 2015/16 these rules provided in-stream benefits in the Lower Balonne distributaries, Warrego River and Border Rivers.

No trading of environmental water occurred in the year but work continues by the Commonwealth Environmental Water Office to establish a framework in the Lower Balonne to support temporary trading of water to meet identified environmental watering requirements.

Progress of water reform

Surface water

There are categories of take defined in the BDL for which Queensland is not able to provide estimates of the take of water with any confidence. These include:

- Take from watercourses under basic rights;
- Take from runoff dams;
- Take by commercial plantations.

Methods for determining permitted and actual take are being developed as part of water resource plan accreditation. However, management and monitoring of related infrastructure is recommended as an alternative approach to estimating take. Infrastructure based management strategies are already in place to limit the take of water in those categories where there is a high risk of growth in take compromising diversion limits. For example,

water resource plans limit the purposes for which a new runoff dam can be constructed and the construction of new stock and domestic bores in areas serviced by town water supply in the Upper Condamine. Infrastructure growth in other areas of take will be monitored over time and management strategies only introduced where there is an identified need. This is already occurring, with a risk assessment for the Warrego, Paroo and Nebine carried out in 2012 as part of its ten year review and amendment process. This risk assessment forms part of the information provided to meet accreditation requirements under the Commonwealth Water Act for the Warrego-Paroo-Nebine Water Resource Plan.

Similar risk assessment processes are being carried out in the lead up to 2019 to inform the review and development of the next generation water resource plans for the remaining valleys of the QMDB.

Groundwater

All groundwater systems will be incorporated into a water resource plan prior to the implementation of the Basin Plan in 2019. The planning process to include the aquifers under the Warrego, Paroo, Bulloo and Nebine area in the second generation water planning process is finalised. Amendments have been made to transitional water resource plans to include the aquifers under the Condamine and Balonne, Border Rivers and Moonie areas to continue to limit further development ahead of second generation plans. The process involved in moving toward the second generation state-based water resource plans and compliance with the Basin Plan will involve a suite of planning and policy work looking at other groundwater matters such as water licence conversions, water trading frameworks and water management arrangements.

The MDBA, in conjunction with Queensland, have been engaged in several projects to gain a better understanding of various aspects of groundwater systems in the QMDB. The projects have primarily focussed on the more heavily utilised and lesser known groundwater systems to improve collective knowledge and assist in future management directions. Three of the projects have involved the Upper Condamine Alluvium and Upper Condamine Basalts.

Upper Condamine Alluvium modelling

> Improved modelling of the Central Condamine Alluvium (CCA) will help to inform the longer term sustainable capacity of the system and look at potential changes in the system as buyback recovers entitlements. The Upper Condamine Alluvium project is ongoing and nearing completion. The first three stages have been completed, with stage 3 being completed December 2015, and stage 4 well advanced. Incorporation of the tributary alluvial systems into the CCA model is also being undertaken. The tributary systems feed into the CCA and as such, impact on how the CCA operates longer-term.

OGIA (Office of Groundwater Impact Assessment) interconnectivity project

> The department has engaged QUT to undertake research on connectivity within and between groundwater and surface water systems in the Upper Condamine Tributaries. This project was recently finalised.

Upper Condamine Alluvium (UCA) (Tributaries) – Hydrogeological and hydrochemical characterisation of recharge and connectivity

This work is investigating geochemical and thermal signatures of various water sources to assist in determination of the degrees of connectivity (if any), which will improve knowledge and better inform future management and possible trade arrangements.