Queensland Section 71, Cap and Matter 9.1 & 9.2 Reporting for 2014-15

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.

Groundwater

In the QMDB, groundwater managed under the Basin Plan includes water in formations above and below the Great Artesian Basin (GAB). Water in aquifers in the GAB is managed separately to those in the Basin Plan and 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 and consequently there has been an increase in the reported areas 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.

In ensuring ongoing sustainable management of the groundwater systems in line with the Basin Plan, various other management tools have been implemented. These include the amendment of water sharing rules in sections of the Condamine Alluvium 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.

Surface water overview

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)*

  Flows across all catchments of the QMDB in 2014/15 have been well below the long term average. The spring and early summer period saw little if any runoff across all catchments and it was not until December 2014 that some minor to moderate flows occurred.

River and gauging station location	Average annual flow (GL)	Total volume 2014-2015 (GL)	Percentage of average
Condamine and Balonne catchment			
Condamine River @ Chinchilla	574	55	10
Condamine River @ Cotswold	737	104	14
Balonne River @ Weribone	1259	315	25
Maranoa River @ Cashmere	165	91	55
Balonne River @ St George	1228	214	17
Border Rivers catchment			
Macintyre River @ Goondiwindi	958	226	24
Weir River @ Talwood	157	35	22
Barwon River @ Mungindi	603	99	16
Moonie catchment			
Moonie River @ Fenton	162	5	3
Warrego catchment			
Warrego River @ Cunnamulla	491	103	21
Paroo catchment			

River and gauging station location	Average annual flow (GL)	Total volume 2014-2015 (GL)	Percentage of average
Paroo River @ Caiwarro	533	115	22
Nebine catchment			
Nebine Creek @ Roseleigh Crossing	27	3	11

Water held in dams at the start of the water year in the Condamine and Balonne catchment varied from 37% of capacity in Leslie and Beardmore dams to 86% in Chinchilla Weir.

From the headwaters of the Condamine catchment to Chinchilla, there have only been very minor runoff events due to the lack of any significant rain-bearing influence moving over the region. Nevertheless, there were sufficient flows to trigger water harvesting in the Upper Condamine in December 2014 to March 2015, with a further event occurring in May 2015. Leslie Dam (at the top of the system) and Chinchilla Weir finished the water year at 24% and 94% capacity, respectively. Nearly 20% of the inputs to Chinchilla Weir in 2014/15 can be attributed to the 12 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 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.

Further downstream, there were a couple of moderate flow events during the summer months due to better rainfall in that area. There was sufficient flow in December 2014 and January 2015 to fill Beardmore Dam and pass into the lower Balonne distributary system, triggering water harvesting; however, volumes were fairly insignificant as demonstrated by the fact that the total volume past the St George gauging station has been just over 214 GL, which is about 17% of the annual average.

Flow in the Moonie River has been very poor with the station at Fenton remaining dry for the first seven months of the year. There have only been a couple of minor flows since then with just 8.5 GL having passed Nindigully during the water year. Water harvesting occurred in February and April 2015.

The Warrego, Paroo and Nebine catchments have all experienced well below average runoff with no rain events of any significance to cause substantial runoff; however, there were sufficient flows in the Warrego River to allow waterharvesting to occur in December 2014 and January 2015. The same scenario applies to the Macintyre/Border Rivers area with runoff at Goondiwindi about 25% of average. Glenlyon Dam started the water year at 83% capacity and steadily declined, with only minor inflows in October and December 2014 and March 2015, finishing the water year at 30% capacity. Coolmunda Dam started the water year at 50% capacity, increased to 70% following an inflow in late January 2015 and finished the year at 62% capacity. Flows were sufficient to trigger some waterharvesting in the Border Rivers in February and April 2015.

- 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[1] 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 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 Commonwealth Environmental Water Holder (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 2014/15 water year, low flow and medium flow event management rules (under sections 277 and 279, respectively, of the Condamine and Balonne Resource Operations Plan) were activated in the Lower Balonne. Accordingly, the rate of take under unsupplemented water access entitlements was reduced to 90% of the maximum permitted take for a total of 13.5 days over five flow events in January and February 2015 and again for one day in May 2015. The annual permitted take has been reduced accordingly.

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* (Qld). Potential increase in take is limited due to the right to take water being limited to properties with riparian access to water. This element of take is not currently included in the calculation of annual permitted take.

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.

Water taken by runoff dams is not currently included in the calculation of annual permitted take, except in the Granite Belt of the Border Rivers catchment where a mix of

[1] 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).

sources (watercourses, springs, overland flow and groundwater) is commonly used for irrigation.

The take of water by commercial plantations

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

This category is not currently included in the calculation of annual permitted take.

- 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[2] 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. The bulk of the entitlements in the scheme are

[2] 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.

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 may build up to a specified percentage of the entitlement (85% in the Border Rivers, 100% in the other two schemes). The storage account increases when distributions are made (i.e. there is inflow into the water storage) and decreases as water is used.

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 allocation (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 2014/15 is shown in the table below.

Water supply scheme	Announced Allocation[3] (%)	Volume entitled to be taken[4] (GL)	Comments
Condamine and Balonne catchment			
Upper Condamine	100	25.6	
Chinchilla Weir	100	4.0	
Maranoa River	N/A	0.8	Announced allocations do not apply to this scheme.
St George	100	101.5	Announced allocations only apply to entitlements managed as part of the bulk share.
Border Rivers catchment			
Border Rivers	N/A	17.5	
Macintyre Brook	100	24.6	Announced allocations only apply to entitlements managed as part of the bulk share.
Warrego catchment			
Cunnamulla	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

[3] Applies to medium priority water allocations managed as announced allocations
[4] Includes entitlements held by the Commonwealth Environmental Water Holder

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 2014/15 was 29% of the total take, take of unsupplemented water was 67% and overland flow (predominantly made up of floodplain harvesting) 4%.

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 not included in annual estimates of take, except in the Granite Belt of the Border Rivers catchment.

The take of water by commercial plantations

No estimate of take is currently provided for the take of water by commercial plantations. There are no commercial plantations in the Moonie, Warrego, Paroo and Nebine catchments.

Summary of surface water take

Diversions reached 354 GL (85% of the water permitted to be taken) for the Condamine and Balonne catchment, 114 GL (90%) for the Border Rivers, 7 GL (26%) for the Warrego, 0.01 GL (14%) for the Paroo and 0.08 GL (2%) for the Nebine catchment for the 2014/15 water year.

The actual take in the Moonie catchment of 4 GL for 2014/15 exceeded the permitted take as determined by the model. Review of the actual take data has determined that reported take is compliant with water entitlement conditions (based on flows available at the point of take).

The discrepancy between permitted (modelled) and actual take is due to the representation of water allocations and licences in the model where full activation is assumed (i.e. all water entitled to be taken is being extracted). In reality, the management decisions of upstream users (including the Commonwealth Environmental Water Holder) have resulted in an increase in water entitled to be taken downstream. The 2014/15 water year was unusual in that there were only two small flow events where the flows occurred principally in the consumptive flow windows, with the bulk of the water taken by a single water entitlement holder in the lower catchment.

A review of the Moonie model was undertaken to ensure that there were no limitations or issues with the existing model.

- 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 200 ML was made available in the QMDB for short-term use.

- 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 60 GL of water permanently traded in the QMDB in 2014/15, 35 GL was traded separately from land and 25 GL traded with land, with the largest percentage of the total volume of permanent trades occurring in the Lower Balonne subcatchment.

The New South Wales – Queensland Border Rivers Intergovernmental Agreement 2008 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.

In contrast to previous years, there was net temporary trade from Queensland to New South Wales in 2014/15. This was largely due to the impact of temporary restrictions on the take of water from unregulated flow events in the NSW Border Rivers which were implemented on 28 January 2015. The restrictions were imposed to help ensure larger flows reached Menindee Lakes and to shore up the critical water supply situation for towns along the Darling River and the city of Broken Hill. The temporary restrictions in the NSW Border Rivers were lifted on 29 May 2015.

There was no trade between consumptive and environmental entitlement pools in 2014/15.

Groundwater use overview

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)*

While this year has tended towards being drier than the recent few years of above average rainfall, the more connected groundwater systems continue to benefit from some localised rainfall and flow events, especially the basalt and alluvial systems on the Great Dividing Range. While a rapid rise in water levels occurred in many of these groundwater systems after the exceptionally wet years, the levels have either stabilised or begun to fall. Several of the aquifer systems (not including the Central Condamine Alluvium) remain close to full in terms of aquifer storage.

- 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).

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)*

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 was 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 2014/15 is 156 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 (using a methodology tailored specifically for this purpose).

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 2014/15 for all resource units was within the respective SDLs, as will be required from 2019. Diversions in the key Central Condamine Alluvium (GS64a) were measured at 85% of SDL for water access excluding stock and domestic. This was achieved by limiting take to 50% and 70% of nominal entitlement. 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 70 to 80% of 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 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 3 GL of temporary trade and 2 GL of permanent trade. The Federal Government has released three tender rounds seeking interest from entitlement holders in the Central Condamine Alluvium area. Water sharing rules were amended to allow relocation of water licences in the Dalrymple Creek and Oakey Creek alluvial groundwater areas as of 1 July 2015 (outside this reporting period) as a first step towards enabling the buyback of entitlements and generating greater water entitlement flexibility.

2014/15 Snapshot of Water Diversions in the QMDB

Resource	Diversion 2014/15 (GL)	Permitted (GL)	Diversion 2013/14 (GL)
Surface water	479	579	770
Groundwater	178	262	194

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 annual permitted take. Water recovered by the Commonwealth from entitlement holders has previously been included in the annual permitted take as irrigation water and annual permitted take 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 2014/15 these rules assisted in providing for a flow through event into the Narran Lakes and provided in-stream benefits in the Lower Balonne distributaries, Warrego River and Border Rivers.

No trading of environmental water occurred in the year but considerable progress has been made by the CEWO to establish a framework in the Lower Balonne to support temporary trading of water to meet identified environmental watering requirements. This occurred as a result of the January/February 2015 flow events in the Lower Balonne where there was initially some concern that flows might not connect through to the Barwon River or that additional water might be beneficial to the Narran Lakes. Ongoing rainfall and continuing flows eventually provided adequate water without any need to supplement flows. Flows were controlled at the Whyenbah bifurcation weir upstream of Dirranbandi during the event to divert additional low flow water to the Narran, Bokhara and Birrie Rivers.

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.

Queensland acknowledges the work of the Murray-Darling Basin Authority in attempting to make an estimate of use under these categories of take, but given the level of uncertainty involved, doesn't support further use of these estimates in annual reporting.

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 will form part of the information provided to meet accreditation requirements under the Commonwealth Water Act for the Warrego, Paroo, Bulloo and Nebine Water Resource Plan.

Similar risk assessment processes will be 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. A planning process is currently underway to include the aquifers under the Warrego, Paroo, Bulloo and Nebine area in the second generation water planning process.

The MDBA, in conjunction with Queensland, have recently engaged in several projects to gain a better understanding of various aspects of groundwater systems in the QMDB. The Upper Condamine Alluvium project is ongoing and will continue until 2016. Stages 1 and 2 have been completed and Stages 3 and 4 commenced in 2015.

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. 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. Data gathering has also been conducted to gain an understanding of the ability and complexity of incorporating the tributary alluvial systems into the CCA model. The tributary systems feed into the CCA and as such, impact on how the CCA operates longer-term.

There are various levels of extraction of groundwater for stock and domestic use in the groundwater systems. In the more populated areas of the Upper Condamine (Alluvium and Basalts), there is significant pressure on the resource from peri-urban development. To better understand this use, levels of current extraction, and the implications of this use into the future, a project was conducted into the purposes and volumes of extraction for various users with a specific focus on stock and domestic extraction. The outcomes of the report

reaffirm the department's inclusion of restrictions in water resource plans regarding the extraction of groundwater in peri-urban areas. The report also allows for an improved understanding of the total quantum of water extracted from these groundwater systems for stock and domestic purposes in reporting under the Basin Plan.

The department has engaged QUT to undertake research on connectivity within and between groundwater and surface water systems in the Upper Condamine Tributaries. 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.

In moving toward the second generation state-based water resource plans and compliance with the Basin Plan, there will be a suite of planning and policy work looking at other groundwater matters such as water licence conversions, water trading frameworks and water management arrangements.