

Under the WSP, Carrathool Shire Council is authorised to extract up to 2,247 ML/yr from the Lower Lachlan GMU, which includes groundwater from the borefield near Lake Brewster.

Extraction of groundwater in other GMUs may be achieved under basic landholder rights. For licensed water users who extract from the Upper Lachlan GMU, extraction will be managed under the Lachlan Alluvial Macro Groundwater Sharing Plan, which is currently being developed (NOW, 2010o).

For licensed water users who extract from the Lachlan Fold Belt GMU, extraction will soon be managed under the WSP for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources, which at the time of writing was in draft format and open for public comment.

The proposed changes to groundwater diversions in the Lachlan catchment, for the GMUs relevant to the REROC LGAs, are presented in Table 5. This may change with the publication of the final Basin Plan.

Table 5: Proposed changes to groundwater diversions in the Lachlan catchment as per The Guide (MDBA, 2010b)

	Current diversion limit	SDL proposal	Reduction
Lower Lachlan Alluvium	108 GL/yr	64.8 GL/yr	43.2 GL/yr or 40%
Lachlan Fold Belt: Lachlan	23.1 GL/yr	23.1 GL/yr	Nil
Upper Lachlan Alluvium	77.1 GL/yr	63 GL/yr	14.1 GL/yr or 18%

3.3 Murray Catchment

The LGAs of Tumbarumba, Lockhart and Urana have land area within the Murray River catchment.

Surface Water Management

A surface WSP exists for the NSW Murray, Lower Darling and Upper Billabong water source. The REROC LGAs do not fall within the extent of these WSPs.

The extraction of surface water in the Murray River catchment can be achieved under basic landholder rights. For some licensed water users, extraction will soon be managed under the WSP for the Murray Unregulated and Alluvial Water Sources, which at the time of writing, was in draft format and open for public comment.

The WSP applies to Khancoban Pondage and Swampy River Plain downstream of the pondage. It also applies to Indi Blackwater and to the Murray River downstream to the full supply limit of Hume Dam (NOW, 2010q). Tumbarumba LGA is the REROC LGA who will be subject to this WSP.

At the time of publication of the draft WSP there were 26 surface water licenses with a total entitlement of 1,561 ML/yr in the Tumbarumba water source (NOW, 2010q). Of this entitlement, 69.2% is for irrigation and 32% for town water supply (NOW, 2010q).

The proposed change to the amount of water that is diverted in the Murray catchment is between 26% and 35% of the current SDL under The Guide. This may change with the publication of the final Basin Plan.

Groundwater Management

The extraction of groundwater in the Lachlan Fold Belt within the Murray catchment can be achieved under basic landholder rights. For licensed water users, extraction will soon be managed under the WSP for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources, which at the time of writing was in draft format and open for public comment.

The Guide proposed nil change to the amount of groundwater that is diverted/extracted in the Murray catchment). This may change with the publication of the final Basin Plan.

3.4 Recycled Water

Recycled water for the REROC urban water supply schemes is sourced from the wastewater treatment plants that are operated by the councils. The standard of treatment that is achieved by the REROC councils varies from secondary standard to advanced tertiary.

In 2008/09, the volume of water recycled by the REROC councils ranged from zero (Tumbarumba) to 572 ML (Wagga Wagga) (Table 6). Temora, Gundagai and Coolamon recycled the greatest proportion of their effluent in the 2008/09 period (Table 6). The total volume of recycled water used for the REROC area for the 2008/09 period was 167GL (Table 6). The estimated volume of water recycled via decentralised systems was not available for the REROC SBC councils.

Table 6: Recycled water statistics for the REROC SBC councils (NOW, 2010a)

Utility	% of Effluent Recycled			Total Recycled Water (ML)
	2006/07	2007/08	2008/09	2008/09
Wagga Wagga			11	572
Tumut		4	4	33
Cootamundra	37	51	52	202
Temora	91	28	100	113
Bland	45	45	45	104
Junee	60	54	65	166
Tumbarumba			0	0
Gundagai	99	100	100	117
Coolamon	74	89	90	88
Lockhart	41	40	1	2
Total				167,231

Some of these figures should be considered with care as it became apparent during the project that there is a lack of consistency in the way that recycled water volumes are reported. Some LGA's report volumes that include evaporated recycled water, while others do not, making it difficult to compare figures across the REROC region. Furthermore, the feasibility and effectiveness of recycled water schemes is unique for each of the LGAs, due to site-specific constraints and opportunities.

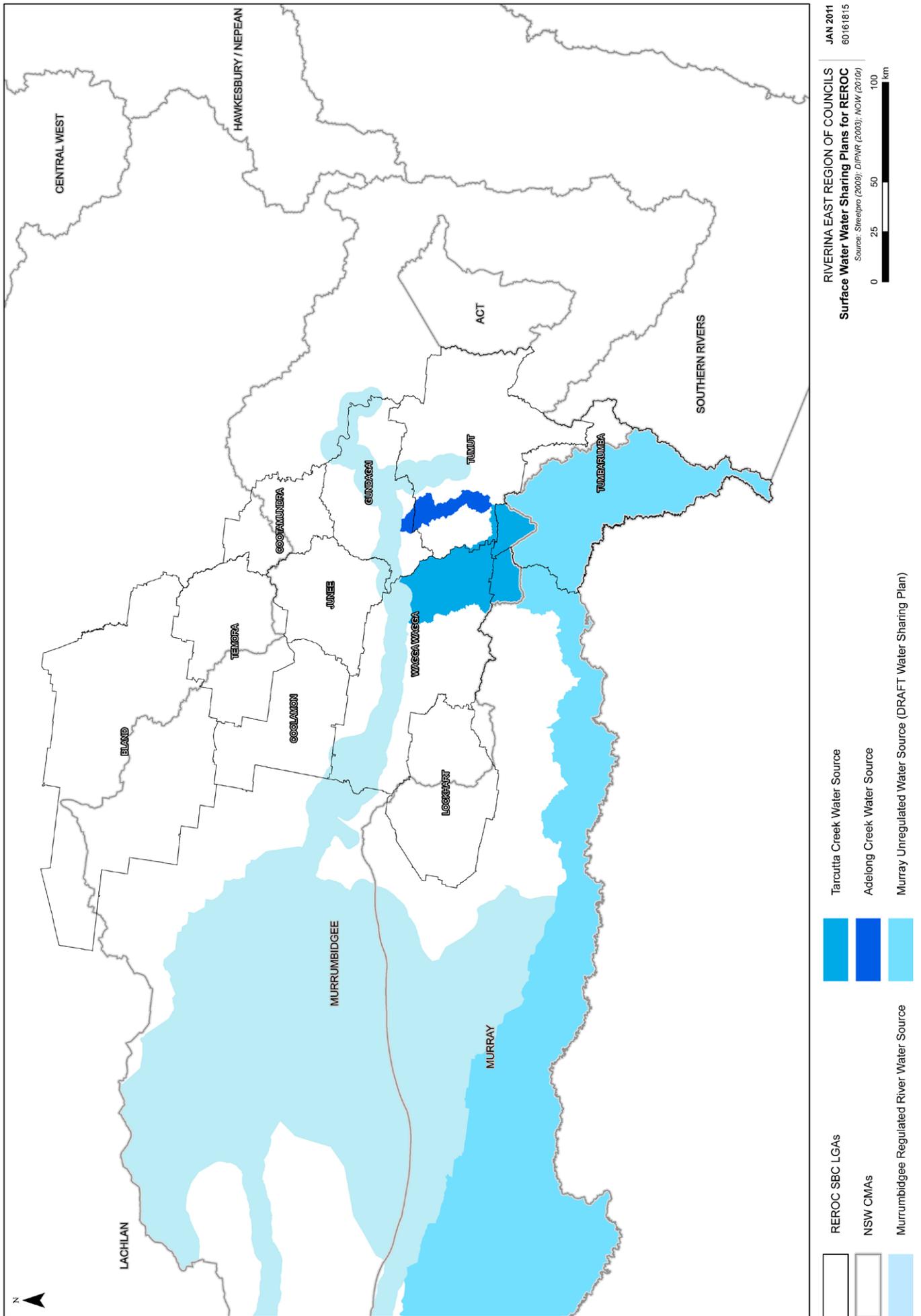


Figure 13: Surface water WSPs applying to the REROC region

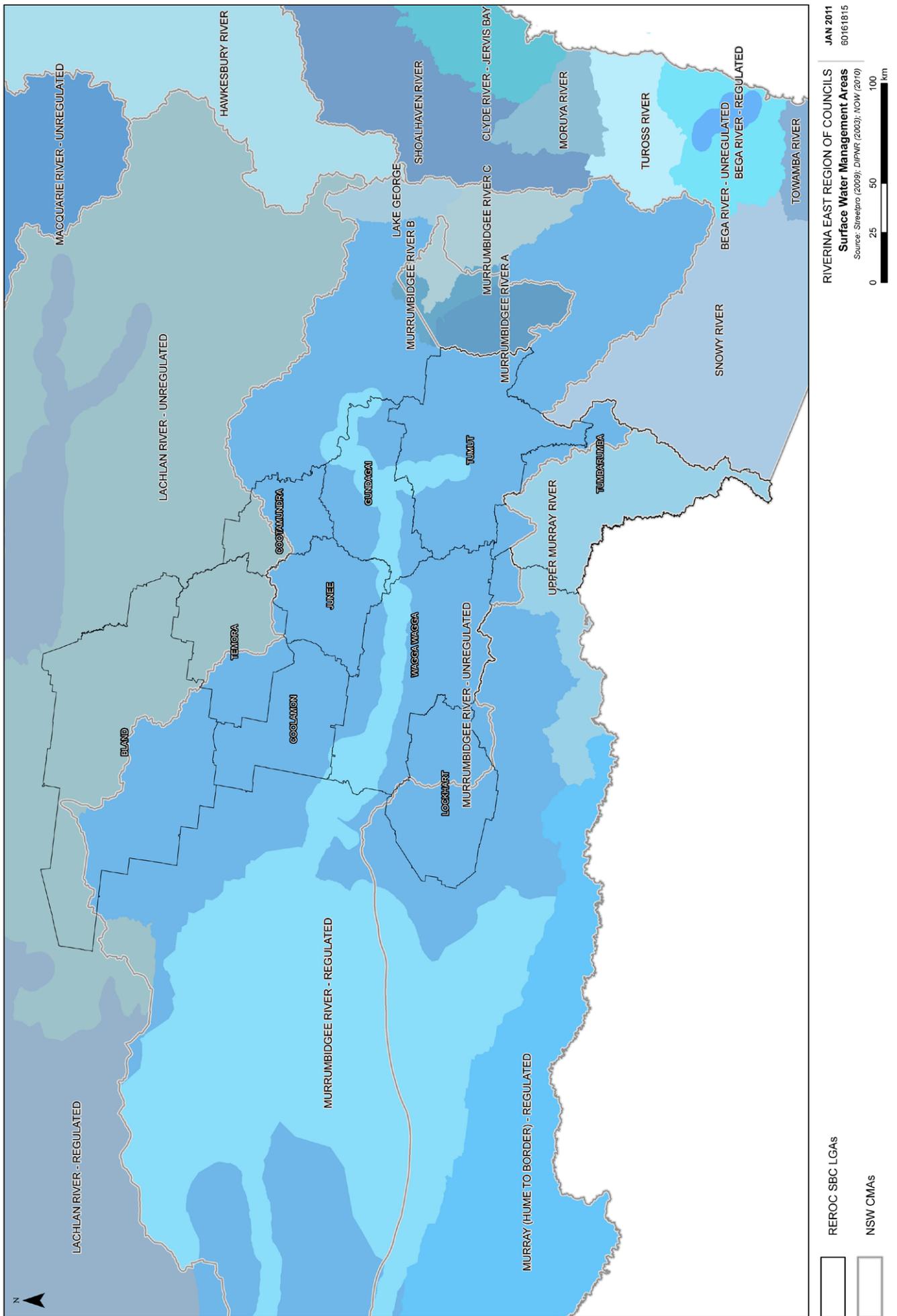


Figure 14: Surface WMAs for REROC

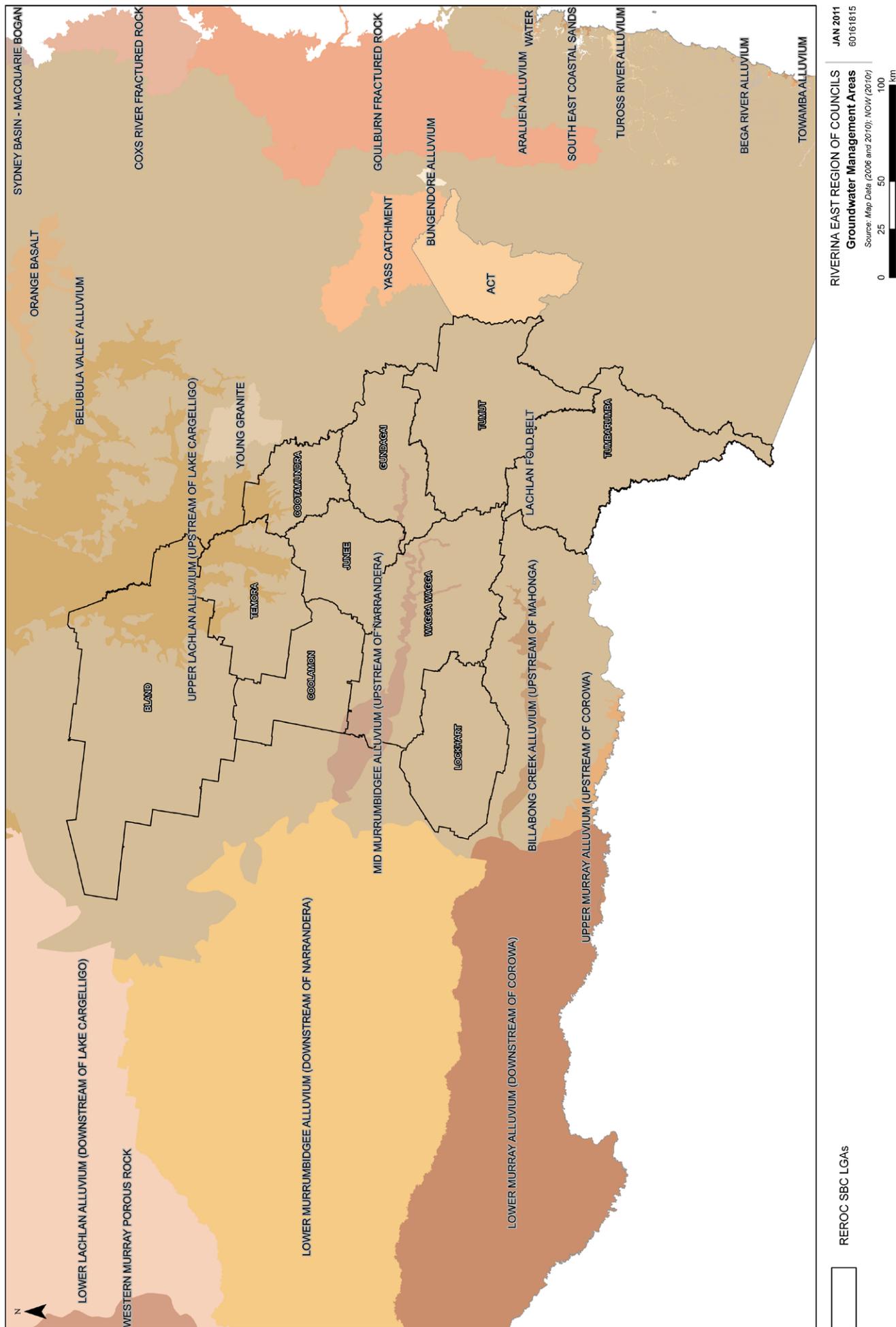


Figure 15: Groundwater WMAs for REROC

4. Historical and Future Runoff

Data from the South Eastern Australian Climate Initiative (SEACI) project were sourced to map historical and projected runoff in the REROC region.

Historical

The historical runoff (period 1895-2006) follows relatively closely the rainfall pattern in the REROC region. The highest runoff values (between 560 mm/yr and 1200 mm/yr) are found in the south-eastern parts of the region where rainfall is also the highest; conversely runoff is the lowest in the north-west with runoff values below 20 mm/yr (see Figure 16).

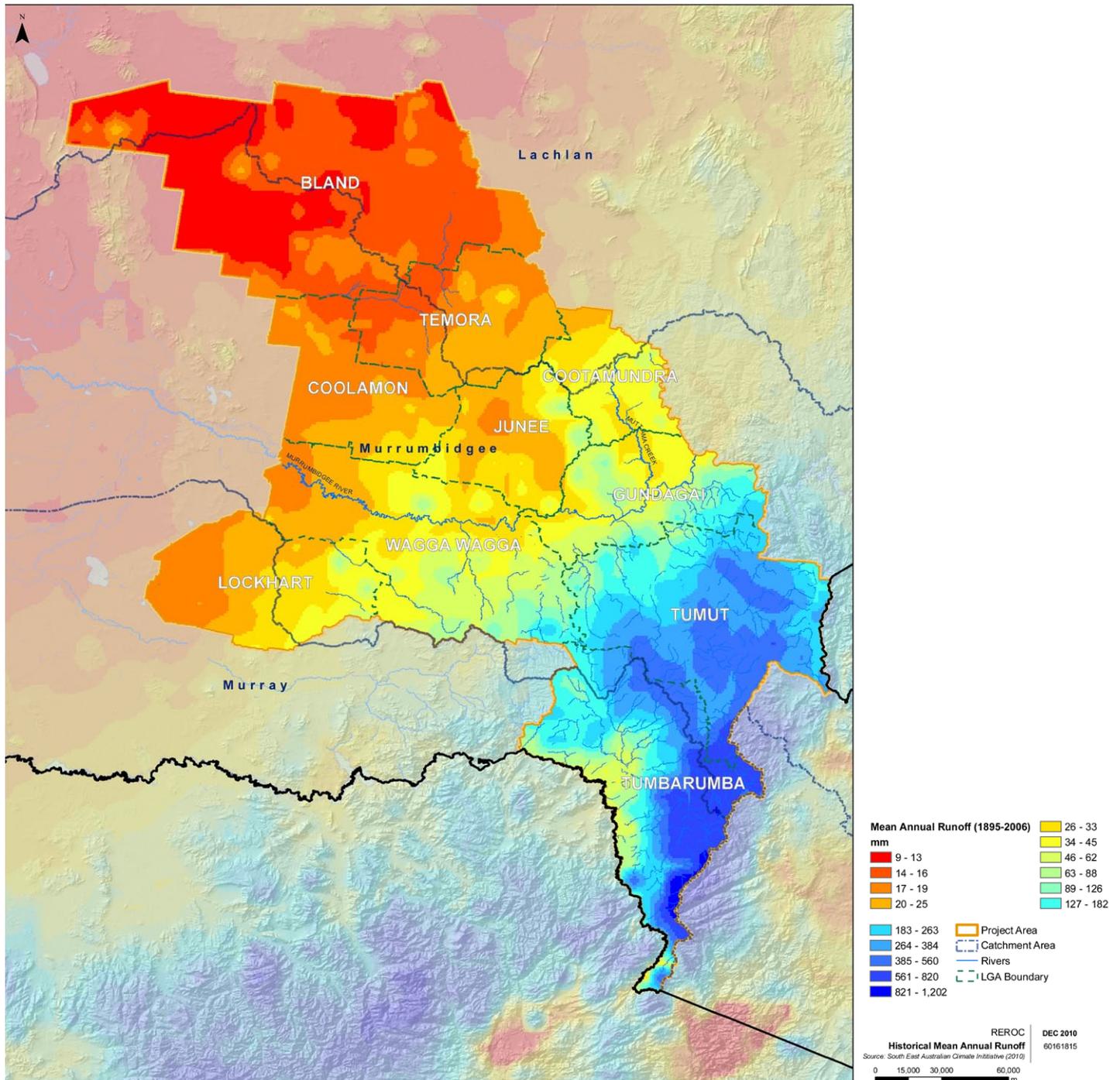


Figure 16: Mean annual runoff for REROC – historical period (1895-2006)

Under the median scenario, the entire REROC region would experience a reduction in runoff in comparison to historical runoff. The greatest decrease would be found in the LGAs of Cootamundra, Gundagai and some areas of Wagga Wagga. The south-east corner of REROC is the area least affected in relative terms (see Figure 17).

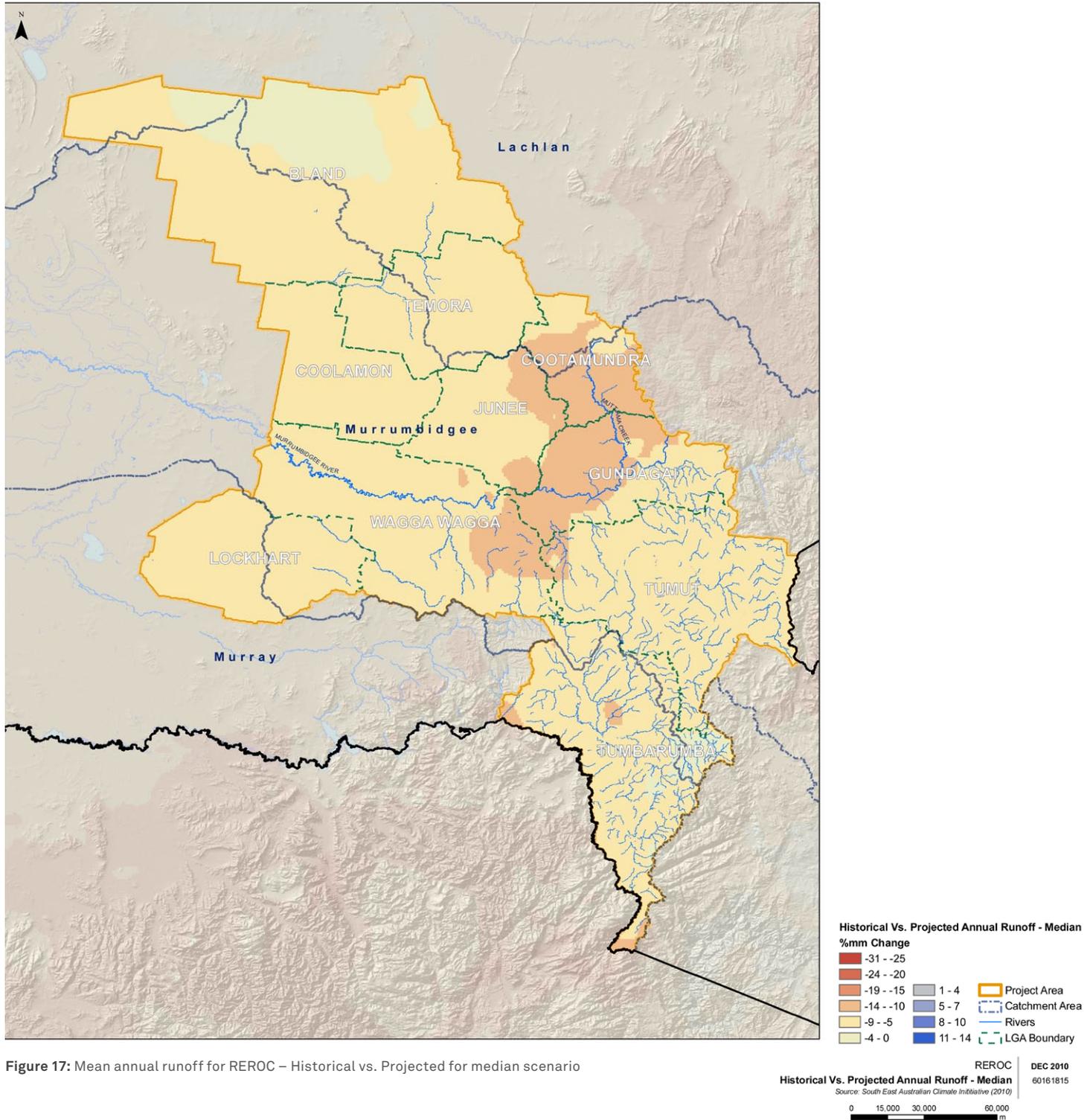


Figure 17: Mean annual runoff for REROC – Historical vs. Projected for median scenario

5. Water Use

The following information contains a summary of urban and non-urban water use for each REROC LGA.

5.1 Urban

The access to water for urban use across REROC and NSW is controlled under WALs that are administered by NOW. A Local Water Utility may gain access under a Local Water Utility (surface or groundwater) WAL, a Regulated River (High Security) (Local Water Utility) WAL or an Aquifer (Local Water Utility) WAL.

Bland

Bland Shire Council has five low (general) security recreation surface water WALs with a combined entitlement of 94ML (NOW, 2010s). All of the WALs are unregulated river licenses so consumption is not yet recorded annually by NOW. Bland Shire Council does not hold any WALs for groundwater. The balance of water used in Bland comes from GWCC.

The residential sector is by far the largest water user in the Bland LGA (GWCC, 2010d). In general, water use has fluctuated over time, with a peak in 2008-09 and a trough in 2009-10 (GWCC, 2010d). Commercial and industrial water use in the LGA has declined steadily, while rural, community and institutional water use have all fluctuated (GWCC, 2010d). The average annual residential water supplied in 2009-10 was 249kL/connected property (GWCC, 2010d).

Temora

Temora Shire Council has one surface water WAL. The licence is a general security irrigation WAL for the Lachlan River Unregulated WMA, with a licensed entitlement of 10 ML (NOW, 2010s). The balance of water used in Temora comes from GWCC.

The residential sector is the largest water user in the Temora LGA, with rural water use the second largest (GWCC, 2010d). Residential water use increased in 2008-09 and fell again for the 2009-10 water year (GWCC, 2010d). Rural water use has declined since 2007 (GWCC, 2010d). For all other sectors, water use has fluctuated over time with a peak in 2008-09 (GWCC, 2010d). Commercial standpipes are used for drought relief and a peak in usage was observed in 2007-08 (GWCC, 2010d). The average annual residential water supplied in 2009-10 was 241kL/connected property (GWCC, 2010d).

Coolamon

The Coolamon LGA is supplied with potable water from GWCC's Oura and Mt Arthur water supply schemes. Both of these schemes are 100% groundwater (GWCC, 2010a). There are no WALs for town water supply use in the Coolamon LGA (NOW, 2010s).

The residential and rural sectors are by far the largest water users in the Coolamon LGA (GWCC, 2010d). For almost all sectors, water use has fluctuated over time with a peak in 2008-09 (GWCC, 2010d). The average annual residential water supplied in 2009-10 was 257kL/connected property (GWCC, 2010d).

Cootamundra

The supply for Cootamundra is the Jugiong water supply scheme, comprising of raw water from the Murrumbidgee River and treatment at the Jugiong Water Treatment Plant (GWCC, 2010a). GWCC provides water supply and reticulation services directly to a portion of the LGA; urban customers in Stockinbingal and Wallendbeen, rural customers in Frampton, rural customers between Cootamundra and Bauloora and rural customers between Cootamundra and Cowangs (GWCC, 2010a).

Cootamundra Shire Council reticulates bulk water from GWCC to the remainder of the shire, specifically customers in the Cootamundra town area (GWCC, 2010a). Cootamundra Shire Council also holds two general security recreation groundwater WALs with a total licensed entitlement of 40ML (NOW, 2010s). The licenses are for the Lachlan Fold Belt GMU.

For those parts of the Cootamundra LGA supplied directly by GWCC, the majority of the water supplied is for rural and commercial use. Rural water use has fluctuated over time with a peak in 2007-08 (GWCC, 2010d). The commercial, residential and community sector have all remained relatively constant (GWCC, 2010d). The average annual residential water use for the 2009-10 period was 161 kL/connected property (GWCC, 2010d).

Cootamundra Shire Council purchased 705 ML of potable water from GWCC during the 2008-09 period (NOW, 2010a). Overall, the volume has been decreasing since 2006-07 (ACT CSE, 2009a). Of this volume of water supplied directly by Cootamundra Shire Council, residential consumption is clearly the greatest component of total water use and has been steadily declining since 2002-03 (NOW, 2010a). This is consistent with the fact that water restrictions have been in place 100% of the time for the past three water years in the Cootamundra Shire (NOW, 2010a). Industrial water use has also declined while commercial and rural/irrigation water use has generally increased (NOW, 2010a). The average annual residential water use for Cootamundra Shire Council customers for the 2008-09 period was 198 kL per connected property (NOW, 2010a).

Overall (taking into account water supplied directly by GWCC and water supplied by Cootamundra Shire Council), the residential sector is the largest water user for the Cootamundra LGA, with commercial and rural sectors following second.

Junee

The Junee LGA receives potable water from GWCC's Oura and Jugiong water supply schemes. The Oura scheme is groundwater and the Jugiong source is the Murrumbidgee River (GWCC, 2010a). There are no WALs for urban/town water supply use in the Junee LGA (NOW, 2010s).

The rural sector is the largest water user in the Junee LGA, with residential water use the second largest (GWCC, 2010d). Rural water use has remained fairly steady over the past three years, while residential peaked in 2008-09 (GWCC, 2010d). Institutional and community water use has remained relatively steady and commercial water use has steadily increased (GWCC, 2010d). The average annual residential water supplied in 2009-10 was 245kL/connected property (GWCC, 2010d).

Gundagai

The raw water source for the Gundagai water supply system is the Murrumbidgee River (GSC, 2009d) and the extraction point is downstream of Burrinjuck Dam and the junction with the Tumut River. The Gundagai Local Water Utility (GLWU) has a high security town water supply licence for 1,250ML/yr (GSC, 2009c) and the expected usage must be 'ordered' each month. The licence volume is generally the governing factor for the supply rather than the river flow (ACT CSE, 2009c).

The total volume of revenue water use was 502 ML, with 160 ML of non-revenue water. The largest volume is attributable to the residential sector, with commercial also consuming a relatively large volume (approximately 50% of total residential consumption). Reticulated water use by the rural sector increased from zero in 2000-01 to 50 ML/yr in 2006-07 (ACT CSE, 2009c).

The commercial and industrial sector's water use dropped from 150 ML/yr in 2000-01 to 125 ML/yr in 2007-08 (ACT CSE, 2009c). According to NOW this rose again to 185 ML/yr in 2008-09. One of the major industries in this category is the Gundagai Meat Processors (ACT CSE, 2009c). Total water use in the Gundagai Shire has remained relatively constant from the year 2000 to 2009, at around 600 to 650 ML/yr (ACT CSE, 2009c). The reduction in residential water use through water restrictions has been balanced out by the overall rise in consumption in the rural, commercial and industrial sectors.

Residential water use has generally declined since 2003-04, with a minimum in 2007-08. This is consistent with the fact that Gundagai LGA has been on water restrictions 100% of the time since 2005 (NOW, 2010a).

Residential water use increased in 2008-09. The average annual residential water supplied during the 2008-09 period was 281 kL per connected property (NOW, 2010a).

Tumbarumba

Tumbarumba Shire Council maintains two water supply systems; Tumbarumba and Khancoban. The raw water source for the Tumbarumba water supply system is Burra Creek, with additional supply sourced from Tumbarumba Creek and a groundwater bore (McMeekin Bore) (GHD, 2008). To meet increasing demand and manage decreasing water availability, a system upgrade is currently underway. The Tumbarumba Reservoir is being enlarged and additional groundwater bores are being developed. The raw water source for the Khancoban water supply system is Khancoban Creek (ACT CSE, 2009c).

Since 2001/2002, there has been a steady decline in water consumption (TSC, 2010); the greatest reduction was achieved in the Tumbarumba system. Annual water use patterns show a clear peak over summer, however the monthly consumption has been highly variable from year to year (TSC, 2010).

The NSW Office of Water reports that the average annual residential water supplied for the 2008-2009 period was 221kL/connected property (NOW, 2010a).

Based on the Tumbarumba Drought Mitigation Strategy (GHD, 2008) and the Regional State of the Environment Report (ACT CSE, 2009c), there does not appear to be a water recycling system in place for Tumbarumba Shire. Information on non-potable water use was not included for the Tumbarumba Shire in the NSW Water Utility Performance Monitoring reports, supporting this observation (NOW, 2010a).

Wagga Wagga

Wagga Wagga receives water from the RWCC. Approximately 65% of water for the Wagga Wagga supply system was extracted from groundwater resources in 2008-09 (RWCC, 2010). Annual water consumption in the Wagga supply system has fluctuated over time between 11,700ML and 14,227ML.

The total water use for the LGA has fluctuated over time. The total water use and water use per capita was at a minimum in 2007-08, which is likely to be in response to the drought that was felt most severely in the 2006-07 period. Although a specific breakdown of usage is not available by sector for the Wagga Wagga LGA, the breakdown of water use across RWCC provides the best indication available. On this basis, residential water use is consistently the greatest proportion of total water use, with commercial consisting of approximately 15%.

Lockhart

The potable water supply for the Lockhart LGA includes both surface and groundwater from RWCC. The proportion of potable water sourced from groundwater is estimated to be approximately 70% (RWCC, 2010).

Due to the format of data collection, water use figures include a small proportion of water consumption from residents in Milbrulong (population 45 people, as of 2007), which is in the Urana Shire. Water consumption has generally reduced over time, apart from a peak in the 2006/07 water year (RWCC, 2010).

Tumut

Tumut Shire Council is in charge of five water supply systems in the LGA; Adelong, Batlow, Brungle, Talbingo and Tumut.

Raw water for the Adelong scheme is sourced from Adelong Creek (ACT CSE, 2009b) which is subject to low flows during drought. In 2008-2009 the creek did not meet the demand of the scheme so four supplementary bores were commissioned (ACT CSE, 2009b). The groundwater bores can meet the demand of the scheme under stage 4 restrictions (ACT CSE, 2009b).

The raw water source for the Batlow water supply scheme is Kunama Dam, which is fed by Little Gilmore Creek. The security of the Batlow supply source is currently a concern (TSC, 2005).

The raw water source for the Brungle scheme is Nimbo Creek, which is a branch of the Nimbo River. The raw water source for the Talbingo scheme is a small loose rock wall dam on Jounama Creek (TSC, 2005).

The raw water for the Tumut scheme is drawn from the Tumut River. The Tumut River transfers water from the Snowy Mountains Hydroelectricity Scheme to irrigation areas on the Murrumbidgee River. The flow in the river is therefore dependant on electricity demand and irrigation requirements. Flow is particularly high in the summer months when irrigation demand is at a maximum. The Tumut reticulation system supplies the towns of Tumut and Cloverdale.

The total volume of potable water used in 2008-09 for the Tumut Shire was approximately 1,500 ML (minor discrepancies exist between the volume reported by NOW and the ACT CSE). Surface water usage has declined over the past five years, in conjunction with a decline in reticulated water usage, a reflection perhaps of an overall decrease in water availability across the five supply schemes. Bore water consumption that was reported for the 2006-07 and 2007-08 period would correspond to the groundwater bores that were installed in Adelong supply scheme.

It is clear that the largest proportion of revenue water is used for residential purposes, with the industrial sector consuming the second largest amount of revenue water. Residential water use has fluctuated over time, with a clear minimum during the 2006-07 water year. Since that time, residential water usage has remained at around 220 kL/connected property. According to the NSW Office of Water, the average annual residential water supplied for the 2008-2009 period was 219 kL per connected property (NOW, 2010a).

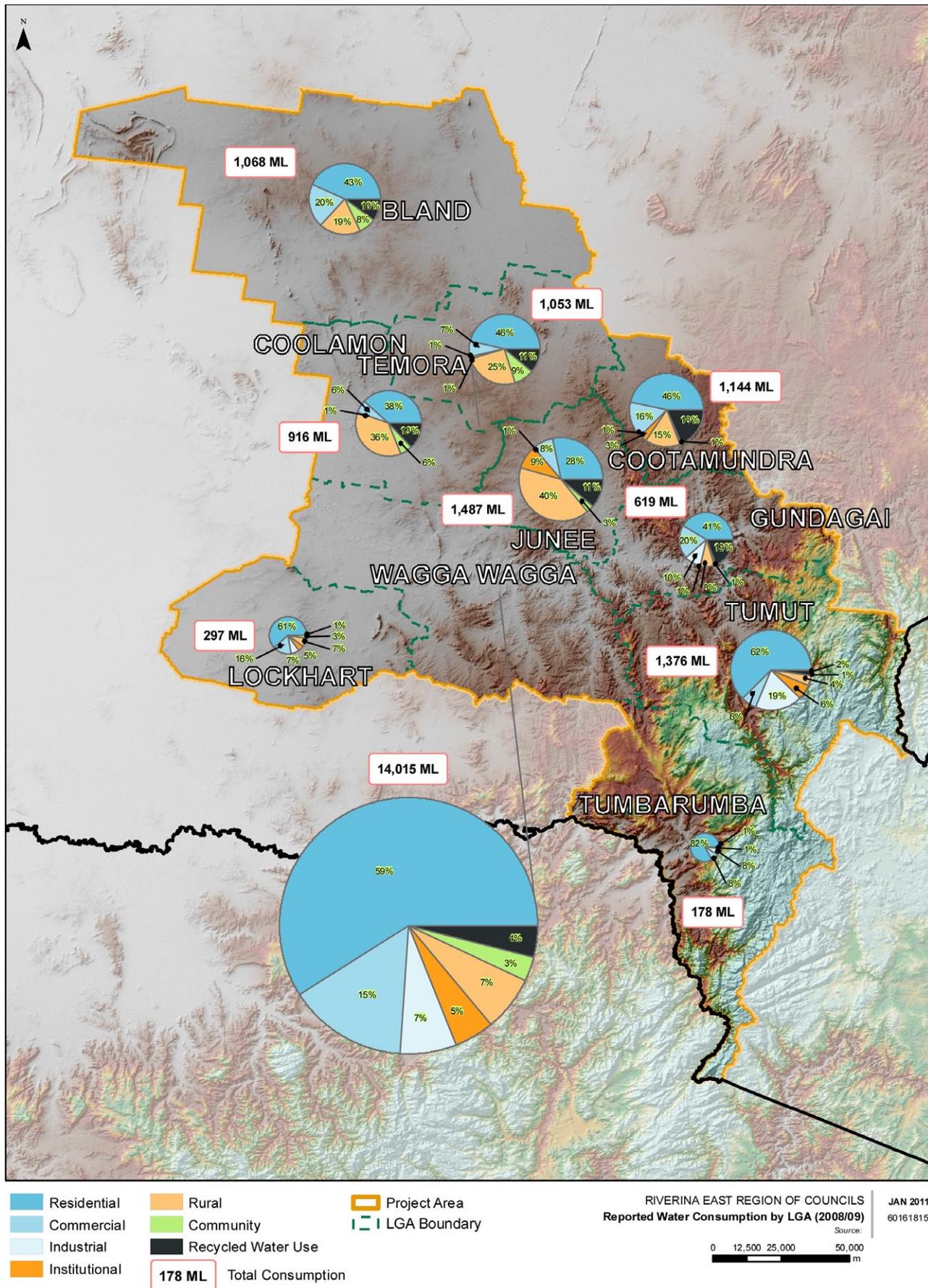


Figure 18: Reported Water Consumption by LGA

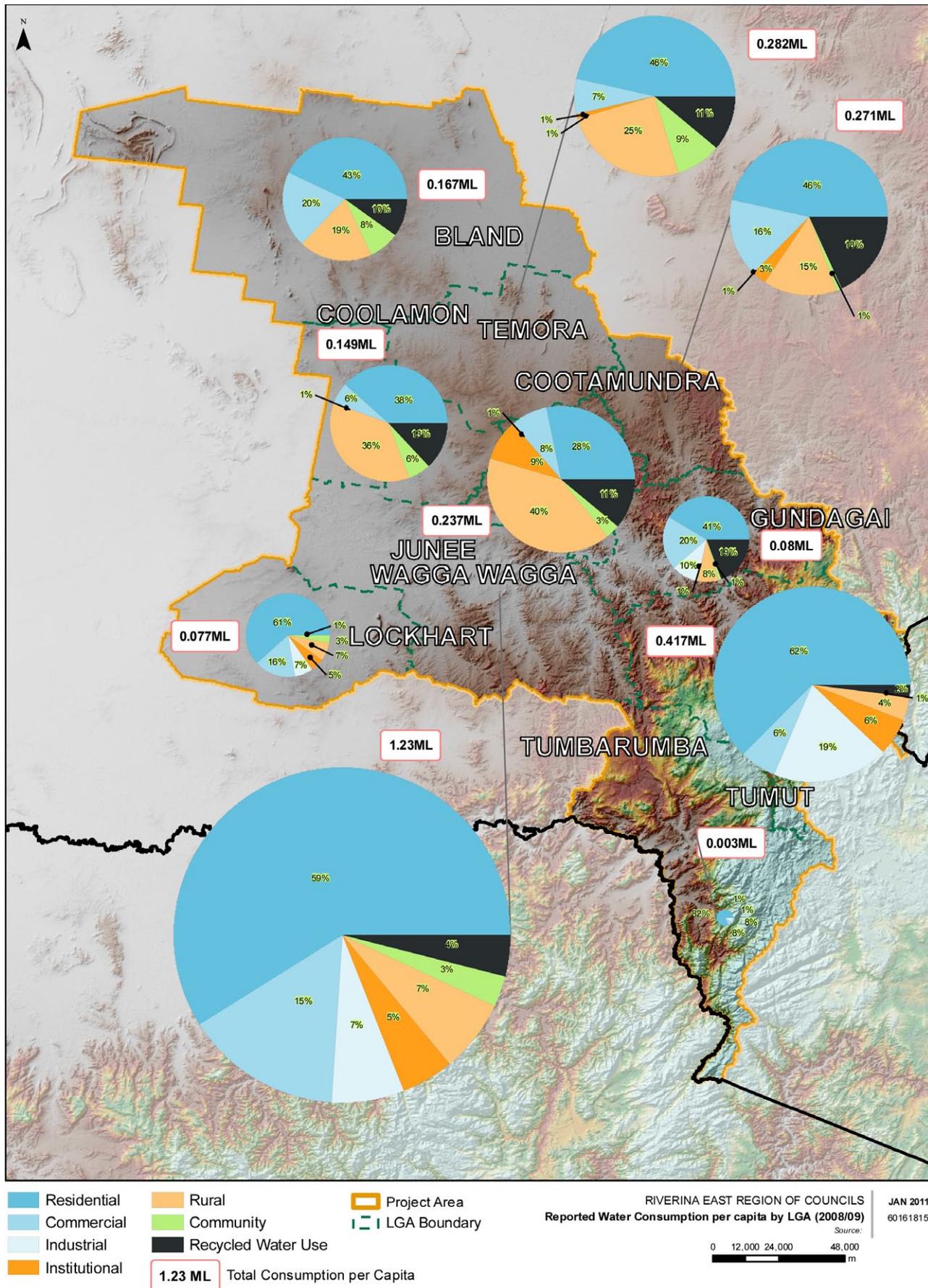


Figure 19: Reported Water Consumption per capita by LGA

5.2 Non-Urban

Non-Urban water consumption refers to water that is consumed outside the water supply system that is provided by a local water utility. This may include water that is consumed via the following mechanisms:

- WALs other than Local Water Utility or Town Water Supply (e.g. stock and domestic, regulated river, aquifer etc)
- WALs made under the Water Act 1912 that have not been transferred into the NOW database of licences (i.e. those that are not covered by a WSP or those that will be covered by a macro WSP)
- Basic Landholder Rights/Dryland agriculture

Water use under some non-urban WALs that are within active WSP areas can be estimated, as they are monitored by NOW. For WALs outside of WSP areas, water consumption is not actively monitored or reported by NOW, so water use cannot be accurately determined. Water use can only be estimated by making some assumptions about how much of an allocation would be used in a particular year.

Water consumption under WALs that were made under the Water Act 1912 that do not yet appear on NOW databases cannot be estimated. These licences will either be in hard copy format or they may still yet to be defined/captured in a formal licence.

Similarly, the volume of water consumed under basic landholder rights cannot be accurately estimated. For the areas that are covered by WSPs, there may be an estimated allocation for basic landholder rights in the plan. The only other mechanism of estimating water use in this category is by tracking water supply works approvals in the NOW database. This type of analysis is beyond the scope of this project.

The following information on WALs within each LGA was current at the time of writing.

Bland

There are 20 surface water WALs in the Bland LGA and the majority are high security (NOW, 2010s). Eleven WALs have zero listed entitlement and these are domestic and stock basic landholder rights (which are not recorded by NOW). Of these WALs, three are for the Murrumbidgee River Unregulated WMA and the remainder are for the Lachlan River Unregulated WMA (NOW, 2010s; NOW, 2010r). Both of these areas are not yet subject to a WSP, so water use is not published by NOW.

In addition, there are 161 groundwater WALs in the Bland LGA with the vast majority being high security (NOW, 2010s). A large proportion of the licenses have zero listed entitlement and as with the surface water WALs, these are mainly domestic and stock basic landholder rights (which are not recorded by NOW). Of these licenses, 75 extract water from the Lachlan Fold Belt GMU and 86 extract water from the Upper Lachlan Alluvium GMU (NOW, 2010s; NOW, 2010r). Both of these areas are not yet subject to a WSP, so water use is not published by NOW.

Temora

There are 13 surface water WALs in the Temora LGA and there is a relatively even balance between high and general security licenses (NOW, 2010s). Four WALs have zero listed entitlement and these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). Three of the WALs are for the Murrumbidgee River Unregulated WMA and the remainder of the WALs are for the Lachlan River Unregulated WMA (NOW, 2010s; NOW, 2010r). Both of these areas are not yet subject to a WSP, so water use is not published by NOW.

There are 68 groundwater WALs in the Temora LGA with nearly all of the WALs being high security (NOW, 2010s). Entitlements are not listed for any of the WALs as they are mainly domestic and stock basic landholder rights (which are not recorded by NOW). 50 of the WALs are for the Lachlan Fold Belt GMU and 12 are for the Upper Lachlan Alluvium; six of the WALs could not be attributed to a GMU (NOW, 2010s; NOW, 2010r).

Coolamon

There are eight surface water WALs in the Coolamon LGA and the majority are high security (NOW, 2010s). Four WALs have zero listed entitlement and these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). All of these WALs are for the Murrumbidgee River Unregulated WMA, which is not yet subject to a WSP, so water use is not published by NOW (NOW, 2010s; NOW, 2010r).

There are 115 groundwater WALs in the Coolamon LGA and the vast majority are high security (NOW, 2010s). All of the licenses have zero listed entitlement and as with the surface water WALs, these are mainly domestic and stock basic landholder rights (which are not recorded by NOW). Of these licenses, 112 extract water from the Lachlan Fold Belt GMU and three extract water from the Mid Murrumbidgee Alluvium GMU (NOW, 2010s; NOW, 2010r). Both of these areas are not yet subject to a WSP, so water use is not published by NOW.

Cootamundra

There are 11 surface water WALs in the Cootamundra LGA and the majority of the licenses are high security (NOW, 2010s). Three WALs have zero listed entitlement and these are domestic and stock basic landholder rights (which are not recorded by NOW). Four of the WALs are for the Lachlan River Unregulated WMA and seven are for the Murrumbidgee River Unregulated WMA (NOW, 2010s; NOW, 2010r). Both of these WMAs are not yet subject to a WSP, so water use is not published by NOW.

There are 593 groundwater WALs in the Cootamundra LGA with nearly all of the WALs being high security (NOW, 2010s). Entitlements are not listed for a large proportion of the WALs as they are mainly domestic and stock basic landholder rights (which are not recorded by NOW). 559 of the WALs are within the Lachlan Fold Belt GMU and 31 are for the Upper Lachlan Alluvium GMU (NOW, 2010s; NOW, 2010r). Both of these GMUs are not yet subject to a WSP, so water use is not published by NOW.

Junee

There are 21 surface water WALs in the Junee LGA and there is a relatively even balance between high and general security licenses (NOW, 2010s). Four WALs have zero listed entitlement and these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). Eight of the WALs are for the Murrumbidgee River Unregulated WMA and thirteen of the WALs are for the Murrumbidgee Regulated River WMA (NOW, 2010s; NOW, 2010r). The Murrumbidgee River Unregulated WMA is not yet subject to a WSP, so water use is not published by NOW. Water consumption statistics for the WALs within the Murrumbidgee Regulated River WMA were not available for the project.

There are 223 groundwater WALs in the LGA with nearly all of the WALs being high security (NOW, 2010s). Entitlements are not listed for a large proportion of the WALs as they are mainly domestic and stock basic landholder rights (which are not recorded by NOW). Seven of the WALs are for the Mid Murrumbidgee Alluvium GMU and 216 are for the Lachlan Fold Belt GMU (NOW, 2010s; NOW, 2010r). Both of these GMUs are not yet subject to a WSP, so water use is not published by NOW.

Gundagai

There are 120 surface water WALs in the Gundagai LGA and the majority are general security (NOW, 2010s). Five WALs have zero listed entitlement and three of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). Of the WALs, fourteen are for the Murrumbidgee River Unregulated WMA, and the remainder are for the Murrumbidgee River Regulated WMA (NOW, 2010s; NOW, 2010r).

There are 429 groundwater WALs in the Gundagai LGA and the majority are high security (NOW, 2010s). Four hundred WALs have zero listed entitlement and 396 of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). Of the WALs, 46 are for the Mid Murrumbidgee Alluvium WMA, and the remainder are for the Lachlan Fold Belt (NOW, 2010s; NOW, 2010r).

Tumbarumba

There are 139 surface water WALs in the Tumbarumba LGA and the majority are general security (NOW, 2010s). Eight WALs have zero listed entitlement and nearly all of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). All of the WALs in are for the Upper Murray River WMA (NOW, 2010s; NOW, 2010r).

There are 384 groundwater WALs in the LGA and the vast majority are high security (NOW, 2010s). Three hundred and twenty eight WALs have zero listed entitlement and 313 of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). All of the WALs are for the Lachlan Fold Belt WMA (NOW, 2010s; NOW, 2010r).

Wagga Wagga

There are 240 surface water WALs in the Wagga Wagga LGA and the majority of licenses are general security (NOW, 2010s). Twenty six WALs have zero listed entitlement and the majority of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s).

There are 1,073 groundwater WALs in the Wagga Wagga LGA and the vast majority are high security (NOW, 2010s). A large proportion of the licenses have zero listed entitlement and as with the surface water WALs, these are mainly domestic and stock basic landholder rights (which are not recorded by NOW).

Lockhart

There are 10 surface water WALs in the Lockhart LGA and the majority are high security (NOW, 2010s). Five WALs have zero listed entitlement and most of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). All of the WALs are for the Murrumbidgee River Unregulated WMA (NOW, 2010s; NOW, 2010r).

There are 75 groundwater WALs in the LGA and the vast majority are high security (NOW, 2010s). A large proportion of the licenses have zero listed entitlement and as with the surface water WALs, these are mainly domestic and stock basic landholder rights (which are not recorded by NOW). All of the licenses listed are for the Lachlan Fold Belt WMA (NOW, 2010s; NOW, 2010r).

Tumut

There are 289 surface water WALs in the Tumut LGA and the majority are general security (NOW, 2010s). Fourteen WALs have zero listed entitlement and three of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). Of the WALs, 34 are for the Murrumbidgee River Regulated WMA, and the remainder are for the Murrumbidgee River Unregulated WMA (NOW, 2010s; NOW, 2010r).

There are 367 groundwater WALs in the Tumut LGA and the majority are high security (NOW, 2010s). Three hundred and twelve WALs have zero listed entitlement and 306 of these are domestic and stock basic landholder rights (which are not recorded by NOW) (NOW, 2010s). All of the WALs are for the Lachlan Fold Belt WMA (NOW, 2010s; NOW, 2010r).

5.3 Summary

Figure 20 provides a graphical representation of urban and non-urban surface and groundwater entitlements by LGA. Note that this includes an estimated 8ML per domestic and stock licence (according to the NSW Office of Water, an allowance of 8ML per WAL is a reasonable estimate of domestic and stock use) and does not include a large number of licenses for which there is no entitlement information.

Figure 21 provides a graphical representation of the number of urban and non-urban surface and groundwater WALs and the percent that can be attributed to each licence type.



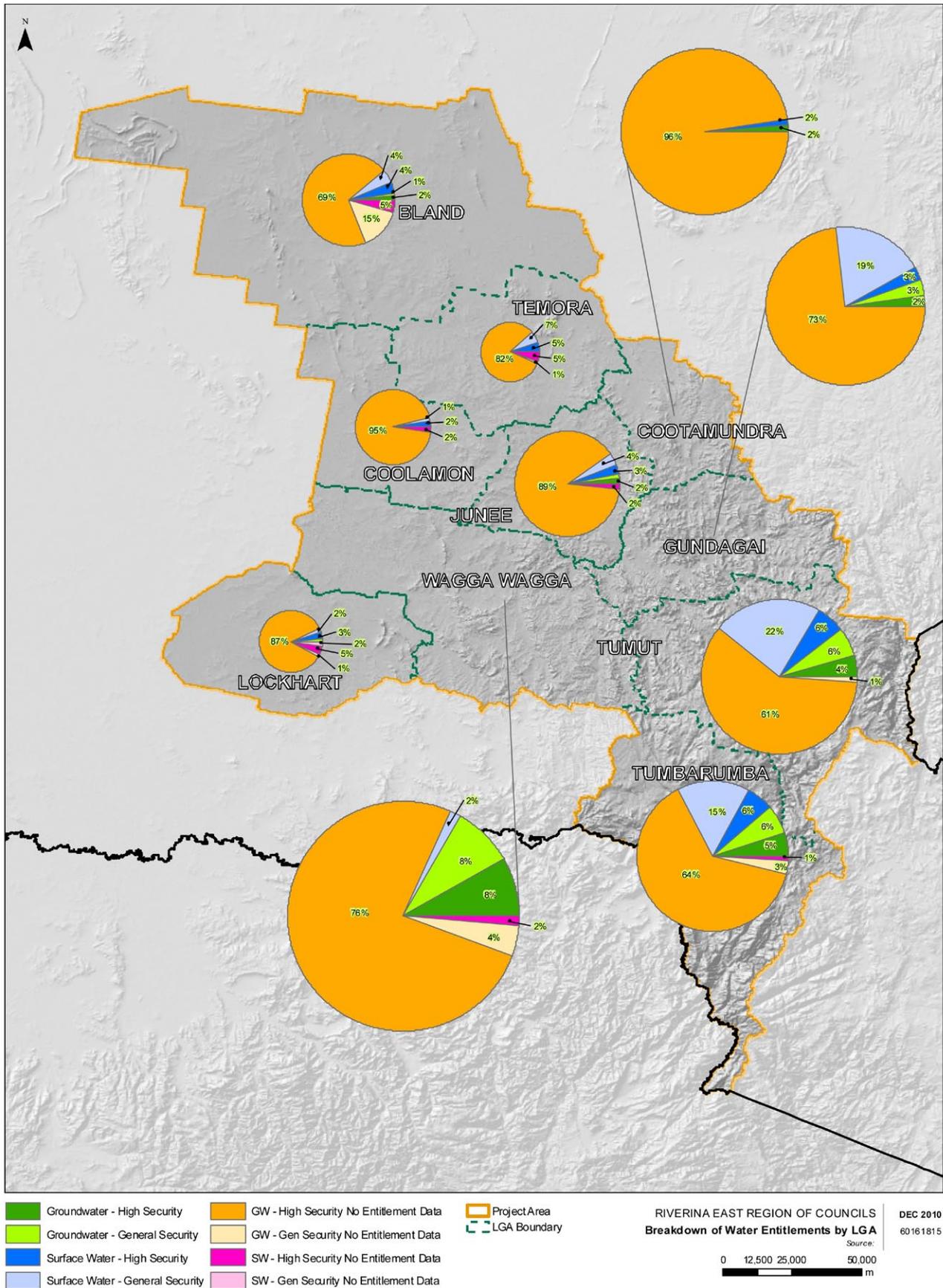


Figure 20: Volume of water entitlements by LGA

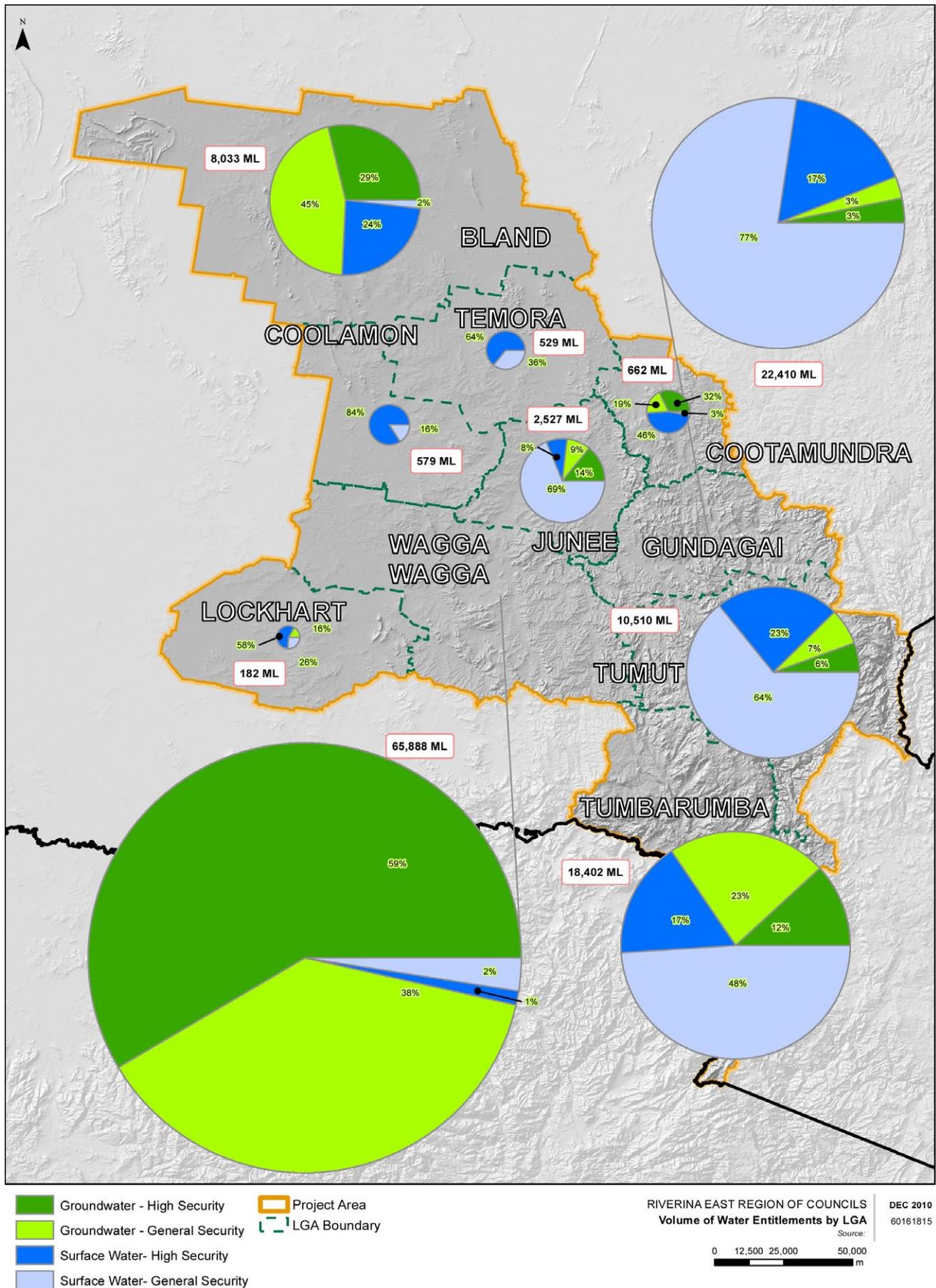


Figure 21: Breakdown of water entitlements by LGA 6.0



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References

6. References

ACT CSE, 2009a, Regional State of the Environment Report 2004-2009, Cootamundra, Indicator: Water Use, accessed at: <http://www.envcomm.act.gov.au/soe/rsoe2009/cootamundra/indicators/wateruse.shtml>, 28th Sep 2010.

GWCC, 2010a, Goldenfields Water County Council, Information Pack, accessed at: http://www.gwcc.nsw.gov.au/attachments/019_Information_Pack_2010.pdf, 21st Sep 2010.

GWCC, 2010d, Water use data 2007-2009, provided by Goldenfields Water County Council, December 2010.

NOW, 2010a, 2008-09 NSW Water Supply and Sewerage Benchmarking Report, accessed at: <http://www.water.nsw.gov.au/Urban-water/Country-Towns-Program/Best-practice-management/Performance-monitoring/Performance-monitoring/default.aspx>, 22nd Sep 2010.

NOW, 2010r, GIS Information: Macro Water Plans GW MDB Fractured Rock WSP; Macro Water Plans GW Upper Murray; WSP Combined October 2010 Murray; WSP Lower Murray Groundwater; WSP Lower Murrumbidgee Groundwater Source; WSP Lower Lachlan Groundwater Source; GAZ WSP; WSP Regulated water Source; GW Macro August 2010, provided by NSW Office of Water, Oct/Nov 2010.

NOW, 2010s, Water Access Licence Data for the REROC SBC LGAs, provided by NSW Office of Water, December 2010.

RWCC, 2010, Director of Engineering's Report to the General Manager (2006, 2007, 2008, 2009 and 2010 versions).

TSC, 2010, Town Water Supply.xls.

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