Department of Science, Information Technology, Innovation and the Arts

Land Use Summary 1999–2012

for the Logan-Albert catchment within SEQ

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To access land use datasets it is recommended that the Queensland Government Information Service (QGIS) be used. Search for **"land use mapping"** in the type of data search after restricting your search to **"cadastral and land planning"** in the topic category field. Metadata is also available from QGIS.

Acknowledgements

We wish to acknowledge the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) who coordinate the Australian Collaborative Land Use and Management Program (ACLUMP).

The QLUMP team includes staff from DSITIA in Brisbane and four business centres of the Department of Natural Resource and Mines (DNRM) South Region. The input from the regions has been extremely valuable in respect of their mapping skills, local knowledge and capacity to engage regional experts in compiling updated land use mapping data.

June 2014

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Introduction

The Queensland Land Use Mapping Program (QLUMP) is a joint initiative of the Department of Science, Information Technology, Innovation and the Arts (DSITIA) and the Department of Natural Resources and Mines (DNRM). QLUMP is part of the Australian Collaborative Land Use and Management Program (ACLUMP) coordinated by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES). ACLUMP promotes nationally consistent land use information.

Land use and land management practices have a profound impact on Queensland's natural resources, agricultural production and the environment. The availability of consistent and reliable spatial information regarding land use is critical for sustainable natural resource management by Australian, Queensland and local Governments, Natural Resource Management regional groups, industry groups, community groups and land managers.

QLUMP has updated land use mapping in the South-East Queensland (SEQ) Natural Resource Management Region to 2011 or later. Mapping has been compiled at the catchment level, with the exception of the Brisbane catchment, which has been divided into its sub-catchments (Brisbane River, Stanley River, Lockyer Creek and Bremer River) due to the size and diversity of the area. Apart from the Maroochy and Noosa catchments (2011) and the Brisbane River sub-catchment (2013), remaining catchments in SEQ were updated to 2012.

This report presents and summarises land use mapping in the Logan-Albert catchment (which accounts for 18% of SEQ total area) including:

- revised 1999 and 2006 land use datasets including improvements and corrections to the originals
- 2012 land use dataset
- land use change dataset from 1999–2006, 2006–2012 and 1999–2012
- summary statistics derived from the above spatial datasets
- results of the accuracy assessment of the 2012 land use dataset

Methodology

Mapping is performed in accordance with ACLUMP guidelines. The methodology is accurate, reliable, cost-effective, and makes best use of available databases, satellite imagery and aerial photography. QLUMP maps each catchment with the most recent suitable imagery available. The updated land use datasets for each catchment within SEQ range from 2011 to 2013.

The Australian Land Use and Management (ALUM) classification (Figure 1, page 5) shows five primary classes, identified in order of increasing levels of intervention or potential impact of land use; *water* is included separately as a sixth primary class. Within the primary classes is a three-level hierarchical structure. Primary, secondary and tertiary levels broadly describe the potential degree of modification of or impact of land use on the landscape. The secondary level in the three-level hierarchical structure is the minimum attribution level for land use mapping in Queensland.

Primary and secondary levels relate to land use (i.e. the principal use of the land in terms of the objectives of the land manager). The tertiary level includes data on commodities or infrastructure, (e.g. crops such as cereals or infrastructure such as *urban residential*). Where possible, class

attribution is performed to the tertiary level. For instance, QLUMP consistently maps land use classes *sugar* and *cotton* (dryland and irrigated) to tertiary level.

The mapping scale is 1:50,000 with a minimum mapping unit of two hectares and a width of 50 metres for linear features.

The 1999 (or later where available) baseline land use dataset formed the basis for the 2012 land use dataset. The 1999 and 2006 land use maps were revised and improved in addition to compiling an updated land use map for 2012. This was achieved primarily by interpretation of SPOT5 satellite imagery, high-resolution orthophotography, scanned aerial photography and inclusion of expert local knowledge. An ESRI ArcSDE geodatabase replication environment was utilised to overlay land use datasets on imagery and digitise or modify areas previously omitted or incorrectly mapped in the 1999 and 2006 mapping, as well as areas of actual land use change (2012). A land use change mapping product was then derived (at the secondary level of the ALUM classification) between 1999–2006, 2006–2012 and 1999–2012.

Some land uses are difficult to differentiate using satellite imagery and existing databases, for example, dryland and irrigated *agriculture*. To overcome this, local expert knowledge was an important component of the mapping methodology. This was provided by regional staff in state government agencies, natural resource management groups, shires, agricultural industries and landholders. Field survey is also undertaken to verify areas of uncertainty in the land use mapping.

The land use mapping methods used by QLUMP are described in full in the ABARES handbook: Guidelines for land use mapping in Australia: principles, procedures & definitions – Edition 4

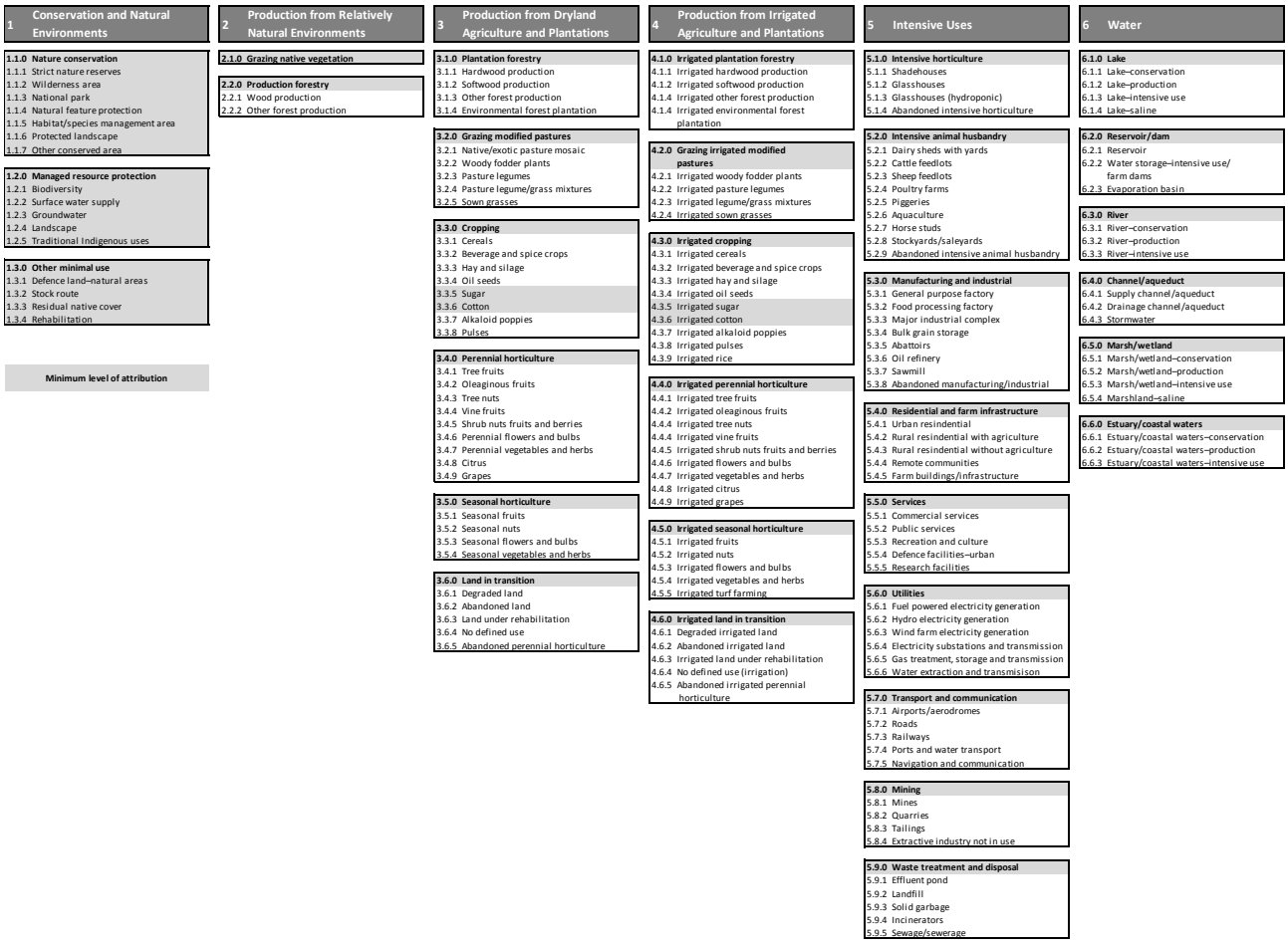

Figure 1: Australian Land Use and Management (ALUM) classification, Version 7

Data Limitations

Land use features that are linear, such as roads and railways, are not mappable at a scale of 1:50,000 with a specified minimum mapping width of 50 metres. As a result, the area estimates of these **linear features** represent only a small proportion of the actual area within this land use type in Queensland. This is of relevance to the following land use classes:

- *transport and communication*
- *utilities*
- *rivers*

Similarly, land uses that fall under the QLUMP minimum mapping area of two hectares are not explicitly mapped but aggregated into the surrounding land use class. This will have the effect of over-estimating the area of some land use classes, for example *other minimal use* and *grazing native vegetation*, whereby tracks and farm infrastructure, road reserves, drainage lines, cleared and uncleared land adjacent to rivers as well as land immediately adjacent to or between cropped paddocks are included.

Livestock grazing occurs on a range of pasture types including native and exotic as well as mixtures of both. Identifying and separating these using imagery, aerial photography and field observation is difficult and unreliable. Therefore, the ALUM classification secondary classes of *grazing modified pastures* and *irrigated grazing modified pastures* have not been mapped explicitly by QLUMP. Where possible (for example, with the benefit of field verification), these classes can be mapped (for example, dairy pastures and fodder crops). Areas of pasture which appeared to be harvested for fodder or grazed off were mapped as *cropping*. This may contribute an over-estimation of cropping in the region. The appearance of these can be highly variable and classification may therefore not be consistent.

The distinction between (dryland) *cropping* and *irrigated cropping* was not always evident and it is likely there is some misclassification in these classes. Proximity to water sources (watercourse or dam) as well as information from water entitlements (irrigation licences), field survey and local knowledge were used to confirm areas of irrigation as much as possible. Areas mapped as *irrigated cropping* are potentially irrigated on a supplementary basis and may not have actually been irrigated in 1999, 2006 or 2012.

The *rural residential* land use class is a source of possible thematic error. Properties on the fringes of suburban settlements, hobby farms and subdivisions in isolated localities with comparatively small lot sizes were mapped to this class. The use of Queensland Valuation System (QVAS) (valuation information) was helpful in mapping this class, based on whether or not the land owner was classified as a primary producer. Residential features greater than 0.2 hectares and less than 16 hectares were mapped as *rural residential.* This class may be misclassified with *grazing native vegetation* and o*ther minimal use*, especially on larger properties.

A combination of the Queensland Herbarium's wetlands and regional ecosystem datasets provided the basis for mapping *marsh/wetlands*, *lakes*, *rivers* and *reservoir/dams*. The ephemeral nature of many of these water features can lead to confusion insofar as they may be present in imagery of one date and either absent or of differing extent in imagery of subsequent or previous dates. As a result, there may be errors, omissions and disagreement in the mapping of features such as farm dams, reservoirs, lakes, wetlands and other water features. Many water features, whilst exceeding the minimum mappable area requirements, do not meet the criteria for linear or uniform features.

The 1999, 2006 and 2012 land use datasets are a snapshot of what was interpreted as the primary land use in these years. However, effort was given to distinguishing between an actual land use change and a rotation. For example, an area that is usually cropped, but is not used for that particular purpose in the year of interest, was still mapped as *cropping* in the 2012 dataset even though no crop was present in that year. This was not considered an actual land use change, but rather a rotation, as the primary land use for that paddock would still be *cropping*.

Refer to metadata for details on the mapping of specific classes.

Products

1999, 2006 and 2012 land use datasets

Figure 2 (page 8), Figure 3 (page 9) and Figure 4 (page 10) show the 1999, 2006 and 2012 land use datasets respectively, for the Logan-Albert catchment, presented at the secondary level of the ALUM classification (Figure 1, page 5). Table 1 (page 11), Table 2 (page 12) and Table 3 (page 13) provide the summary statistics for each. All statistics presenting the area of land use classes are reported in hectares (ha).

Table 3 (page 13) shows that *grazing native vegetation* (55%), *residential and farm infrastructure* (15%) and *nature conservation* (11%) are the major land use classes for 2012 in the Logan-Albert catchment.

Analysis of the overall change between land use classes shows the primary class of *production from relatively natural environments* decreased by 2% or 3,743ha from 1999–2006 and then decreased further by 2% or 3,761ha from 2006–2012. The majority of this decrease was from *grazing native vegetation* secondary land use class.

The *intensive uses* primary land use class has shown an increase in both eras, increasing by 7% or 4,700ha from 1999–2006 then increasing again by 3% or 2,168ha from 2006–2012. The majority of the growth was observed in the *residential and farm infrastructure* land use class, which increased by 5% or 2,999ha in 1999–2006 and then by 2% or 1,307ha in 2006–2012.

Analysis of the agriculture land use classes showed that *production from dryland agriculture* increased by 7% or 580ha in 1999–2006, and increased again by 11% or 955ha in 2006–2012. The majority of this growth was observed in the *land in transition* secondary land use class. The *production from irrigated agriculture* land use class decreased by 5% or 829ha in 1999–2006 and then fell again by 2% or 360ha in 2006–2012. The majority of the decrease was in the *irrigated cropping* secondary land use class.

Analysis of the specific land use changes from one secondary class to another for 1999–2006 and 2006–2012 is presented in the section on page 14. Analysis of the land use change from 1999–2012 has been included as Appendix A, on page 21.

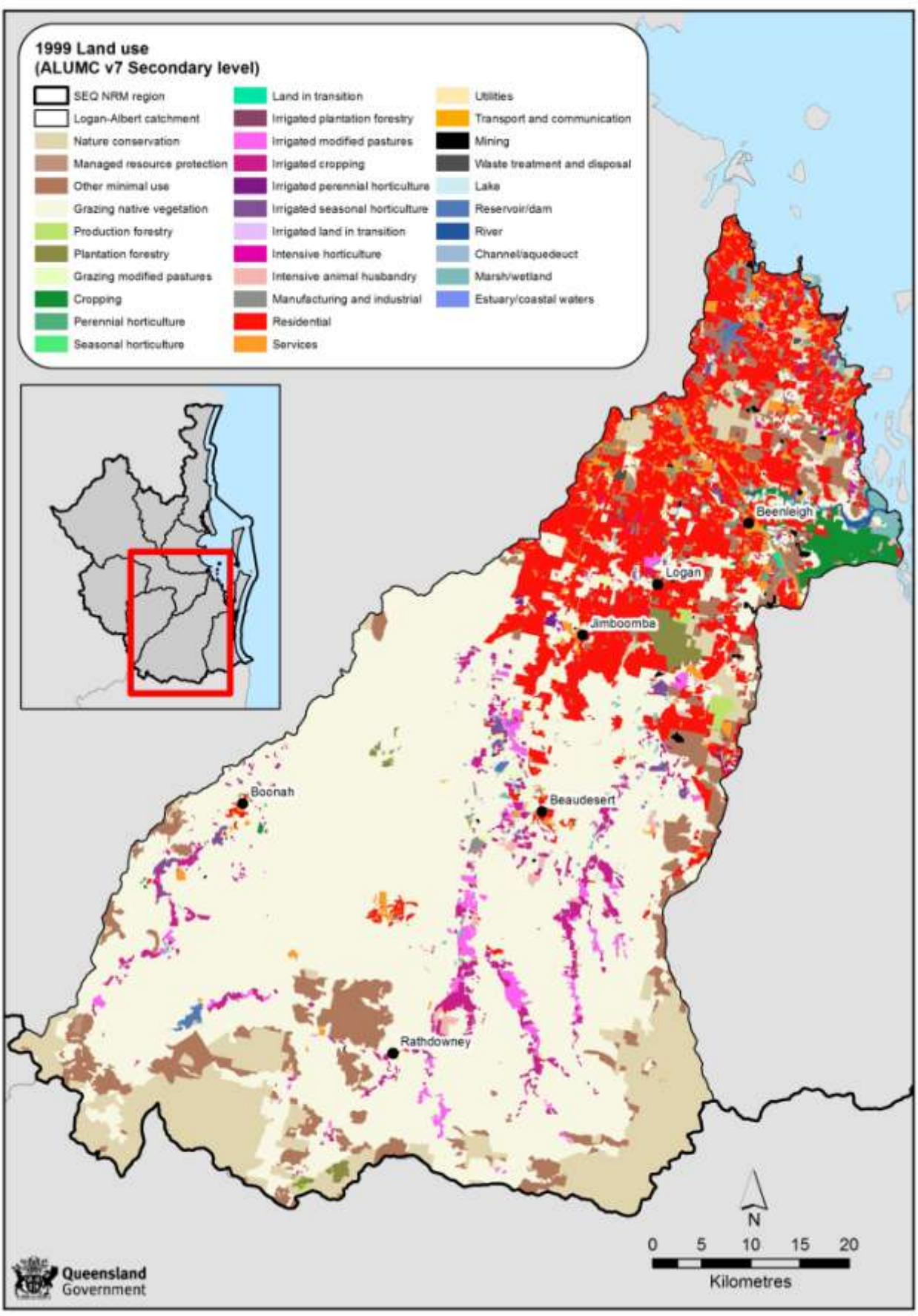

Figure 2: 1999 land use map for the Logan-Albert catchment

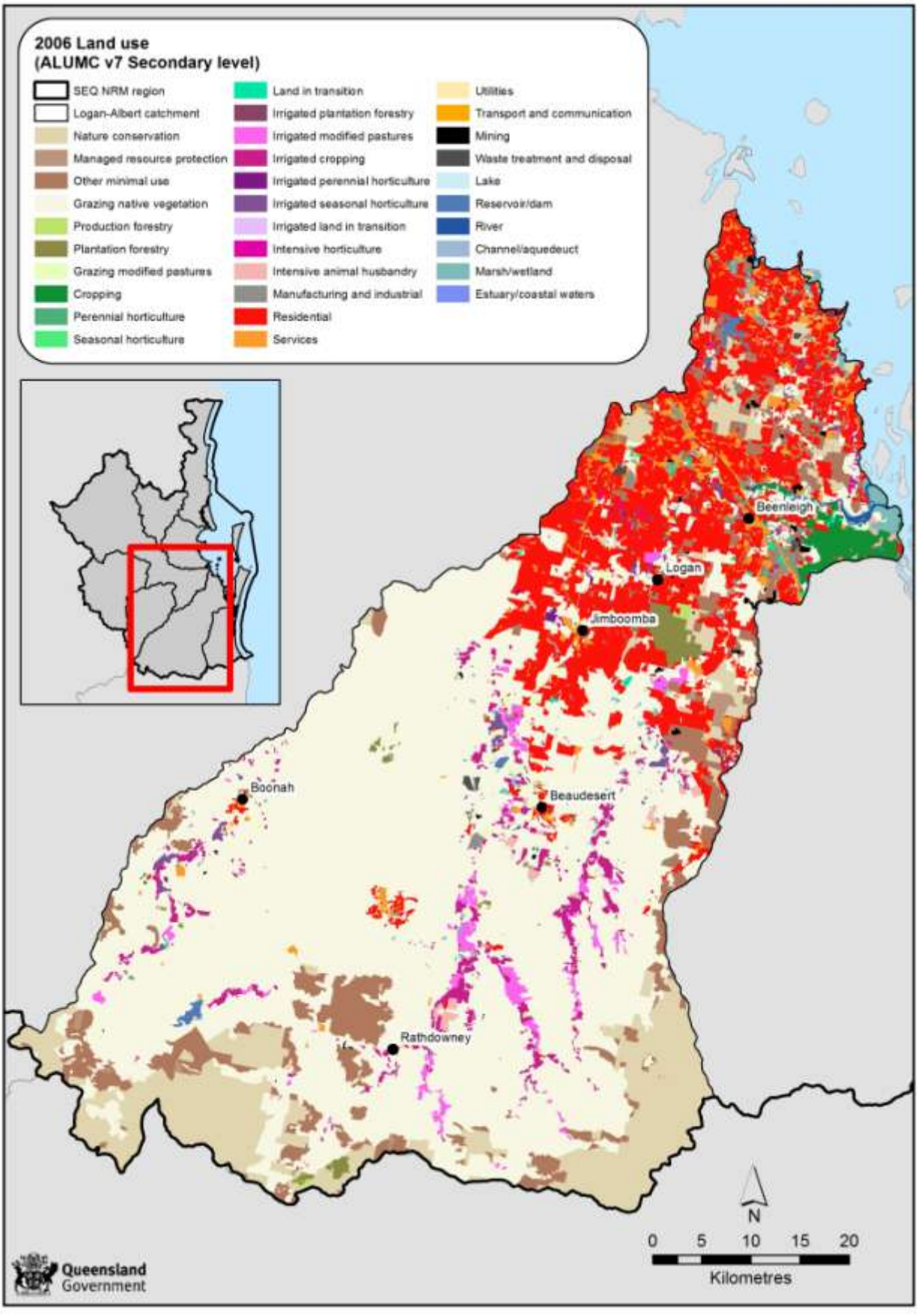

Figure 3: 2006 land use map for the Logan-Albert catchment

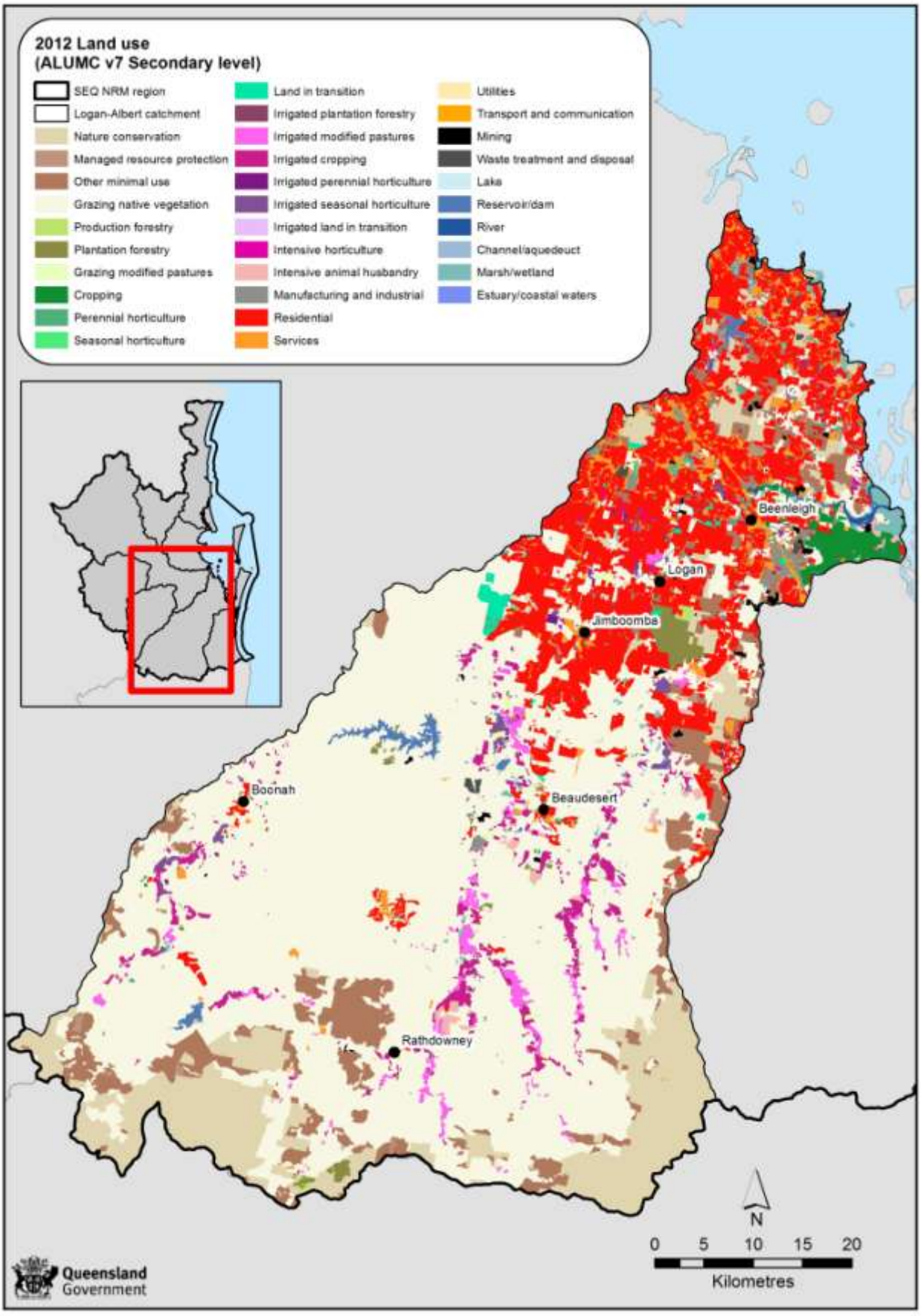

Figure 4: 2012 land use map for the Logan-Albert catchment

Table 1: Summary statistics of land use in 1999 in the Logan-Albert catchment

Land use code	Land use class	Area (ha)	Area %
1	Conservation and natural environments	79,670	19.17
1.1	Nature conservation	46,178	11.11
1.2	Managed resource protection	220	0.05
1.3	Other minimal use	33,272	8.00
2	Production from relatively natural environments	236,427	56.88
2.1	Grazing native vegetation[1]	235,562	56.67
2.2	Production forestry	865	0.21
3	Production from dryland agriculture and plantations	8,195	1.97
3.1	Plantation forestry	2,835	0.68
3.2	Grazing modified pastures[2]	967	0.23
3.3	Cropping	135	0.03
3.3.5	Cropping – sugar[3]	3,761	0.90
3.4	Perennial horticulture	219	0.05
3.5	Seasonal horticulture	32	0.01
3.6	Land in transition	245	0.06
4	Production from irrigated agriculture and plantations	15,555	3.74
4.2	Irrigated grazing modified pastures[2]	4,258	1.02
4.3	Irrigated cropping	9,019	2.17
4.3.5	Irrigated cropping – sugar[3]	19	<0.01
4.4	Irrigated perennial horticulture	605	0.15
4.5	Irrigated seasonal horticulture	1,654	0.40
5	Intensive uses	70,123	16.87
5.1	Intensive horticulture	488	0.12
5.2	Intensive animal husbandry	1,711	0.41
5.3	Manufacturing and industrial	1,444	0.35
5.4	Residential and farm infrastructure	56,016	13.48
5.5	Services	8,607	2.07
5.6	Utilities	44	0.01
5.7	Transport and communication	856	0.21
5.8	Mining	659	0.16
5.9	Waste treatment and disposal	299	0.07
6	Water	5,698	1.37
6.1	Lake	4	<0.01
6.2	Reservoir/dam	1,781	0.43
6.3	River	1,019	0.25
6.5	Marsh/wetland	2,843	0.68
6.6	Estuary/coastal waters	51	0.01
	Grand Total	**415,667**	**100.00**

[1] *grazing native vegetation* includes all pastures (modified and unmodified). No distinction is made in respect of tree cover.

[2] *grazing modified pastures* and *irrigated grazing modified pastures* are not mapped explicitly. In this case the areas mapped are generally dairy pastures.

[3] the area of *cropping – sugar* and *irrigated cropping – sugar* are a subset of the total area of *cropping* and *irrigated cropping* respectively.

Table 2: Summary statistics of land use in 2006 in the Logan-Albert catchment

Land use code	Land use class	Area (ha)	Area %
1	Conservation and natural environments	79,068	19.02
1.1	Nature conservation	46,868	11.28
1.2	Managed resource protection	1,136	0.27
1.3	Other minimal use	31,064	7.47
2	Production from relatively natural environments	232,684	55.98
2.1	Grazing native vegetation[1]	232,373	55.90
2.2	Production forestry	312	0.07
3	Production from dryland agriculture and plantations	8,775	2.11
3.1	Plantation forestry	3,007	0.72
3.2	Grazing modified pastures[2]	1,207	0.29
3.3	Cropping	60	0.01
3.3.5	Cropping – sugar[3]	3,533	0.85
3.4	Perennial horticulture	185	0.04
3.5	Seasonal horticulture	35	0.01
3.6	Land in transition	748	0.18
4	Production from irrigated agriculture and plantations	14,726	3.54
4.2	Irrigated grazing modified pastures[2]	4,423	1.06
4.3	Irrigated cropping	8,278	1.99
4.3.5	Irrigated cropping – sugar[3]	27	0.01
4.4	Irrigated perennial horticulture	539	0.13
4.5	Irrigated seasonal horticulture	1,459	0.35
5	Intensive uses	74,823	18.00
5.1	Intensive horticulture	489	0.12
5.2	Intensive animal husbandry	1,969	0.47
5.3	Manufacturing and industrial	1,798	0.43
5.4	Residential and farm infrastructure	59,015	14.20
5.5	Services	9,371	2.25
5.6	Utilities	46	0.01
5.7	Transport and communication	910	0.22
5.8	Mining	717	0.17
5.9	Waste treatment and disposal	509	0.12
6	Water	5,591	1.34
6.1	Lake	4	<0.01
6.2	Reservoir/dam	1,771	0.43
6.3	River	1,012	0.24
6.5	Marsh/wetland	2,752	0.66
6.6	Estuary/coastal waters	51	0.01
	Grand Total	**415,667**	**100.00**

[1] *grazing native vegetation* includes all pastures (modified and unmodified). No distinction is made in respect of tree cover.

[2] *grazing modified pastures* and *irrigated grazing modified pastures* are not mapped explicitly. In this case the areas mapped are generally dairy pastures.

[3] the area of *cropping – sugar* and *irrigated cropping – sugar* are a subset of the total area of *cropping* and *irrigated cropping* respectively.

Table 3: Summary statistics of land use in 2012 in the Logan-Albert catchment

Land use code	Land use class	Area (ha)	Area %
1	Conservation and natural environments	78,785	18.95
1.1	Nature conservation	47,677	11.47
1.2	Managed resource protection	1,125	0.27
1.3	Other minimal use	29,983	7.21
2	Production from relatively natural environments	228,923	55.07
2.1	Grazing native vegetation[1]	228,598	55.00
2.2	Production forestry	325	0.08
3	Production from dryland agriculture and plantations	9,730	2.34
3.1	Plantation forestry	2,945	0.71
3.2	Grazing modified pastures[2]	1,228	0.30
3.3	Cropping	71	0.02
3.3.5	Cropping – sugar[3]	3,467	0.83
3.4	Perennial horticulture	136	0.03
3.5	Seasonal horticulture	23	0.01
3.6	Land in transition	1,860	0.45
4	Production from irrigated agriculture and plantations	14,366	3.46
4.2	Irrigated grazing modified pastures[2]	4,239	1.02
4.3	Irrigated cropping	7,982	1.92
4.3.5	Irrigated cropping – sugar[3]	23	0.01
4.4	Irrigated perennial horticulture	465	0.11
4.5	Irrigated seasonal horticulture	1,641	0.39
4.6	Irrigated land in transition	16	0.00
5	Intensive uses	76,991	18.52
5.1	Intensive horticulture	459	0.11
5.2	Intensive animal husbandry	2,033	0.49
5.3	Manufacturing and industrial	2,168	0.52
5.4	Residential and farm infrastructure	60,322	14.51
5.5	Services	9,568	2.30
5.6	Utilities	80	0.02
5.7	Transport and communication	856	0.21
5.8	Mining	958	0.23
5.9	Waste treatment and disposal	548	0.13
6	Water	6,873	1.65
6.1	Lake	5	<0.01
6.2	Reservoir/dam	3,017	0.73
6.3	River	1,009	0.24
6.5	Marsh/wetland	2,791	0.67
6.6	Estuary/coastal waters	51	0.01
	Grand Total	**415,667**	**100.00**

[1]*grazing native vegetation* includes all pastures (modified and unmodified). No distinction is made in respect of tree cover.

[2]*grazing modified pastures* and *irrigated grazing modified pastures* are not mapped explicitly. In this case the areas mapped are generally dairy pastures.

[3]the area of *cropping – sugar* and *irrigated cropping – sugar* are a subset of the total area of *cropping* and *irrigated cropping* respectively.

Land use change datasets (1999–2006, 2006–2012 and 1999–2012)

Figures 5, 6 and 7 (pages 16, 17 and 22), show the land use change datasets for the Logan-Albert catchment. The data has been presented relative to the **change in intensity** of the land use at the secondary level of the ALUM classification.

For example, change from 2.1.0 (*grazing native vegetation*) to 2.2.0 (*production forestry*) is an increase in land use intensity, whilst change from 2.1.0 (*grazing native vegetation*) to 1.1.0 (*nature conservation*) is a decrease. This is highlighted in the ALUM classification (Figure 1, page 5). Moving down and from left to right through the classification, the level of intervention or potential impact of land use increases.

Land use change mapping products for this catchment have been compiled for three epochs (1999, 2006 and 2012). At the secondary level of the ALUM classification, the total area of land use change is:

- 1999–2006: 11,057ha (3% of the catchment). Of this 7,092ha (64% of the total change) is mapped as an increase in land use intensity, whilst 3,965ha (36%) is a decrease.
- 2006–2012: 9,005ha (2% of the catchment). Of this 6,085ha (68% of the total change) is mapped as an increase in land use intensity, whilst 2,919ha (32%) is a decrease.
- 1999–2012: 17,954ha (4% of the catchment). Of this 12,217ha (68% of the total change) is mapped as an increase in land use intensity, whilst 5,737ha (32%) is a decrease.

The land use change totals between the two eras (1999–2006 and 2006–2012) will not add up to match those compiled for the 1999–2012 era. This is because land use change mapping only accounts for land use at a specific moment in time; some change will result from rotation, whilst some may be the result of more than one change event. An example of this scenario is an area that was mapped as *grazing native vegetation* in 1999 may have been mapped as *land in transition* in 2006 before finally becoming *residential* in 2012. These changes would be reflected in each of the land use change mapping products as change from *grazing native vegetation* to *land in transition* in the 1999–2006, and change from *land in transition* to *residential* in 2006–2012, and lastly change from *grazing native vegetation* to *residential* in 1999–2012.

Summary statistics presenting the land use change at the secondary level for 1999–2006 and 2006–2012 are shown in Tables 4 and 5 (pages 18 and 19). The change from 1999–2012 is presented in Appendix A (page 21).

The 1999–2006 land use change shows that change from *grazing native vegetation* to *residential and farm infrastructure* accounted for 2,163ha or 20% of all the total change mapped, followed by 979ha of *irrigated cropping* changing to *grazing native vegetation*. Collectively, all the land use change to *residential and farm infrastructure* accounts for 3,341ha or 30% of the total for 1999–2006.

For 2006–2012, the largest land use changes were observed from *grazing native vegetation* to *land in transition* (1,277ha or 14%) and *grazing native vegetation* to *reservoir/dam* (1,230ha or 14%). The change to *land in transition* is mostly accounted for in the residential property development at Flagstone Creek, west of Jimboomba. Interestingly the change to *reservoir/dam* is a result of the Wyaralong Dam, north-west of Beaudesert. The dam was completed in 2011.

Collectively, for 2006–2012 the land use change to *residential and farm infrastructure* accounts for 1,544ha or 17% of the total. This change has come from a variety of land uses classes including: *grazing native vegetation* (807ha), *other minimal uses* (297ha) and *land in transition* (282ha).

The pattern of change from *production forestry* in 1999 to *managed resource protection* in 2006 and then to *nature conservation* in 2012, can be attributed to the SEQ Forest Agreement, as State forests in SEQ have been progressively added to the protected area estates.

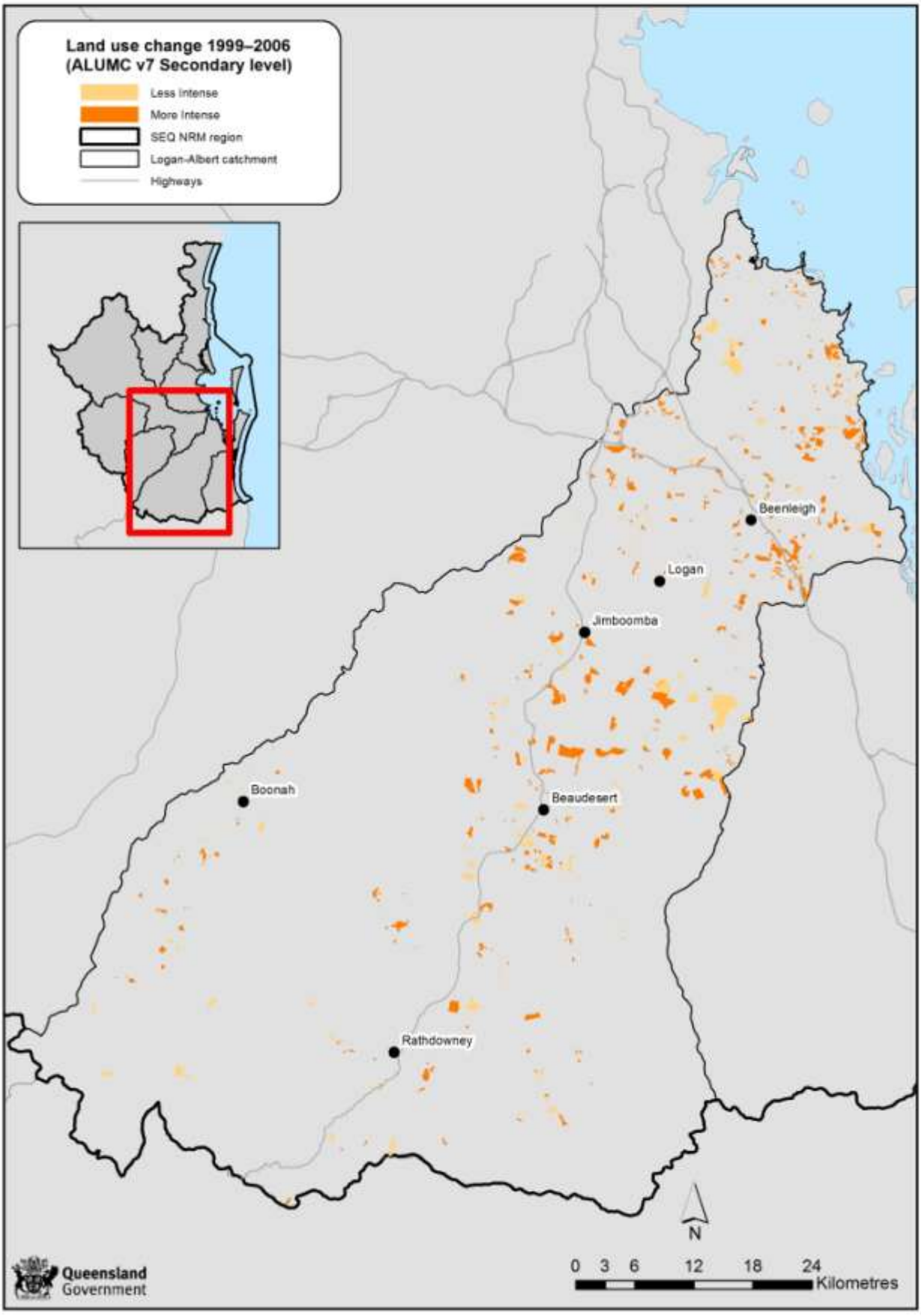

Figure 5: 1999–2006 land use change map at secondary level for the Logan-Albert catchment

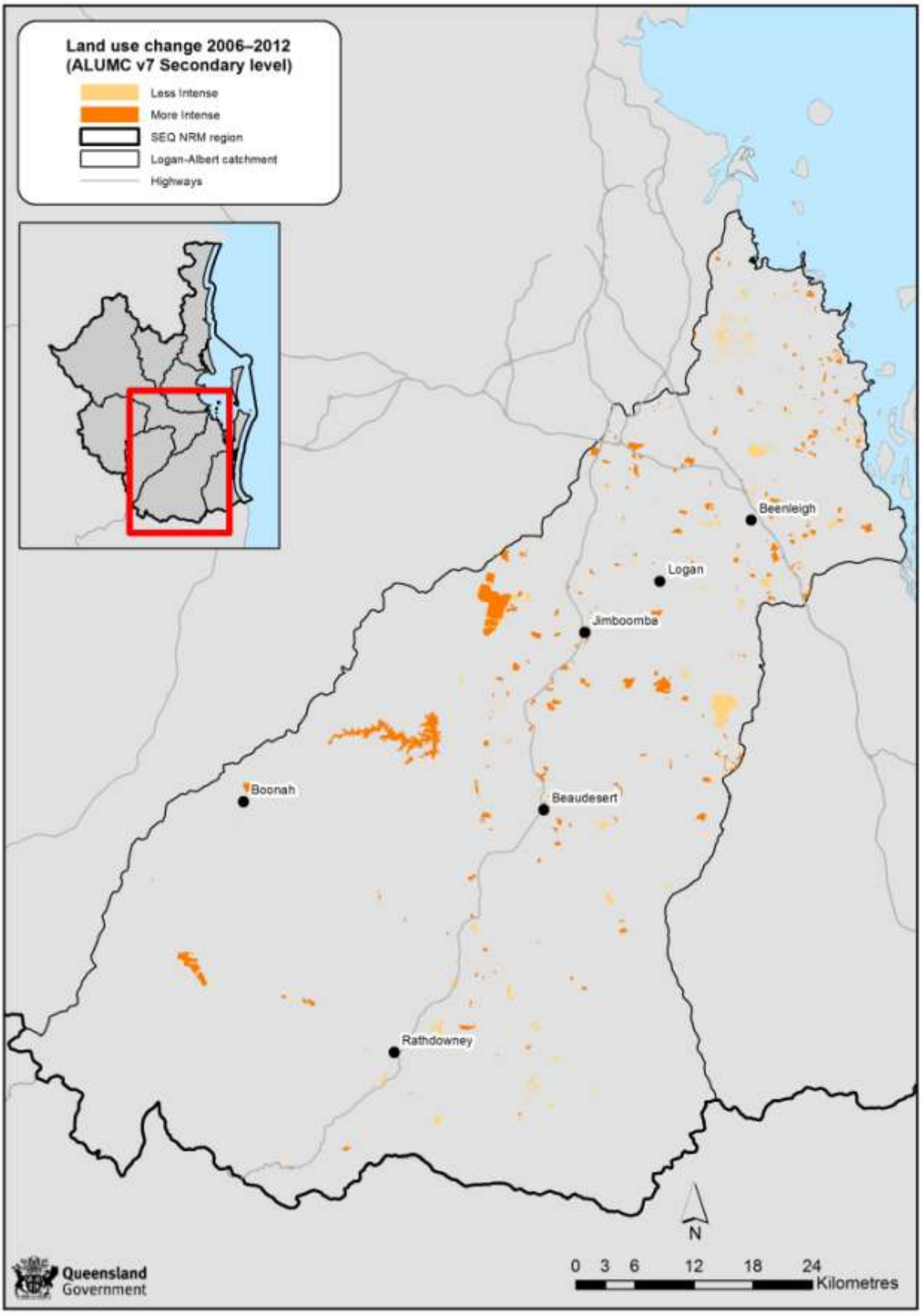

Figure 6: 2006–2012 land use change map at secondary level for the Logan-Albert catchment

Table 4: Summary statistics for land use change at secondary level for 1999–2006 in the Logan-Albert catchment (showing only the land use changes > 50ha)

Land use code 1999	Land use class 1999	Land use code 2006	Land use class 2006	Area (ha)	Area Change (%)	Total change (%)
2.1.0	Grazing native vegetation	5.4.0	Residential & farm infrastructure	2,163	0.52	19.56
4.3.0	Irrigated cropping	2.1.0	Grazing native vegetation	979	0.24	8.85
1.3.0	Other minimal use	5.4.0	Residential & farm infrastructure	725	0.17	6.55
1.3.0	Other minimal use	1.1.0	Nature conservation	605	0.15	5.47
2.2.0	Production forestry	1.2.0	Managed resource protection	553	0.13	5.01
2.1.0	Grazing native vegetation	4.3.0	Irrigated cropping	420	0.10	3.80
2.1.0	Grazing native vegetation	3.6.0	Land in transition	319	0.08	2.89
2.1.0	Grazing native vegetation	5.5.0	Services	303	0.07	2.74
1.3.0	Other minimal use	1.2.0	Managed resource protection	301	0.07	2.73
1.3.0	Other minimal use	5.3.0	Manufacturing and industrial	228	0.05	2.06
1.3.0	Other minimal use	5.5.0	Services	212	0.05	1.92
4.5.0	Irrigated seasonal horticulture	4.2.0	Irrigated modified pastures	183	0.04	1.66
2.1.0	Grazing native vegetation	5.2.0	Intensive animal production	174	0.04	1.57
2.1.0	Grazing native vegetation	3.1.0	Plantation forestry	172	0.04	1.55
2.1.0	Grazing native vegetation	4.2.0	Irrigated modified pastures	167	0.04	1.51
5.4.0	Residential & farm infrastructure	5.5.0	Services	160	0.04	1.45
2.1.0	Grazing native vegetation	5.9.0	Waste treatment and disposal	149	0.04	1.34
2.1.0	Grazing native vegetation	3.2.0	Grazing modified pastures	142	0.03	1.28
5.2.0	Intensive animal production	4.3.0	Irrigated cropping	140	0.03	1.26
4.5.0	Irrigated seasonal horticulture	5.4.0	Residential & farm infrastructure	134	0.03	1.21
4.2.0	Irrigated modified pastures	2.1.0	Grazing native vegetation	127	0.03	1.15
2.1.0	Grazing native vegetation	1.1.0	Nature conservation	121	0.03	1.09
1.3.0	Other minimal use	3.6.0	Land in transition	105	0.03	0.95
2.1.0	Grazing native vegetation	4.4.0	Irrigated perennial horticulture	99	0.02	0.90
3.3.5	Cropping - Sugar	5.2.0	Intensive animal production	92	0.02	0.83
4.3.0	Irrigated cropping	5.4.0	Residential & farm infrastructure	80	0.02	0.73
4.4.0	Irrigated perennial horticulture	5.4.0	Residential & farm infrastructure	76	0.02	0.69
1.3.0	Other minimal use	2.1.0	Grazing native vegetation	73	0.02	0.66
2.1.0	Grazing native vegetation	4.5.0	Irrigated seasonal horticulture	72	0.02	0.65
3.3.5	Cropping - Sugar	3.6.0	Land in transition	72	0.02	0.65
4.3.0	Irrigated cropping	5.2.0	Intensive animal production	71	0.02	0.64
5.4.0	Residential & farm infrastructure	3.6.0	Land in transition	68	0.02	0.62
2.1.0	Grazing native vegetation	1.3.0	Other minimal use	67	0.02	0.61
1.3.0	Other minimal use	5.9.0	Waste treatment and disposal	62	0.01	0.56
2.1.0	Grazing native vegetation	1.2.0	Managed resource protection	59	0.01	0.53
3.6.0	Land in transition	5.4.0	Residential & farm infrastructure	57	0.01	0.52
4.2.0	Irrigated modified pastures	5.2.0	Intensive animal production	56	0.01	0.50
6.5.0	Marsh/wetland	5.7.0	Transport and communication	55	0.01	0.50
3.6.0	Land in transition	5.3.0	Manufacturing and industrial	55	0.01	0.50
4.4.0	Irrigated perennial horticulture	2.1.0	Grazing native vegetation	54	0.01	0.49
3.3.0	Cropping	3.2.0	Grazing modified pastures	53	0.01	0.48
Total				**11,057**	**2.66**	**100**

Table 5: Summary statistics for land use change at secondary level for 2006–2012 in the Logan-Albert catchment (showing only the land use changes > 25ha)

Land use code 2006	Land use class 2006	Land use code 2012	Land use class 2012	Area (ha)	Area Change (%)	Total change (%)
2.1.0	Grazing native vegetation	3.6.0	Land in transition	1,277	0.31	14.18
2.1.0	Grazing native vegetation	6.2.0	Reservoir/dam	1,230	0.30	13.66
2.1.0	Grazing native vegetation	5.4.0	Residential & farm infrastructure	807	0.19	8.96
1.2.0	Managed resource protection	1.1.0	Nature conservation	553	0.13	6.15
1.3.0	Other minimal use	1.2.0	Managed resource protection	539	0.13	5.98
1.3.0	Other minimal use	5.4.0	Residential & farm infrastructure	297	0.07	3.29
4.2.0	Irrigated modified pastures	2.1.0	Grazing native vegetation	288	0.07	3.20
3.6.0	Land in transition	5.4.0	Residential & farm infrastructure	282	0.07	3.13
4.3.0	Irrigated cropping	2.1.0	Grazing native vegetation	265	0.06	2.94
4.3.0	Irrigated cropping	4.2.0	Irrigated modified pastures	221	0.05	2.45
2.1.0	Grazing native vegetation	4.3.0	Irrigated cropping	210	0.05	2.34
2.1.0	Grazing native vegetation	5.8.0	Mining	187	0.04	2.07
4.2.0	Irrigated modified pastures	4.5.0	Irrigated seasonal horticulture	183	0.04	2.03
2.1.0	Grazing native vegetation	1.3.0	Other minimal use	172	0.04	1.91
3.6.0	Land in transition	5.3.0	Manufacturing and industrial	148	0.04	1.64
1.3.0	Other minimal use	1.1.0	Nature conservation	132	0.03	1.47
2.1.0	Grazing native vegetation	1.1.0	Nature conservation	130	0.03	1.44
1.3.0	Other minimal use	5.3.0	Manufacturing and industrial	129	0.03	1.43
2.1.0	Grazing native vegetation	4.2.0	Irrigated modified pastures	127	0.03	1.41
5.4.0	Residential & farm infrastructure	3.6.0	Land in transition	122	0.03	1.35
2.1.0	Grazing native vegetation	5.5.0	Services	110	0.03	1.22
1.3.0	Other minimal use	3.6.0	Land in transition	104	0.02	1.15
5.5.0	Services	5.3.0	Manufacturing and industrial	79	0.02	0.87
3.6.0	Land in transition	5.5.0	Services	79	0.02	0.87
2.1.0	Grazing native vegetation	5.2.0	Intensive animal production	68	0.02	0.75
1.3.0	Other minimal use	5.5.0	Services	65	0.02	0.72
3.1.0	Plantation forestry	3.6.0	Land in transition	62	0.01	0.69
4.4.0	Irrigated perennial horticulture	5.4.0	Residential & farm infrastructure	56	0.01	0.63
1.3.0	Other minimal use	5.8.0	Mining	56	0.01	0.62
5.7.0	Transport and communication	6.5.0	Marsh/wetland	55	0.01	0.61
4.2.0	Irrigated modified pastures	3.2.0	Grazing modified pastures	54	0.01	0.60
5.4.0	Residential & farm infrastructure	5.1.0	Intensive horticulture	40	0.01	0.44
2.1.0	Grazing native vegetation	5.6.0	Utilities	34	0.01	0.38
3.6.0	Land in transition	2.1.0	Grazing native vegetation	34	0.01	0.38
5.4.0	Residential & farm infrastructure	1.3.0	Other minimal use	33	0.01	0.37
5.3.0	Manufacturing and industrial	5.9.0	Waste treatment and disposal	33	0.01	0.37
3.4.0	Perennial horticulture	3.6.0	Land in transition	30	0.01	0.33
5.1.0	Intensive horticulture	1.3.0	Other minimal use	29	0.01	0.32
1.3.0	Other minimal use	2.1.0	Grazing native vegetation	27	0.01	0.30
3.6.0	Land in transition	1.3.0	Other minimal use	26	0.01	0.28
3.3.5	Cropping - Sugar	5.2.0	Intensive animal production	25	0.01	0.28
Total				**9,005**	**2.17**	**100**

Data format and availability

Download land use datasets

To access land use datasets it is recommended that the Queensland Government Information Service (QGIS) be used. Search for **"land use mapping"** in the type of data search after restricting your search to **"cadastral and land planning"** in the topic category field. Metadata is also available from QGIS.

The dataset comprises an ESRI vector geodatabase at a nominal scale of 1:50,000. Within this are six feature classes: 1999 improved land use, 2006 improved land use, 2012 updated land use, 1999–2006 land use change layer, 2006–2012 land use change layer and 1999–2012 land use change layer. The feature classes are polygon datasets with attributes describing land use. Land use is classified according to the Australian Land Use and Management Classification (ALUMC) Version 7, May 2010. Note that a representation showing land use at secondary level is available when working within a geodatabase.

Digital Data is supplied with a licence and by using the data you confirm that you have read the licence conditions included with the data and that you agree to be bound by its terms.

Request a land use map

Available from the QLUMP website, it is possible to request a land use map based upon a specific location (Lot on Plan, Street address or Central latitude/longitude coordinates) in Queensland. The land use maps are emailed upon request in portable document format (PDF).The maps present the most recent land use information available at the secondary level of the Australian Land Use and Management (ALUM) Classification.

View land use on the Queensland Globe

The most recent land use information available state-wide in Queensland is available for viewing on the Queensland Globe. This application allows browsing of Queensland spatial data including land use, maps and up-to-date satellite imagery.

Land use is available for viewing within the Planning and Cadastre category globe.

Appendix A 1999–2012 Land Use Change

For 1999–2012, the largest land use changes were observed from *grazing native vegetation* to *residential and farm infrastructure* (3,200ha or 18%), *land in transition* (1,292ha or 7%) and *reservoir/dam* (1,239ha or 7%). Collectively, for 1999–2012 the land use change to *residential and farm infrastructure* accounts for 4,843ha or 27% of the total.

Table 6: Summary statistics for land use change at secondary level for 1999–2012 in the Logan-Albert catchment (showing only the land use changes > 85ha)

Land use code 1999	Land use class 1999	Land use code 2012	Land use class 2012	Area (ha)	Area Change (%)	Total change (%)
2.1.0	Grazing native vegetation	5.4.0	Residential & farm infrastructure	3,200	0.77	17.82
2.1.0	Grazing native vegetation	3.6.0	Land in transition	1,292	0.31	7.20
2.1.0	Grazing native vegetation	6.2.0	Reservoir/dam	1,239	0.30	6.90
4.3.0	Irrigated cropping	2.1.0	Grazing native vegetation	1,132	0.27	6.30
1.3.0	Other minimal use	5.4.0	Residential & farm infrastructure	1,002	0.24	5.58
1.3.0	Other minimal use	1.2.0	Managed resource protection	840	0.20	4.68
1.3.0	Other minimal use	1.1.0	Nature conservation	737	0.18	4.11
2.2.0	Production forestry	1.1.0	Nature conservation	553	0.13	3.08
2.1.0	Grazing native vegetation	4.3.0	Irrigated cropping	545	0.13	3.04
2.1.0	Grazing native vegetation	5.5.0	Services	444	0.11	2.47
4.2.0	Irrigated modified pastures	2.1.0	Grazing native vegetation	400	0.10	2.23
1.3.0	Other minimal use	5.3.0	Manufacturing and industrial	390	0.09	2.17
4.3.0	Irrigated cropping	4.2.0	Irrigated modified pastures	286	0.07	1.59
1.3.0	Other minimal use	5.5.0	Services	284	0.07	1.58
2.1.0	Grazing native vegetation	1.1.0	Nature conservation	251	0.06	1.40
2.1.0	Grazing native vegetation	5.2.0	Intensive animal production	248	0.06	1.38
2.1.0	Grazing native vegetation	4.2.0	Irrigated modified pastures	235	0.06	1.31
2.1.0	Grazing native vegetation	5.8.0	Mining	180	0.04	1.00
5.4.0	Residential & farm infrastructure	5.5.0	Services	175	0.04	0.98
2.1.0	Grazing native vegetation	3.1.0	Plantation forestry	172	0.04	0.96
2.1.0	Grazing native vegetation	1.3.0	Other minimal use	157	0.04	0.88
4.5.0	Irrigated seasonal horticulture	5.4.0	Residential & farm infrastructure	156	0.04	0.87
2.1.0	Grazing native vegetation	5.9.0	Waste treatment and disposal	154	0.04	0.86
2.1.0	Grazing native vegetation	3.2.0	Grazing modified pastures	150	0.04	0.83
1.3.0	Other minimal use	3.6.0	Land in transition	145	0.03	0.81
5.2.0	Intensive animal production	4.3.0	Irrigated cropping	140	0.03	0.78
4.4.0	Irrigated perennial horticulture	5.4.0	Residential & farm infrastructure	133	0.03	0.74
5.4.0	Residential & farm infrastructure	3.6.0	Land in transition	126	0.03	0.70
3.3.5	Cropping - Sugar	5.2.0	Intensive animal production	117	0.03	0.65
2.1.0	Grazing native vegetation	5.3.0	Manufacturing and industrial	112	0.03	0.62
2.1.0	Grazing native vegetation	4.4.0	Irrigated perennial horticulture	110	0.03	0.61
1.3.0	Other minimal use	5.8.0	Mining	87	0.02	0.48
4.3.0	Irrigated cropping	5.4.0	Residential & farm infrastructure	86	0.02	0.48
Total				**17,954**	**4.32**	**100**

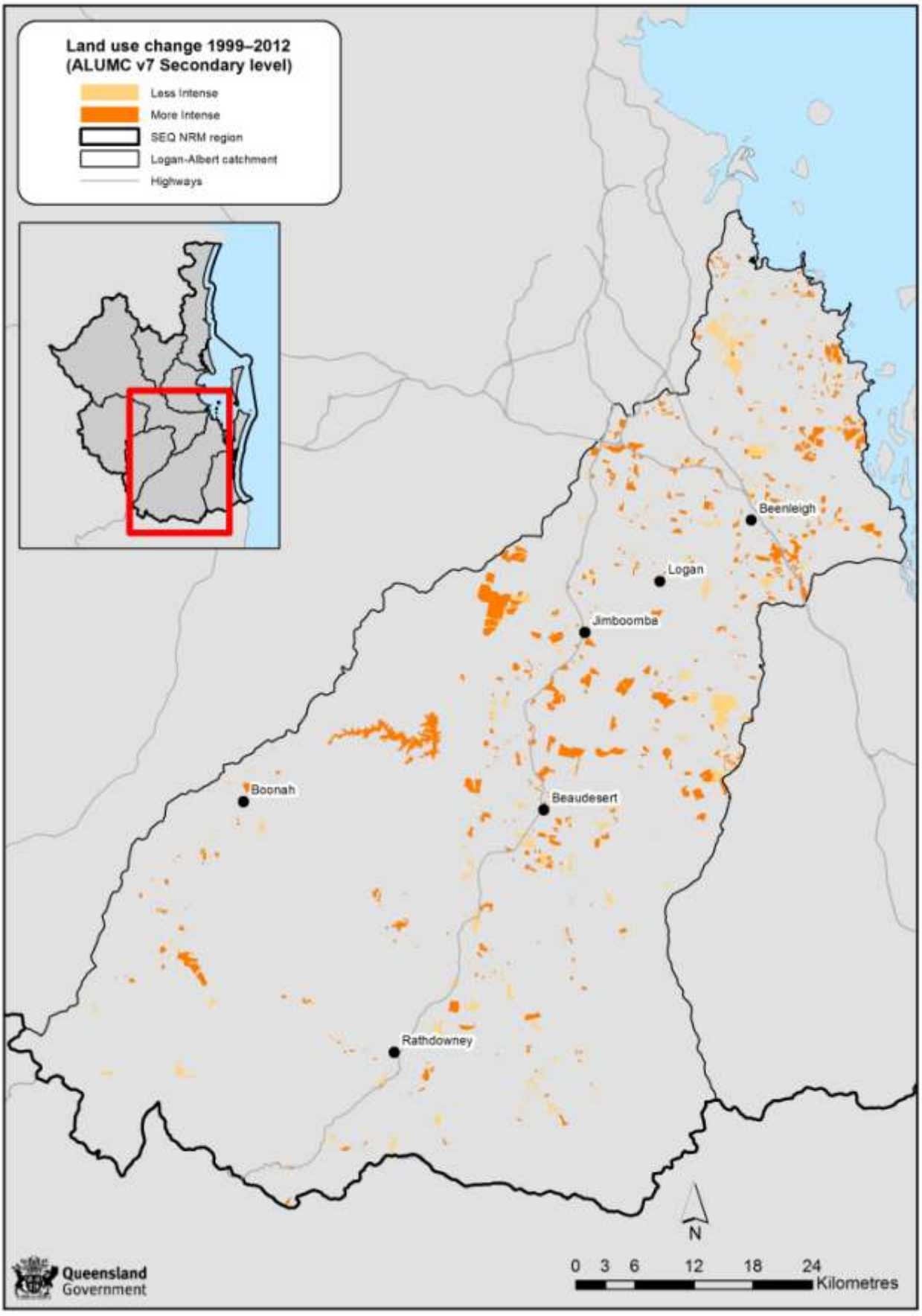

Figure 7: 1999–2012 land use change map at secondary level for the Logan-Albert catchment

Appendix B Accuracy assessment

The accuracy assessment provided reference data suitable for assessing the 2012 land use map. For each of the sample points, the true land use class was independently determined (this provided the reference data) based on desktop interpretation of the same imagery and ancillary datasets available to the mapper. These points were then compared to the mapped class (map data) and the information summarised in the error matrix. The accuracy is summarised in terms of total accuracy, Kappa and user's and producer's accuracies. Each accuracy parameter is reported using a point estimate and a 95% posterior interval. Accuracy figures are provided as probabilities between 0 and 1.

Total accuracy provides an estimate of the overall accuracy of the map, and can be expressed as the probability that a point is mapped correctly. However, it should be kept in mind that total accuracy can be misleading, particularly when a dominant class exists. The Kappa statistic attempts to overcome this problem by adjusting for chance agreement. A common rule of thumb suggests a value of Kappa between 0.6 and 0.8 represents moderate agreement between the map and the ground truth, a value greater than 0.8 suggests strong agreement. Values less than 0.2 suggest the map is only marginally improved compared to a map produced by random allocation.

The user's and producer's accuracies summarise the map's accuracy on a per-class basis. User's accuracy for class A is the probability that a point mapped as A is truly in class A. If the user's accuracy of class A is estimated to be 0.84, then from a random sample of 100 points chosen from areas on the map in this class, approximately 84 would be found to be correct when checked in the field. Producer's accuracy for class B is the conditional probability that the map will show a site as class B given its true state is class B. If the producer's accuracy for class B were 0.84, then from a random sample of 100 points known to be in class B, approximately 84 would also be in class B according to the map. An accurate map should have both high user's and producer's accuracies.

The per-class estimates of accuracy are often not precise, since only part of the total sample points are used to estimate them. As a guide, if the upper bound of the interval for either user's or producer's accuracy is less than 0.5, this can indicate a true misclassification problem, rather than one due to inadequacies in sample size.

Points that differ between the map and the reference data may be due to positional or spatial errors. Inaccurate registration of datasets is an example of spatial error. Thematic errors are the incorrect labelling of an area due to difficulties in determining the true land use in that area, or by oversight or other operational errors. Spatial errors influence thematic accuracy. The purpose here is to assess the thematic accuracy of land use data. However, as described above, the separation of spatial and thematic errors can be difficult and was not undertaken. As a result, the accuracy assessment reflects properties of the land use data as a whole.

Note that the revised 1999 and 2006 land use and the land use change datasets were not accuracy assessed.

2012 land use dataset

The 2012 land use dataset was accuracy assessed with 285 points based on a random sampling strategy, using the map classes (area and frequency) as the strata. The stratified estimate of total accuracy is 0.91 (0.84, 0.94) and Kappa is 0.86 (0.76, 0.91). As the lower bound of the confidence interval for total accuracy is greater than 0.8, the mapping meets the ACLUMP specification.

Table 7 (page 25) shows the error matrix for the accuracy assessment of the 2012 land use data. For the majority of classes, the reference data agreed with the map data. For example, *residential and farm infrastructure* had 30 sample points identified. For 29 of those points, the map data was also *residential and farm infrastructure* and therefore correct. For one point, the map data was incorrect, as the area was found to be *grazing native vegetation*. The misclassification in this case is likely to be related to the size of the property, as lot areas greater than 16ha are not mapped as residential. If a property is close to this threshold, misclassification is more likely.

The column 'proportion' in Table 7 is the relative proportion in area of the classes that were assessed, not of the catchment as a whole. The areas of other classes that are not amenable to assessment, for example, *grazing modified pastures*, are removed from the total area before the proportions are calculated. This column will thus sum to 100%.

Table 8 (page 26) provides the user's and producer's accuracy for the 2012 Logan-Albert land use dataset. This demonstrates that the majority of land use classes in the catchment have been mapped accurately. The largest assessable land use class in this catchment is *grazing native vegetation* which has been mapped with very high user's and producer's accuracies of 0.946 and 0.985 respectively. The next largest class by area is *residential and farm infrastructure* which also returned a high user's and producer's accuracy. The error matrix (Table 4, page 25) provides more detail on the misclassifications.

Accuracy estimates based on samples with fewer than two points are not considered sufficiently reliable, and are presented as NA (not available) in the table. Examples of this are *other conserved area* and *seasonal horticulture*.

The user's and producer's accuracy results should be interpreted individually for their respective classes. It should also be noted that the classes with a small area in proportion to the total area assessed, and also a small sample size, will return a wide confidence interval. The overall accuracy shows a much tighter confidence interval as it effectively summarises the accuracy results for all the assessable classes.

Some classes with low accuracies have insufficient sample points to provide precise estimates. For example, the producer's accuracy for *cropping – sugar* is 0.946, however, from the 95% interval (0.426, 0.999) it can be seen that more sample points would be required to confidently determine class accuracy.

The error matrix shows a misclassification in the mapping within the *production* and *plantation forestry* land use classes. A number of points (eight) were assessed as *production forestry* that were mapped as *plantation forestry*. On examination of these points it was apparent that the map was indeed correct as the accuracy assessment had overlooked the mapping of plantations within state forests (*production forestry)*. It is important to note that these areas constitute a small proportion of the total area assessed, and thus had minimal impact on the overall accuracy.

Table 7: Error matrix for the Logan-Albert catchment 2012 land use dataset

		Reference data																															
	2012 land use class	**Nature conservation**	**Other conserved area**	**Managed resource protect.**	**Other minimal use**	**Grazing native vegetation**	**Production forestry**	**Plantation forestry**	**Cropping – Sugar**	**Perennial horticulture**	**Seasonal horticulture**	**Land in transition**	**Irrigated cropping**	**Irrigated cropping–sugar**	**Irrigated perennial hort.**	**Irrigated seasonal hort.**	**Irrigated land in transition**	**Intensive horticulture**	**Intensive animal husband.**	**Manufacturing & industrial**	**Residential & farm infra.**	**Services**	**Utilities**	**Transport & communications**	**Mining**	**Waste treatment and disposal**	**Lake**	**Reservoir/dam**	**River**	**Marsh/wetland**	**Estuary/coastal waters**	**Total**	**Proportion (%)**
Map data	**Nature conservation**	**14**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	10.28
	Other conserved area	1	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.19
	Managed resource protection	0	0	**9**	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.27
	Other minimal use	1	0	0	**14**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	7.21
	Grazing native vegetation	0	0	0	1	**29**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	56.32
	Production forestry	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.08
	Plantation forestry	0	0	0	0	1	8	**0**	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	10	0.71
	Cropping – Sugar	0	0	0	0	0	0	0	**10**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.83
	Perennial horticulture	0	0	0	0	0	0	0	0	**10**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.03
	Seasonal horticulture	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.01
	Land in transition	0	0	0	1	0	0	0	0	0	0	**8**	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	10	0.45
	Irrigated cropping	0	0	0	0	1	0	0	0	0	0	0	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1.92
	Irrigated cropping – sugar	0	0	0	0	1	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.01
	Irrigated perennial horticulture	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.11
	Irrigated seasonal horticulture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.39
	Irrigated land in transition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.00
	Intensive horticulture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**9**	0	0	1	0	0	0	0	0	0	0	0	0	10	0.11
	Intensive animal husbandry	0	0	0	0	0	0	0	0	0	0	0	0	0	0-	0	0	0	**9**	1	0	0	0	0	0	0	0	0	0	0	0	10	0.49
	Manufacturing and industrial	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**9**	0	0	0	0	0	0	0	0	0	0	0	10	0.52
	Residential & farm infrastructure	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**29**	0	0	0	0	0	0	0	0	0	30	14.52
	Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**12**	0	0	0	0	0	0	0	1	0	13	2.30
	Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**9**	1	0	0	0	0	0	0	0	10	0.02
	Transport and communications	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**7**	0	0	0	0	0	0	9	0.21
	Mining	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	0	10	0.23
	Waste treatment and disposal	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	9	0.13
	Lake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	1	0	0	1	0.00
	Reservoir/dam	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	**6**	0	0	10	0.73
	River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**9**	0	10	0.24
	Marsh/wetland	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**8**	10	0.67
	Estuary/coastal waters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**0**	1	0.01
	Total	17	0	9	19	35	10	0	10	10	1	9	9	0	4	14	0	10	9	10	33	16	10	8	9	8	0	7	9	9	0	**285**	**100**

Table 8: User's and producer's accuracy for the Logan-Albert catchment 2012 land use dataset

Class	User's			Producer's		
	Estimate	95% interval		Estimate	95% interval	
Nature conservation	0.955	0.776	0.998	0.894	0.776	0.973
Other conserved area	NA	NA	NA	NA	NA	NA
Managed resource protection	0.839	0.573	0.976	0.828	0.173	0.997
Other minimal use	0.892	0.686	0.984	0.798	0.466	0.965
Grazing native vegetation	0.946	0.828	0.992	0.985	0.960	0.995
Production forestry	0.520	0.026	0.981	0.057	0.003	0.134
Plantation forestry	0	0	0.036	0	0	0.543
Cropping – Sugar	0.937	0.688	0.998	0.946	0.426	0.999
Perennial horticulture	0.937	0.695	0.998	0.376	0.026	0.970
Seasonal horticulture	NA	NA	NA	NA	NA	NA
Land in transition	0.744	0.447	0.933	0.844	0.246	0.983
Irrigated cropping	0.843	0.568	0.977	0.974	0.599	0.999
Irrigated cropping - Sugar	NA	NA	NA	NA	NA	NA
Irrigated perennial horticulture	0.357	0.121	0.652	0.449	0.030	0.979
Irrigated seasonal horticulture	0.921	0.633	0.998	0.774	0.234	0.907
Irrigated land in transition	NA	NA	NA	NA	NA	NA
Intensive horticulture	0.839	0.556	0.977	0.603	0.081	0.946
Intensive animal husbandry	0.845	0.562	0.977	0.898	0.258	0.998
Manufacturing and industrial	0.842	0.551	0.978	0.808	0.261	0.979
Residential & farm infrastructure	0.946	0.834	0.993	0.984	0.919	0.995
Services	0.877	0.646	0.980	0.902	0.615	0.972
Utilities	0.843	0.548	0.976	0.113	0.013	0.556
Transport and communications	0.718	0.412	0.924	0.751	0.117	0.986
Mining	0.742	0.447	0.936	0.633	0.126	0.945
Waste treatment and disposal	0.823	0.515	0.973	0.696	0.082	0.992
Lake	NA	NA	NA	NA	NA	NA
Reservoir/dam	0.555	0.270	0.815	0.897	0.261	0.997
River	0.842	0.563	0.975	0.809	0.147	0.997
Marsh/wetland	0.744	0.438	0.933	0.682	0.273	0.962
Estuary/coastal waters	NA	NA	NA	NA	NA	NA