Department of Science, Information Technology, Innovation and the Arts

Land Use Summary 1999–2012

for the Stanley River sub-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 Stanley River sub-catchment (which accounts for 7% 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 2 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). Land use change mapping products were 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

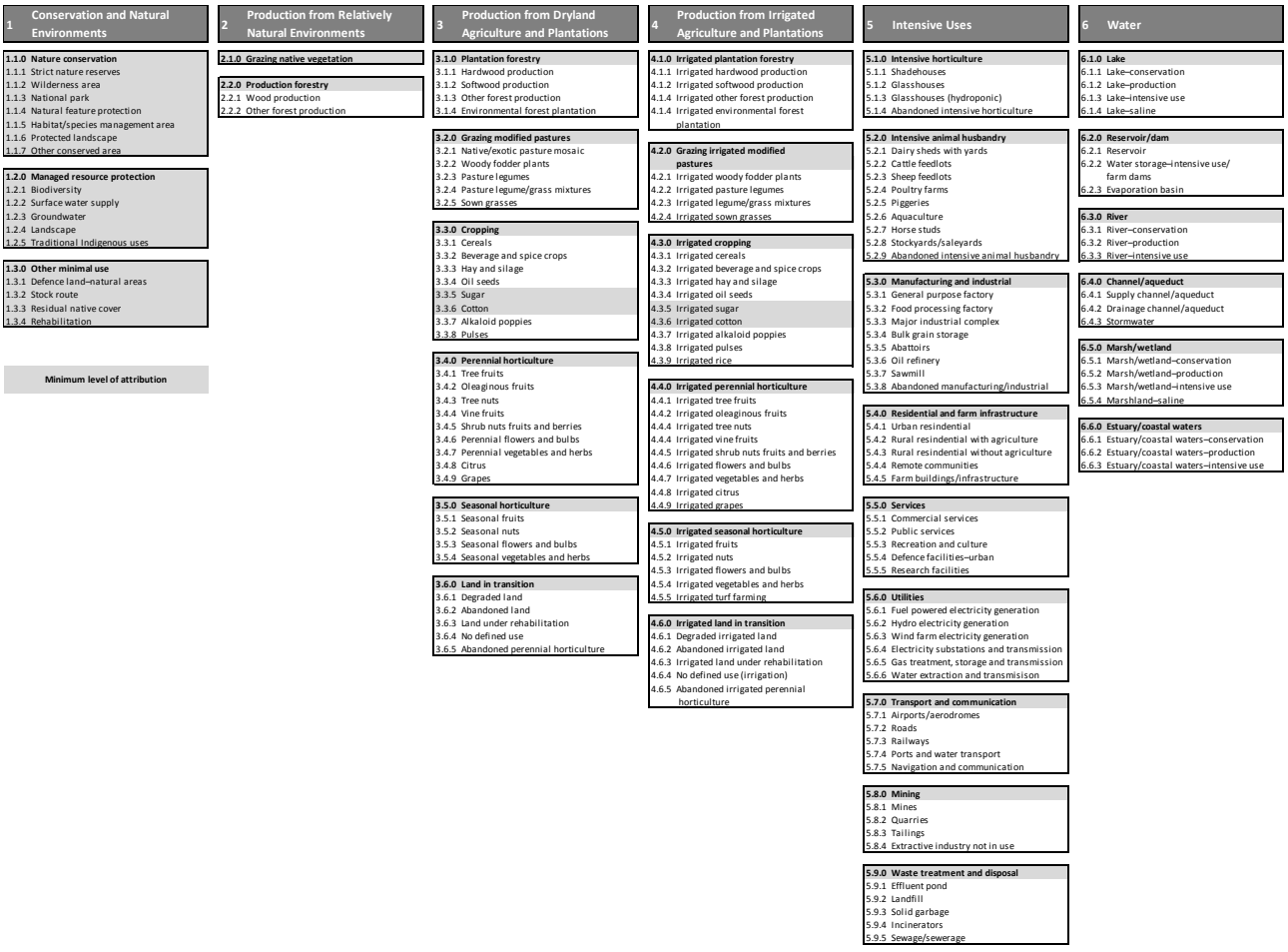

Figure 1: Australian Land Use and Management (ALUM) classification, Version 7

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 Stanley River sub-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* (50%), *nature conservation* (21%) and *other minimal use* (11%) are the major land use classes for 2012 in the Stanley River sub-catchment.

Analysis of the overall change between land use classes shows that the primary class of *conservation and natural environments* increased significantly by 149% or 30,395ha from 1999–2012; by 147% or 30,062ha from 1999–2006; and by 1% or 476ha from 2006–2012. The majority of the increase from 1999–2006 was from *production forestry* to *managed resource protection* (28,388ha), while the majority of the increase from 2006–2012 was from *managed resource protection* to *nature conservation* (28,337ha).

As a result of the SEQ Forest Agreement, (whereby state forests have been progressively added to the conservation reserves estates), the secondary class of *managed resource protection* increased substantially from 1999–2006 (the class was not present in 1999, but represented 19% or 28,988ha of the catchment in 2006). From 2006–2012 *managed resource protection* decreased by 97% or 28,005ha whilst the *nature conservation* secondary land use class increased significantly by 645% or 28,481ha.

The *intensive uses* primary land use class has shown an increase in both eras, increasing by 6% or 368ha from 1999–2006 then increasing again by 13% or 915ha from 2006–2012. The majority of the growth was observed in the *residential and farm infrastructure* secondary land use class, which increased by 6% or 324ha in 1999–2006 and then by 13% or 775ha in 2006–2012.

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 20.

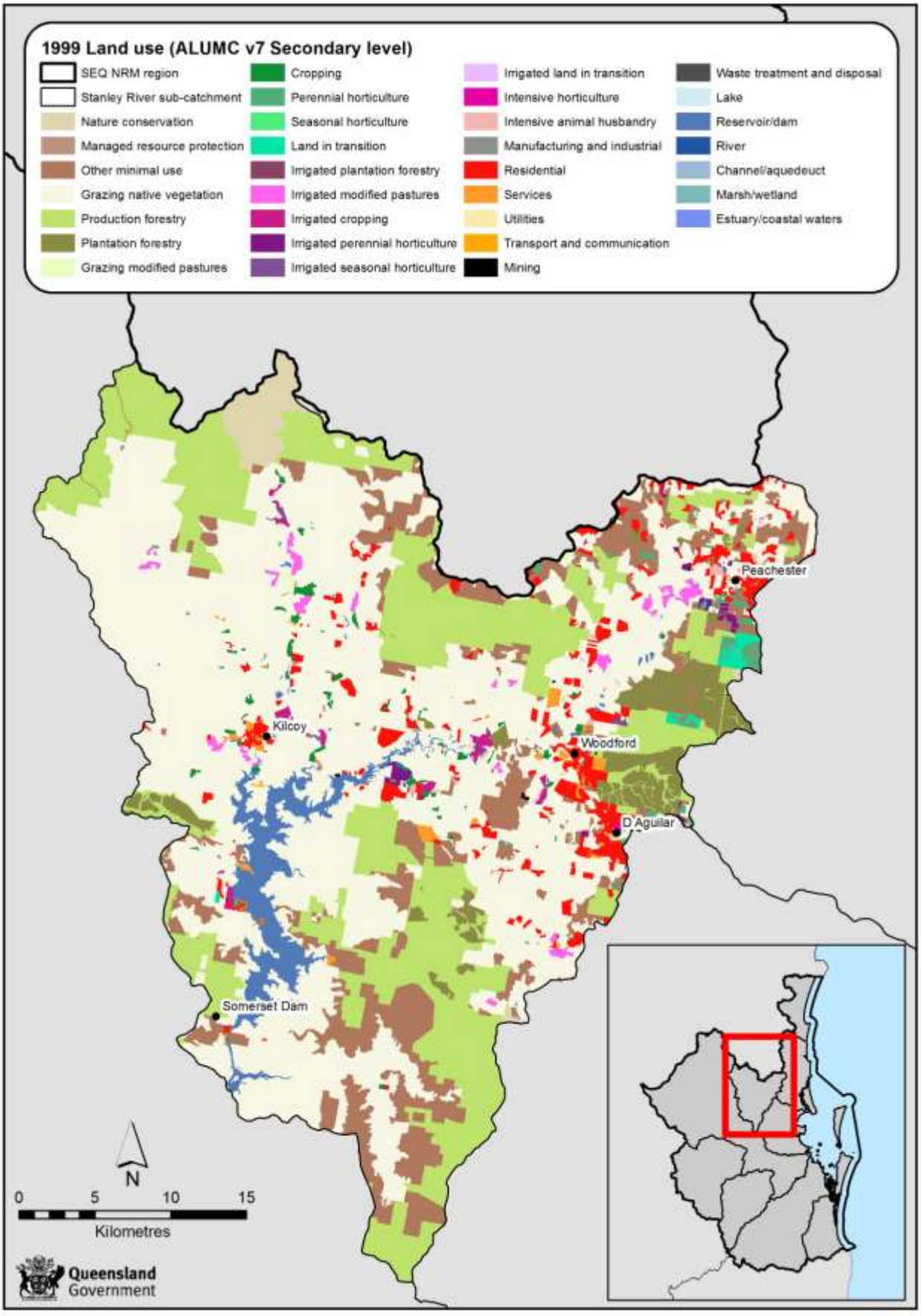

Figure 2: 1999 land use map for the Stanley River sub-catchment

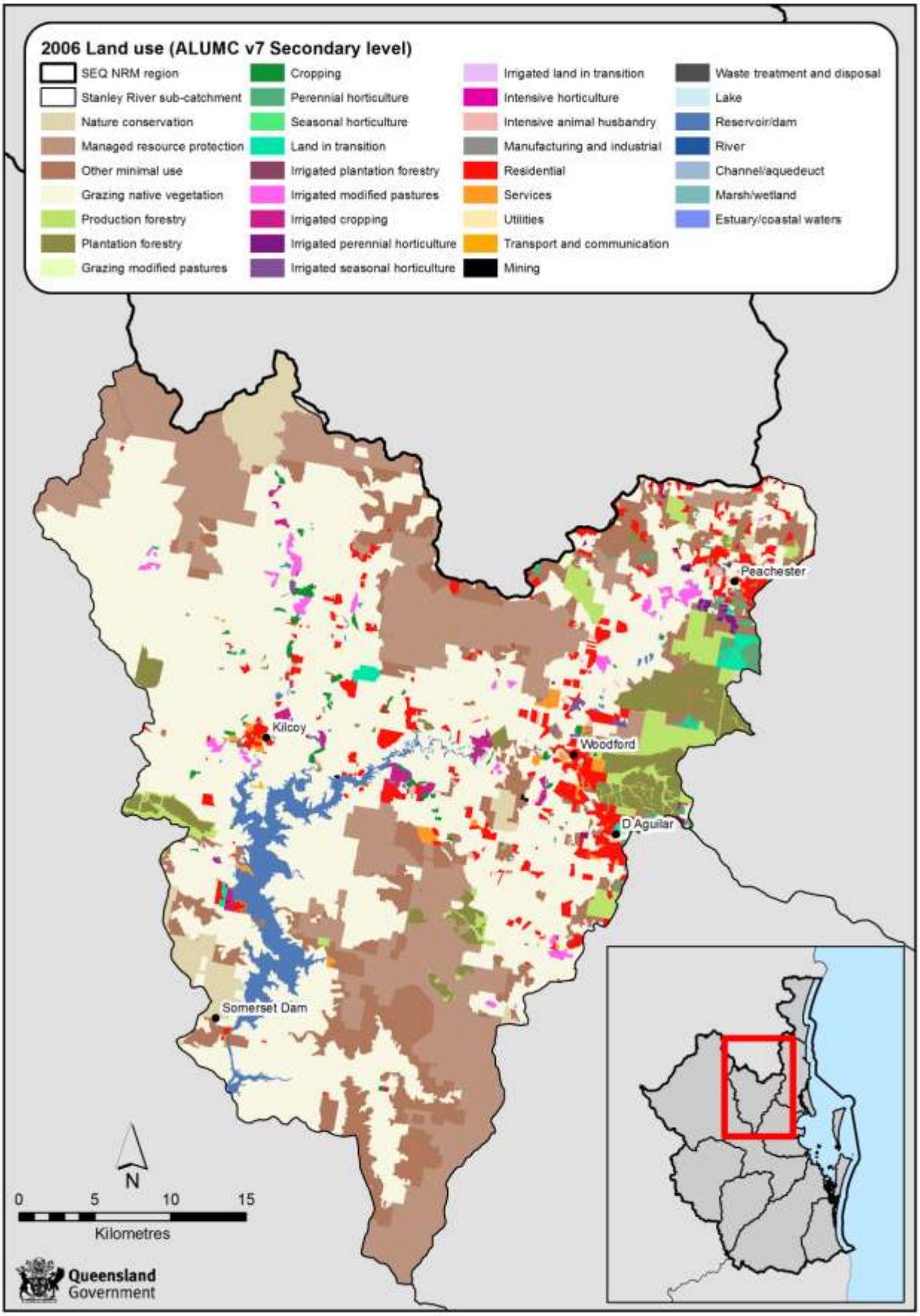

Figure 3: 2006 land use map for the Stanley River sub-catchment

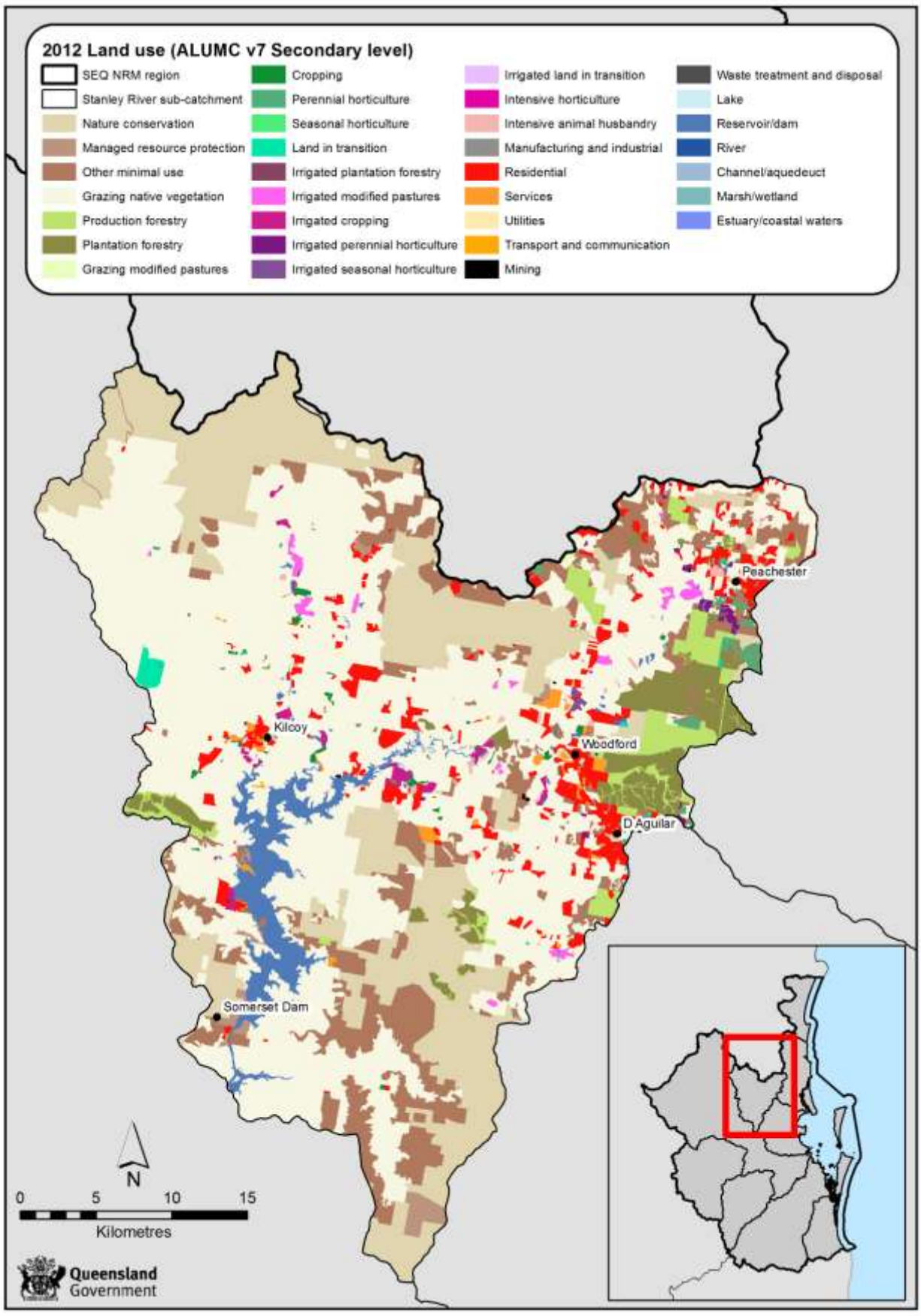

Figure 4: 2012 land use map for the Stanley River sub-catchment

Table 1: Summary statistics of land use in 1999 in the Stanley River sub-catchment

Land use code	Land use class	Area (ha)	Area %
1	Conservation and natural environments	20,426	13.28
1.1	Nature conservation	2,481	1.61
1.3	Other minimal use	17,945	11.67
2	Production from relatively natural environments	112,707	73.28
2.1	Grazing native vegetation[1]	78,635	51.13
2.2	Production Forestry	34,072	22.15
3	Production from dryland agriculture and plantations	7,265	4.72
3.1	Plantation forestry	5,178	3.37
3.2	Grazing modified pastures[2]	139	0.09
3.3	Cropping	746	0.49
3.3.5	Cropping – sugar[3]	23	0.02
3.4	Perennial horticulture	754	0.49
3.6	Land in transition	448	0.29
4	Production from irrigated agriculture and plantations	1,974	1.28
4.2	Irrigated grazing modified pastures[2]	988	0.64
4.3	Irrigated cropping	492	0.32
4.4	Irrigated perennial horticulture	402	0.26
4.5	Irrigated seasonal horticulture	92	0.06
5	Intensive uses	6,558	4.26
5.1	Intensive Horticulture	31	0.02
5.2	Intensive animal husbandry	201	0.13
5.3	Manufacturing and industrial	77	0.05
5.4	Residential and farm infrastructure	5,476	3.56
5.5	Services	720	0.47
5.7	Transport and communication	15	0.01
5.8	Mining	27	0.02
5.9	Waste treatment and disposal	11	0.01
6	Water	4,873	3.17
6.2	Reservoir/dam	4,830	3.14
6.5	Marsh/wetland	43	0.03
	Grand Total	**153,801**	**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* is a subset of the total area of *cropping.*

Table 2: Summary statistics of land use in 2006 in the Stanley River sub-catchment

Land use code	Land use class	Area (ha)	Area %
1	Conservation and natural environments	50,487	32.83
1.1	Nature conservation	4,414	2.87
1.2	Managed resource protection	28,988	18.85
1.3	Other minimal use	17,086	11.11
2	Production from relatively natural environments	81,800	53.19
2.1	Grazing native vegetation[1]	77,699	50.52
2.2	Production Forestry	4,101	2.67
3	Production from dryland agriculture and plantations	7,652	4.98
3.1	Plantation forestry	5,505	3.58
3.2	Grazing modified pastures[2]	113	0.07
3.3	Cropping	657	0.43
3.3.5	Cropping – sugar[3]	23	0.02
3.4	Perennial horticulture	773	0.50
3.6	Land in transition	604	0.39
4	Production from irrigated agriculture and plantations	2,051	1.33
4.2	Irrigated grazing modified pastures[2]	988	0.64
4.3	Irrigated cropping	646	0.42
4.4	Irrigated perennial horticulture	273	0.18
4.5	Irrigated seasonal horticulture	144	0.09
5	Intensive uses	6,926	4.50
5.1	Intensive horticulture	4	<0.01
5.2	Intensive animal husbandry	235	0.15
5.3	Manufacturing and industrial	75	0.05
5.4	Residential and farm infrastructure	5,801	3.77
5.5	Services	759	0.49
5.7	Transport and communication	15	0.01
5.8	Mining	27	0.02
5.9	Waste treatment and disposal	11	0.01
6	Water	4,885	3.18
6.2	Reservoir/dam	4,842	3.15
6.5	Marsh/wetland	43	0.03
	Grand Total	**153,801**	**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* is a subset of the total area of *cropping.*

Table 3: Summary statistics of land use in 2012 in the Stanley River sub-catchment

Land use code	Land use class	Area (ha)	Area %
1	Conservation and natural environments	50,821	33.04
1.1	Nature conservation	32,895	21.39
1.2	Managed resource protection	983	0.64
1.3	Other minimal use	16,943	11.02
2	Production from relatively natural environments	81,606	53.06
2.1	Grazing native vegetation[1]	77,514	50.40
2.2	Production forestry	4,092	2.66
3	Production from dryland agriculture and plantations	6,903	4.49
3.1	Plantation forestry	5,307	3.45
3.2	Grazing modified pastures[2]	98	0.06
3.3	Cropping	352	0.23
3.3.5	Cropping – sugar[3]	23	0.02
3.4	Perennial horticulture	769	0.50
3.6	Land in transition	377	0.24
4	Production from irrigated agriculture and plantations	1,746	1.14
4.2	Irrigated grazing modified pastures[2]	684	0.44
4.3	Irrigated cropping	606	0.39
4.4	Irrigated perennial horticulture	292	0.19
4.5	Irrigated seasonal horticulture	164	0.11
5	Intensive uses	7,841	5.10
5.1	Intensive horticulture	4	<0.01
5.2	Intensive animal husbandry	329	0.21
5.3	Manufacturing and industrial	78	0.05
5.4	Residential and farm infrastructure	6,576	4.28
5.5	Services	797	0.52
5.7	Transport and communication	15	0.01
5.8	Mining	27	0.02
5.9	Waste treatment and disposal	14	0.01
6	Water	4,885	3.18
6.2	Reservoir/dam	4,842	3.15
6.5	Marsh/wetland	43	0.03
	Grand Total	**153,801**	**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* is a subset of the total area of *cropping.*

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

Figure 5, 6 and 7 (pages 15, 16 and 21), show the land use change datasets for the Stanley River sub-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 sub-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: 32,481ha (21% of the sub-catchment). Of this 1,166ha (4% of the total change) is mapped as an increase in land use intensity, whilst 31,314ha (96%) is a decrease.
- 2006–2012: 31,457ha (20% of the sub-catchment). Of this 1,623ha (5% of the total change) is mapped as an increase in land use intensity, whilst 29,834ha (95%) is a decrease.
- 1999–2012: 34,880ha (23% of the sub-catchment). Of this 2,144ha (6% of the total change) is mapped as an increase in land use intensity, whilst 32,736ha (94%) is a decrease.

The land use change 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 and farm infrastructure* 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 17 and 18). The change from 1999–2012 is presented in Appendix A (page 20).

The 1999–2006 land use change shows that change from *production forestry* to *managed resource protection* accounted for 28,388 ha or 87% of the total change mapped, followed by 1,584ha or 5% of *production forestry* changing to *nature conservation*. Collectively, all the land use change to *residential and farm infrastructure* accounts for 330ha or 1% of the total for 1999–2006.

For 2006–2012, the largest land use changes were observed from *managed resource protection* to *nature conservation* (28,337ha or 90%) and *grazing native vegetation* to *residential and farm infrastructure* (489ha or 2%). Changes from *plantation forestry* to *land in transition* accounted for the third largest change (326ha or 1%). Collectively, for 2006–2012 the land use change to *residential and farm infrastructure* accounts for 793ha or 2.5% of the total.

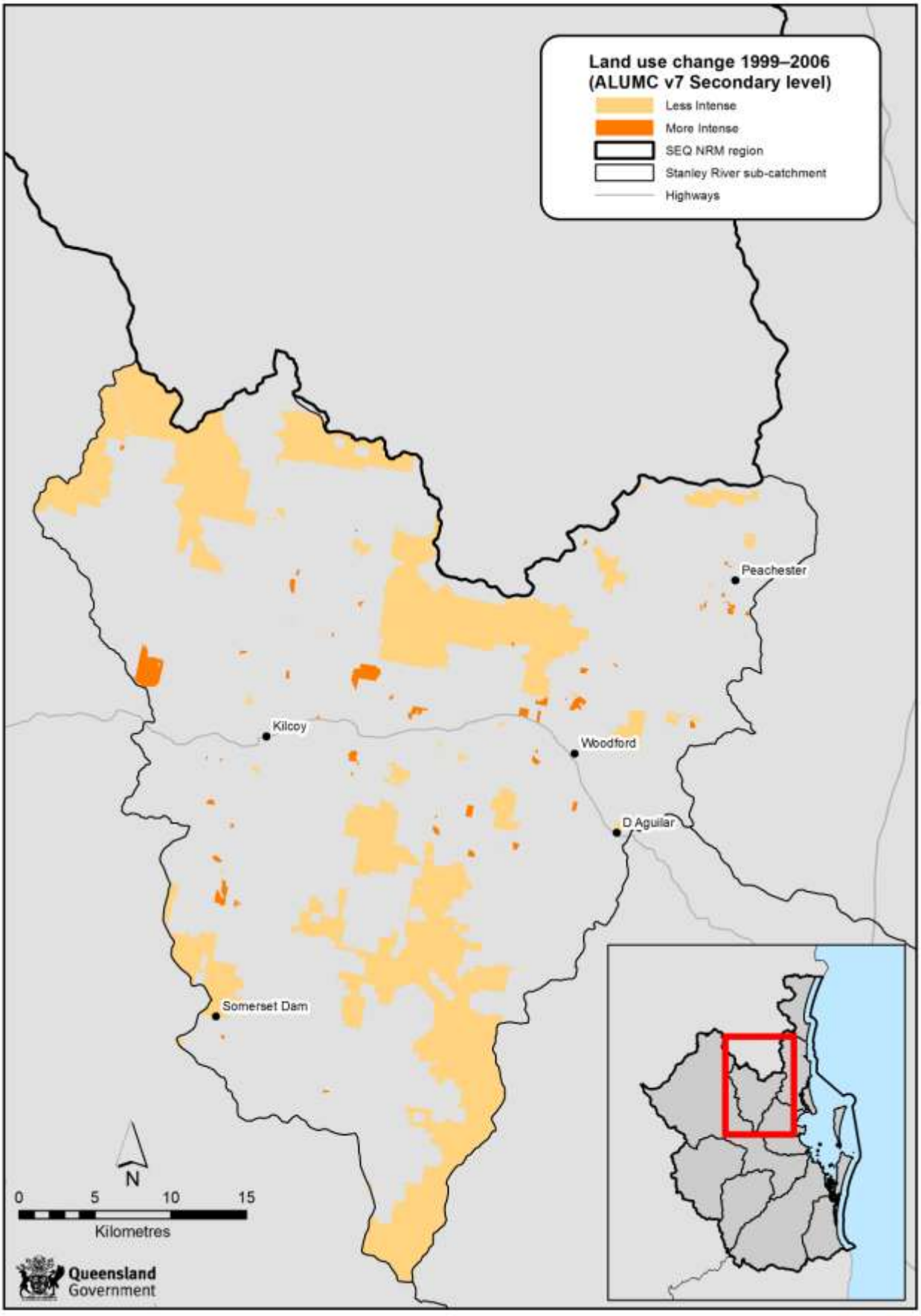

Figure 5: 1999–2006 land use change map at secondary level for the Stanley River sub-catchment

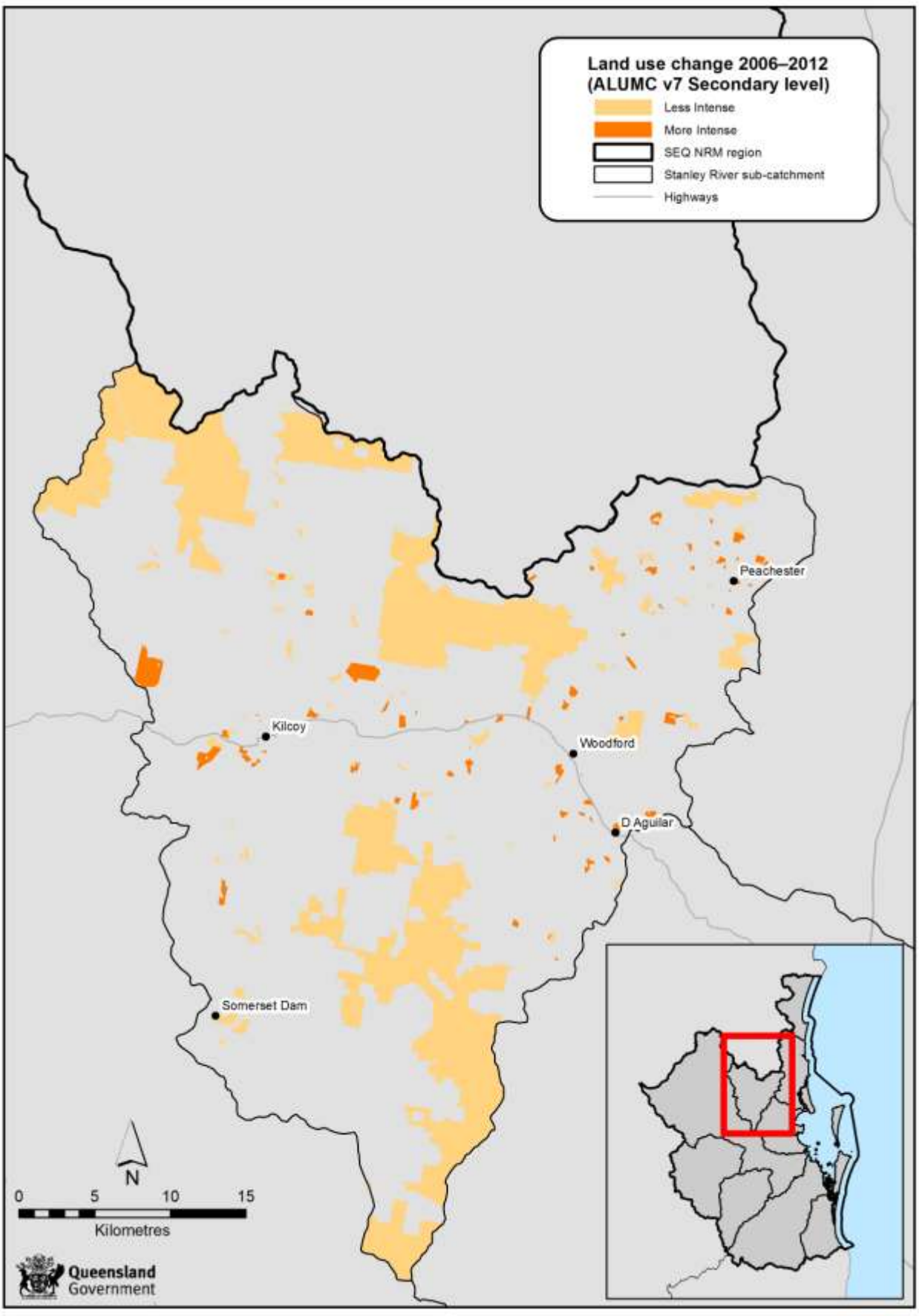

Figure 6: 2006–2012 land use change map at secondary level for the Stanley River sub-catchment

Table 4: Summary statistics for land use change at secondary level for 1999–2006 in the Stanley River sub-catchment (showing only the land use changes > 10ha)

Land use code 1999	Land use class 1999	Land use code 2006	Land use class 2006	Area (ha)	Area Change (%)	Total change (%)
2.2.0	Production forestry	1.2.0	Managed resource protection	28,388	18.46	87.40
2.2.0	Production forestry	1.1.0	Nature conservation	1,584	1.03	4.88
1.3.0	Other minimal use	1.2.0	Managed resource protection	524	0.34	1.61
1.3.0	Other minimal use	1.1.0	Nature conservation	349	0.23	1.07
2.1.0	Grazing native vegetation	3.1.0	Plantation forestry	327	0.21	1.01
2.1.0	Grazing native vegetation	5.4.0	Residential & farm infrastructure	257	0.17	0.79
2.1.0	Grazing native vegetation	3.6.0	Land in transition	209	0.14	0.64
4.4.0	Irrigated perennial horticulture	4.3.0	Irrigated cropping	146	0.09	0.45
3.3.0	Cropping	2.1.0	Grazing native vegetation	93	0.06	0.29
2.1.0	Grazing native vegetation	1.2.0	Managed resource protection	77	0.05	0.24
2.1.0	Grazing native vegetation	4.4.0	Irrigated seasonal horticulture	62	0.04	0.19
3.6.0	Land in transition	1.3.0	Other minimal use	54	0.03	0.17
2.1.0	Grazing native vegetation	5.5.0	Services	44	0.03	0.14
4.5.0	Irrigated seasonal horticulture	2.1.0	Grazing native vegetation	36	0.02	0.11
3.6.0	Land in transition	5.4.0	Residential & farm infrastructure	35	0.02	0.11
2.1.0	Grazing native vegetation	5.2.0	Intensive animal production	34	0.02	0.10
5.1.0	Intensive horticulture	3.6.0	Land in transition	27	0.02	0.08
3.2.0	Grazing modified pastures	4.4.0	Irrigated seasonal horticulture	26	0.02	0.08
2.1.0	Grazing native vegetation	3.3.0	Cropping	24	0.02	0.07
2.1.0	Grazing native vegetation	3.4.0	Perennial horticulture	21	0.01	0.06
3.6.0	Land in transition	3.4.0	Perennial horticulture	19	0.01	0.06
2.1.0	Grazing native vegetation	4.3.0	Irrigated cropping	16	0.01	0.05
3.3.0	Cropping	5.4.0	Residential & farm infrastructure	16	0.01	0.05
1.3.0	Other minimal use	3.6.0	Land in transition	15	0.01	0.04
3.4.0	Perennial horticulture	3.6.0	Land in transition	14	0.01	0.04
1.3.0	Other minimal use	2.1.0	Grazing native vegetation	11	0.01	0.03
1.3.0	Other minimal use	5.4.0	Residential & farm infrastructure	10	0.01	0.03
Total				**32,481**	**21.12**	**100.00**

Table 5: Summary statistics for land use change at secondary level for 2006–2012 in the Stanley River sub-catchment (showing only the land use changes > 10ha)

Land use code 2006	Land use class 2006	Land use code 2012	Land use class 2012	Area (ha)	Area Change (%)	Total change (%)
1.2.0	Managed resource protection	1.1.0	Nature conservation	28,337	18.42	90.08
2.1.0	Grazing native vegetation	5.4.0	Residential & farm infrastructure	489	0.32	1.55
3.1.0	Plantation forestry	3.6.0	Land in transition	326	0.21	1.04
2.1.0	Grazing native vegetation	1.2.0	Managed resource protection	325	0.21	1.03
3.3.0	Cropping	2.1.0	Grazing native vegetation	294	0.19	0.93
4.2.0	Irrigated modified pastures	2.1.0	Grazing native vegetation	272	0.18	0.86
3.6.0	Land in transition	5.4.0	Residential & farm infrastructure	225	0.15	0.71
3.6.0	Land in transition	3.1.0	Plantation forestry	171	0.11	0.54
1.3.0	Other minimal use	2.1.0	Grazing native vegetation	130	0.08	0.41
3.6.0	Land in transition	1.1.0	Nature conservation	120	0.08	0.38
4.3.0	Irrigated cropping	2.1.0	Grazing native vegetation	89	0.06	0.28
2.1.0	Grazing native vegetation	5.2.0	Intensive animal production	84	0.05	0.27
3.4.0	Perennial horticulture	2.1.0	Grazing native vegetation	63	0.04	0.20
4.2.0	Irrigated modified pastures	4.3.0	Irrigated cropping	48	0.03	0.15
3.6.0	Land in transition	3.4.0	Perennial horticulture	46	0.03	0.15
2.1.0	Grazing native vegetation	3.4.0	Perennial horticulture	42	0.03	0.13
2.1.0	Grazing native vegetation	4.5.0	Irrigated seasonal horticulture	36	0.02	0.11
2.1.0	Grazing native vegetation	4.2.0	Irrigated modified pastures	32	0.02	0.10
3.4.0	Perennial horticulture	5.4.0	Residential & farm infrastructure	30	0.02	0.10
3.1.0	Plantation forestry	2.1.0	Grazing native vegetation	23	0.01	0.07
2.1.0	Grazing native vegetation	3.2.0	Grazing modified pastures	21	0.01	0.07
3.2.0	Grazing modified pastures	2.1.0	Grazing native vegetation	21	0.01	0.07
1.3.0	Other minimal use	5.4.0	Residential & farm infrastructure	18	0.01	0.06
2.1.0	Grazing native vegetation	5.5.0	Services	17	0.01	0.05
5.4.0	Residential & farm infrastructure	5.5.0	Services	16	0.01	0.05
4.5.0	Irrigated seasonal horticulture	3.6.0	Land in transition	16	0.01	0.05
3.2.0	Grazing modified pastures	5.2.0	Intensive animal production	16	0.01	0.05
4.2.0	Irrigated modified pastures	5.4.0	Residential & farm infrastructure	15	0.01	0.05
3.6.0	Land in transition	4.4.0	Irrigated perennial horticulture	15	0.01	0.05
3.3.0	Cropping	5.4.0	Residential & farm infrastructure	14	0.01	0.05
3.1.0	Plantation forestry	1.1.0	Nature conservation	13	0.01	0.04
2.1.0	Grazing native vegetation	1.3.0	Other minimal use	13	0.01	0.04
Total				**31,457**	**20.45**	**100.00**

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 *production forestry* to *nature conservation* (29,930ha or 86% due to the SEQ forest agreement), *grazing native vegetation* to *residential and farm infrastructure* (954ha or 3%) and *other minimal use* to *managed resource protection* (524ha or 2%). Collectively, for 1999–2012 the land use change to *residential and farm infrastructure* accounts for 1,123ha or 3% of the total.

Table 6: Summary statistics for land use change at secondary level for 1999–2012 in the Stanley River sub-catchment (showing only the land use changes > 16ha)

Land use code 1999	Land use class 1999	Land use code 2012	Land use class 2012	Area (ha)	Area Change (%)	Total change (%)
3.1.0	Production forestry	1.1.0	Nature conservation	29,930	19.46	85.81
2.1.0	Grazing native vegetation	5.4.0	Residential & farm infrastructure	954	0.62	2.74
1.3.0	Other minimal use	1.2.0	Managed resource protection	524	0.34	1.50
2.1.0	Grazing native vegetation	1.2.0	Managed resource protection	401	0.26	1.15
3.3.0	Cropping	2.1.0	Grazing native vegetation	362	0.24	1.04
1.3.0	Other minimal use	1.1.0	Nature conservation	349	0.23	1.00
2.1.0	Grazing native vegetation	3.6.0	Land in transition	331	0.22	0.95
4.2.0	Irrigated modified pastures	2.1.0	Grazing native vegetation	272	0.18	0.78
3.6.0	Land in transition	3.1.0	Plantation forestry	171	0.11	0.49
4.4.0	Irrigated perennial horticulture	4.3.0	Irrigated cropping	146	0.09	0.42
3.6.0	Land in transition	1.1.0	Nature conservation	120	0.08	0.34
2.1.0	Grazing native vegetation	5.2.0	Intensive animal production	118	0.08	0.34
1.3.0	Other minimal use	2.1.0	Grazing native vegetation	95	0.06	0.27
2.1.0	Grazing native vegetation	4.5.0	Irrigated seasonal horticulture	90	0.06	0.26
4.3.0	Irrigated cropping	2.1.0	Grazing native vegetation	85	0.06	0.24
3.4.0	Perennial horticulture	2.1.0	Grazing native vegetation	63	0.04	0.18
2.1.0	Grazing native vegetation	3.4.0	Perennial horticulture	61	0.04	0.18
2.1.0	Grazing native vegetation	5.5.0	Services	61	0.04	0.17
3.6.0	Land in transition	3.4.0	Perennial horticulture	52	0.03	0.15
3.1.0	Production forestry	1.2.0	Managed resource protection	50	0.03	0.14
3.6.0	Land in transition	2.1.0	Grazing native vegetation	49	0.03	0.14
4.2.0	Irrigated modified pastures	4.3.0	Irrigated cropping	48	0.03	0.14
4.5.0	Irrigated seasonal horticulture	2.1.0	Grazing native vegetation	36	0.02	0.10
3.6.0	Land in transition	5.4.0	Residential	35	0.02	0.10
2.1.0	Grazing native vegetation	4.2.0	Irrigated modified pastures	32	0.02	0.09
3.3.0	Cropping	5.4.0	Residential & farm infrastructure	31	0.02	0.09
3.4.0	Perennial horticulture	5.4.0	Residential & farm infrastructure	30	0.02	0.09
1.3.0	Other minimal use	5.4.0	Residential & farm infrastructure	28	0.02	0.08
4.2.0	Grazing modified pastures	4.5.0	Irrigated seasonal horticulture	26	0.02	0.07
3.1.0	Plantation forestry	2.1.0	Grazing native vegetation	23	0.01	0.07
2.1.0	Grazing native vegetation	4.2.0	Grazing modified pastures	21	0.01	0.06
4.2.0	Grazing modified pastures	2.1.0	Grazing native vegetation	21	0.01	0.06
1.3.0	Other minimal use	4.4.0	Irrigated perennial horticulture	19	0.01	0.05
Total				**34,880**	**22.68**	**100.00**

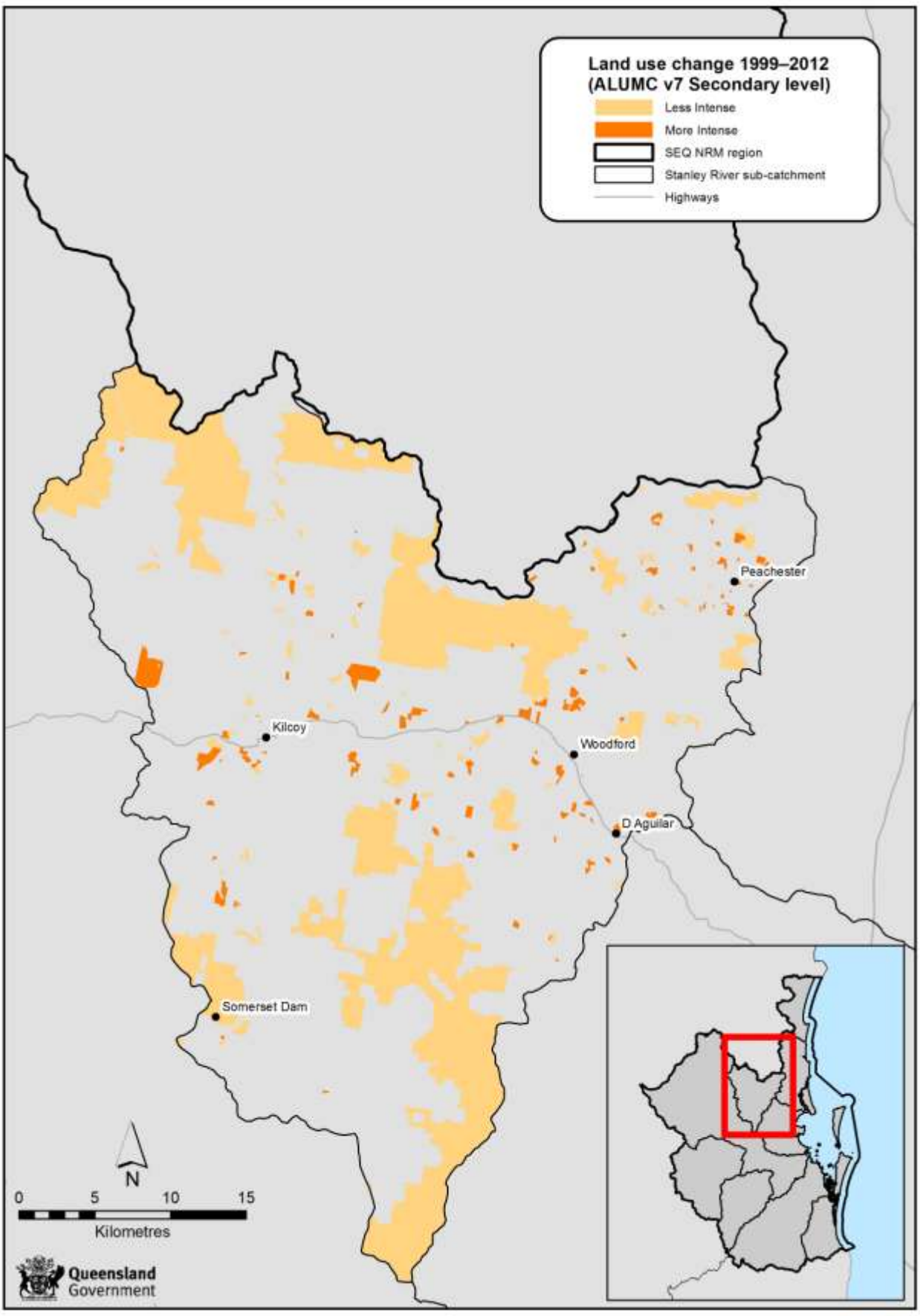

Figure 7: 1999–2012 land use change map at secondary level for the Stanley River sub-catchment

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 164 points based on a random sampling strategy, using the map classes (area and frequency) as the strata. The stratified estimate of total accuracy is 0.92 (0.83, 0.96) and Kappa is 0.88 (0.76, 0.94). 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 24) 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, *intensive animal husbandry* had 10 sample points identified. For 8 of those points, the map data was also *intensive animal husbandry* and therefore correct. For two points 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 image interpretation. Areas of *intensive animal husbandry* may be interpreted as *grazing native vegetation*, and confusion may also occur when some infrastructure of rural properties resembles that of dairy sheds and yards, sheep feedlots, poultry farms, piggeries and/or horse studs.

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 25) provides the user’s and producer’s accuracy for the 2012 Stanley River sub-catchment 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 0.957 and 0.967 respectively. The next largest class by area is *nature conservation* which also returned a high user’s and producer’s accuracy. The error matrix (Table 7, page 24) 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 *land in transition*, *irrigated seasonal horticulture* and *marsh/wetland*.

The user’s and producer’s accuracy results should be interpreted individually for their respective classes. It should 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 *production forestry* is 0.973, however, from the 95% interval (0.529, 1.00) it can be seen that more sample points would be required to confidently determine class accuracy.

Table 7: Error matrix for the Stanley River sub-catchment 2012 land use dataset

		Reference data																							
	2012 land use class	Nature conservation	Managed resource protection	Other minimal uses.	Grazing native vegetation	Production forestry	Plantation forestry	Cropping	Cropping - Sugar	Perennial horticulture	Land in transition	Irrigated cropping	Irrigated perennial horticulture	Irrigated seasonal horticulture	Intensive horticulture	Intensive animal husbandry	Manufacturing and industrial	Residential & farm infrastructure	Services	Transport and communications	Mining	Waste treatment & disposal	Reservoir / dam	Marsh / wetland	Total	Proportion (%)
Map data	Nature conservation	**15**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	21.09
	Managed resource protection	0	**10**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.64
	Other minimal uses	0	0	**13**	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	11.06
	Grazing native vegetation	0	0	0	**15**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	51.10
	Production forestry	0	0	0	0	**10**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	2.67
	Plantation forestry	0	0	0	0	0	**10**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3.46
	Cropping	0	0	0	1	0	0	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0.21
	Cropping - Sugar	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02
	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	10	0.50
	Land in transition	0	0	0	1	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.25
	Irrigated cropping	0	0	0	0	0	0	0	0	0	0	**10**	0	0	0	0	0	0	0	0	0	0	0	0	10	0.40
	Irrigated perennial horticulture	0	0	0	1	0	0	0	0	0	0	0	**8**	0	1	0	0	0	0	0	0	0	0	0	10	0.19
	Irrigated seasonal horticulture	0	0	0	0	0	0	0	0	0	0	1	0	**1**	0	0	0	0	0	0	0	0	0	0	1	0.11
	Intensive horticulture	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
	Intensive animal husbandry	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	0	0	0	0	10	0.21
	Manufacturing and industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	1	0.05
	Residential & farm infrastructure	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**9**	0	0	0	0	0	0	10	4.29
	Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**10**	0	0	0	0	0	10	0.52
	Transport and communications	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	1	0.01
	Mining	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	1	0.02
	Waste treatment & disposal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	1	0.01
	Reservoir / dam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**10**	0	10	3.16
	Marsh / wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	1	0.03
	Total	15	10	14	22	10	10	9	1	10	0	10	8	1	2	8	1	9	10	1	1	1	10	1	**164**	**100**

Table 8: User's and producer's accuracy for the Stanley River sub-catchment 2012 land use dataset

Class	User's			Producer's		
	Estimate	95% interval		Estimate	95% interval	
Nature conservation	0.956	0.783	0.999	0.997	0.925	0.999
Managed resource Protection	0.936	0.691	0.997	0.885	0.211	0.997
Other minimal uses	0.826	0.594	0.956	0.953	0.778	0.995
Grazing native vegetation	0.957	0.777	0.998	0.967	0.921	0.990
Production forestry	0.938	0.705	0.997	0.973	0.529	0.999
Plantation forestry	0.935	0.694	0.998	0.980	0.612	0.999
Cropping	0.841	0.565	0.978	0.705	0.069	0.993
Cropping - Sugar	NA	NA	NA	NA	NA	NA
Perennial horticulture	0.938	0.709	0.997	0.859	0.178	0.996
Land in transition	NA	NA	NA	NA	NA	NA
Irrigated cropping	0.937	0.695	0.997	0.831	0.136	0.996
Irrigated perennial horticulture	0.743	0.445	0.935	0.638	0.054	0.989
Irrigated seasonal horticulture	NA	NA	NA	NA	NA	NA
Intensive horticulture	NA	NA	NA	NA	NA	NA
Intensive Animal Husbandry	0.744	0.448	0.937	0.669	0.065	0.991
Manufacturing and industrial	NA	NA	NA	NA	NA	NA
Residential & farm infrastructure	0.847	0.573	0.975	0.982	0.609	0.999
Services	0.938	0.693	0.998	0.864	0.190	0.997
Transport and communications	NA	NA	NA	NA	NA	NA
Mining	NA	NA	NA	NA	NA	NA
Waste treatment and disposal	NA	NA	NA	NA	NA	NA
Reservoir/dam	0.936	0.70	0.998	0.975	0.563	0.999
Marsh/wetland	NA	NA	NA	NA	NA	NA