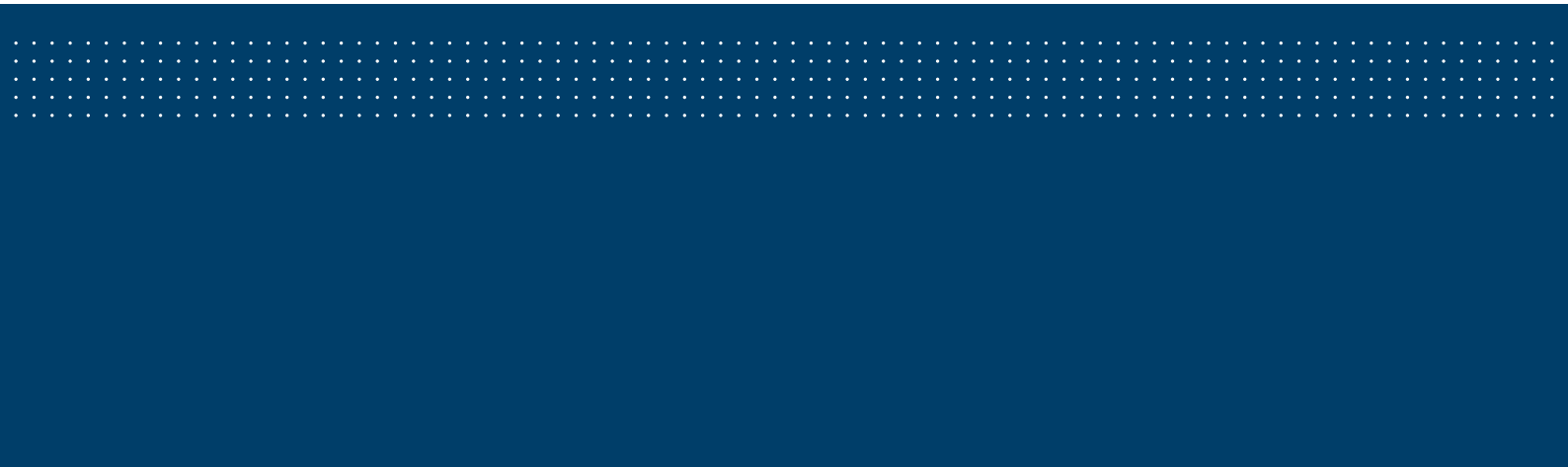


Queensland Agricultural Land Audit
South East Queensland



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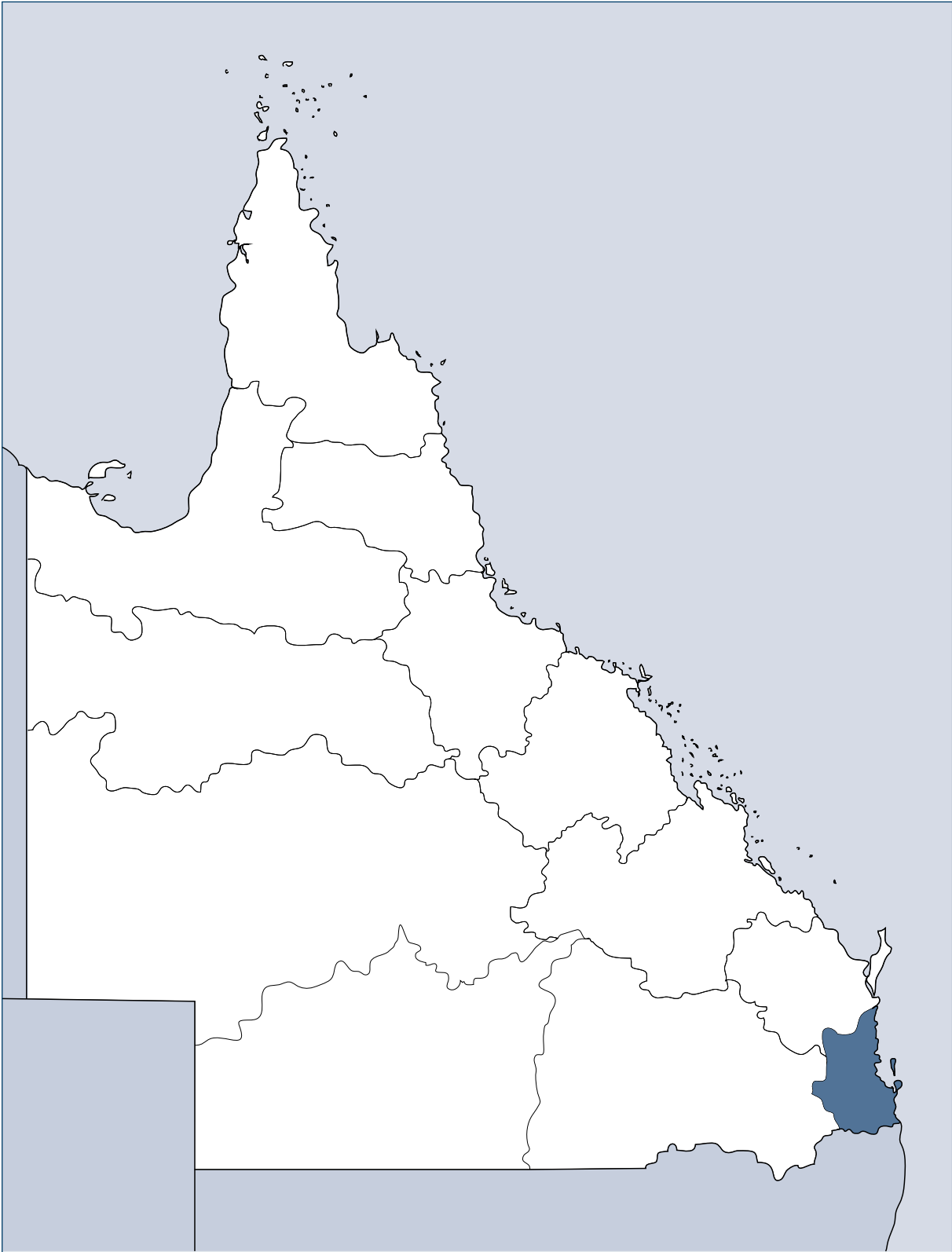
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13.1 Regional agricultural profile

Map 13.1 Location of the South East Queensland Agricultural Land Audit region



13.1.1 Economic profile

South East Queensland comprises the 10 local government areas of Brisbane City, Gold Coast City, Ipswich City, Lockyer Valley Regional Council, Logan City, Moreton Bay Regional Council, Redland City, Scenic Rim Regional Council, Somerset Regional Council and Sunshine Coast Regional Council (see Map 13.1).

It has a total area of 21 596 km² or 1.23 per cent of the total area of the state.

The South East Queensland region supports a range of agricultural industries. Agricultural activities account for approximately 57 per cent (1 221 193 hectares) of the total land area of the region.

In 2010–11, agriculture in the South East Queensland region contributed a total of over \$1.2 billion to the state's economy or 12.6 per cent of the state's value of agricultural commodities. The dominant agricultural industries in the South East Queensland region are horticulture (vegetable production was valued at \$340.4 million and fruit at \$126.5 million in 2010–11), poultry (\$283.4 million), cattle (\$122.6 million), dairy (\$78.1 million) and cultivated turf (\$69.8 million).

As at 30 June 2011, the estimated resident population of South East Queensland was 3 045 096 people or 66.5 per cent of the state's population. South East Queensland's population is projected to increase to 4 393 841 people by 2031—an increase of approximately 44.29 per cent. The greatest increase in population is projected to be in the Ipswich and Scenic Rim local government areas.

Agricultural businesses comprise a small proportion of businesses at 3.9 per cent of total business registrations. The dominant industries are construction, professional and technical services, and property and financial services.

Agriculture and related industries represent a low employment rate within the region at 1.1 per cent of the employed workforce.

Land valuations reflect the high price paid for arable land, predominantly in peri-urban areas. These values are some of the highest for the state. The proximity to Brisbane and the competition from peri-urban lifestyle use have increased property prices in this region. This land is valued more for its amenity by those seeking a rural lifestyle than its productivity capacity for agriculture.

Table 13.1 The change in land values for the South East Queensland region

Local authority	Land type	Market valuation (\$/ha)			Percentage change 2001–12	State market valuations range 2012 (\$/ha)
		Pre-boom 2001	Boom (market peak) 2007	Post-boom 2012		
Brisbane City	Grazing	10 000	27 000	25 000	150	20 to 25 000
	Arable	15 000	43 000	41 000	173	1 150 to 450 000
Gold Coast City	Forest grazing	5 000	21 000	15 000	200	24 to 1 500
	Remnant forest	3 500	9 500	8 500	143	35 to 8 500
Ipswich City	Grazing	2 500	6 500	5 500	120	20 to 25 000
Lockyer Valley Regional Council	Forest grazing	2 000	6 000	5 000	150	24 to 1 500
	Irrigated arable	14 000	35 000	30 000	114	8 000 to 45 000
	Dryland arable	8 000	20 000	17 500	119	1 000 to 17 500
Logan City	Grazing	65 000	125 000	80 000	23	20 to 25 000
Moreton Bay Regional Council	Grazing	6 000	17 000	16 000	167	20 to 25 000
	Arable	12 000	45 000	40 000	233	1 150 to 450 000
Redland City	Grazing	85 000	125 000	80 000	-6	20 to 25 000
	Arable	250 000	600 000	450 000	80	1 150 to 450 000
Scenic Rim Regional Council	Forest grazing	2 500	7 000	6 000	140	24 to 1 500
	Irrigated arable	15 000	40 000	35 000	133	8 000 to 45 000
	Dryland arable	6 000	17 500	15 000	150	1 000 to 17 500
	Remnant forest	1 000	2 500	2 000	100	35 to 8 500
Somerset Regional Council	Forest grazing	2 000	6 000	5 000	150	24 to 1 500
	Remnant forest	1 000	2 500	2 000	100	35 to 8 500
Sunshine Coast Regional Council	Grazing	4 000	15 000	10 000	150	20 to 25 000
	Arable	25 000	90 000	65 000	160	1 150 to 450 000
	Remnant forest	2 000	6 000	5 000	150	35 to 8 500

13.1.2 Strengths, weaknesses, opportunities and threats

Key regional issues

- Agricultural land in South East Queensland is not just important for the production of agricultural commodities, but is also valued due to its landscape (scenic amenity) and other ecosystem services by the urban population. Commercial agricultural producers value the region due to its proximity to markets and high productivity. This juxtaposition increases land values and contributes to land conflicts.
- Urban encroachment is a significant issue across the region for the long-term future of agricultural activities. The incompatibility of agricultural activities with the lifestyle decisions of some peri-urban residents plays a large role in location of industries. Inappropriate fragmentation of rural landscapes also impedes the ability of rural industries to remain profitable into the future.
- The region is in close proximity to major transport hubs for interstate and international markets.
- There are numerous value-adding/processing enterprises crossing many sectors and there is support for expansion of processing and value-adding industries.
- The climate is suitable to grow a diverse range of subtropical crops and agricultural commodities over a relatively small geographical area, due to different microclimates within close proximity.
- The region attracts stable, long-term employees as well as transient workers. The region also supports large numbers of skilled workers, such as consultants and service delivery or support professionals.
- The food and beverage manufacturing sector has expanded in a number of local government areas, particularly those with tourism as a key economic driver (e.g. Sunshine Coast, Redland and Moreton Bay).

Strengths

The strengths of the region include the following:

- South East Queensland has the highest population density in Queensland, with approximately 3 million people. The region is experiencing strong population growth, which results in increased local demand for food, jobs and services—population projections predict average annual growth of 1.8 per cent from 2011 to 2031.
- The population is educated and the region attracts stable, long-term employees as well as transient workers. The region also supports large numbers of skilled workers, such as consultants and service delivery or support professionals for the industry.
- The coastal area of the region enjoys a subtropical climate with warm, wet summers and mild winters. There is minimal seasonal variation in the coastal areas and the region supports a wide range of microclimates. The region is suitable to grow a diverse range of subtropical crops and agricultural commodities over a relatively small geographical area.
- The region has soils capable of supporting a wide range of agricultural production.
- Land under agricultural production is declining in some local government areas (e.g. Redland and Ipswich). These areas have established capacity to provide services (transport, manufacturing, consulting and processing) to support and expand agriculture in surrounding local government areas.
- A wide variety of goods are produced and processed in the region
 - The Sunshine Coast area produces and processes the highest amount of ginger in Australia (approximately 6075 tonnes annually).
 - The Moreton Bay and Sunshine Coast areas have substantial softwood timber plantations in the north. The area around Caboolture supports significant timber processing.
 - The Somerset local government area is the base for meat processing facilities in Kilcoy, supplying processed beef to both national and international markets.

- The Scenic Rim provides 90 per cent of Queensland’s carrots. It also produces other vegetables, fruit, flowers and cattle, and has a burgeoning boutique food industry (wines, cheeses and olives).
- The Lockyer Valley contains major producers of many fruit and vegetables, as well as milk, beef and grain enterprises.
- The Redland local government area supports a large number of poultry farms and substantial poultry processing facilities.
- Logan has one of Queensland’s major mushroom production enterprises.
- The region supports numerous value-adding/processing enterprises crossing many sectors (poultry, viticulture, fruit juice, ginger, garlic, fresh herbs and dairy), and many local government areas are keen to expand processing and value-adding industries.
- The region supplies quarry material (including material from native forests on state land) for infrastructure and construction requirements.
- South East Queensland is in close proximity to major transport hubs (airport, rail and ports) for interstate and international markets (see Section 13.1.5)
 - The region is close to domestic markets (Rocklea markets as well as many smaller local markets/farmers markets).
 - The main highway (Bruce Highway/Pacific Highway) connecting south-eastern Queensland to the rest of Australia’s eastern seaboard runs through the region.
 - There is good road access linking western agricultural areas to eastern manufacturing and transport hubs.
- The region has a number of major water storages and weirs, as well as underground water resources. Many agricultural areas have irrigation supply schemes and associated infrastructure.
- There is access to reliable broadband, providing connections to controlled traffic and mobile phone applications for farm management tools.

Weaknesses

The weaknesses of the region include the following:

- Land valuations show the high cost of rural land in the region (see Table 13.1).
- A number of traditional agricultural sectors have declined in a number of local government areas
 - Sunshine Coast—processing pineapples, dairying and sugarcane (closure of Moreton Mill)
 - Redland—poultry and vegetables
 - Scenic Rim and Gold Coast—dairy.
- Traffic congestion and deterioration of road infrastructure delays access to markets and processors (see Section 13.1.5).
- Wild dogs, feral deer, lantana, rusts, root rots, spiralling white fly, cattle tick and tick fever, bovine pests, viral diseases and internal parasites need to be managed and controlled. Noxious weeds and pests cause significant economic loss, cause degradation of natural resources, threaten biodiversity and interfere with human activities.
- There is limited availability of reliable water access for irrigation, and there is increased competition with urban and industrial water users (see Section 13.1.4).

Opportunities

The opportunities for expanded agricultural production in the region include the following:

- Western Corridor Recycled Water Grid infrastructure, not currently being used for agricultural production, has the capacity to provide water to agricultural users. However, cost for transportation, delivery infrastructure and treatment to achieve class A quality may be prohibitive.
- A desktop soil assessment¹ indicates that there are approximately 9000 hectares of land in the sites assessed that could be suitable for irrigation with treated sewage effluent.
- There are four new cities proposed in the South East Queensland region—Ripley Valley (Ipswich local government area), Yarabilba (Logan), Flagstone (Logan) and Caloundra South (Sunshine Coast). An increased population will increase demand for produce and support labour supply. There is also an increased opportunity for boutique producers (wine, cheese, olives, nuts and fruits) to participate in food tourism, providing diversity of farm income.
- The proposed Ebenezer Regional Industrial Area (Ipswich) may provide capacity for food processing and other value-adding/supply-chain industries to locate businesses in the area.
- The Bromelton State Development Area (Scenic Rim) is being developed—a multimodal industrial facility with a spur connecting it to the Sydney–Brisbane freight railway line. This state development area focuses on large-lot industrial uses, freight and logistics operations, medium- and large-scale manufacturing and warehousing activities, and industry support services. It will provide increased market, transportation and support service access.
- Development of peri-urban agriculture opportunities will support small-scale intensive horticulture operations supplying local markets with fresh fruit and vegetables, and niche markets such as ‘low food mile’ production.
- There is demand-driven diversification of primary production. Trials of new broadacre crops in the region (such as industrial hemp in the Lockyer Valley and Maroochy River areas) have been undertaken on a small scale.
- The food and beverage sector has expanded in a number of local government areas, particularly those with tourism as a key economic driver (e.g. Sunshine Coast, Redland and Moreton Bay). Logan has also identified itself as having an emerging food and beverage manufacturing sector.
- Tree changers or young active retirees with high disposable incomes are able to invest in the area. This may create increased demand for specialised goods.
- There is an increased demand for quarry and forest products (wood and timber products) to support building and construction industry requirements as a result of population growth. There is an opportunity to increase forestry production from some areas of existing grazing country, by managing the land for timber (thinning and harvesting trees) and grazing, creating silvopastoral systems (production systems that combine forestry and grazing in a mutually beneficial way). Increased forestry production will in turn support growth in the downstream timber processing sector.
- An expanding equine industry in some local government areas may increase demand for fodder.
- There are training and education opportunities, with numerous high-quality universities, technical colleges and training organisations in the area.
- Two extra berths at the Port of Brisbane are scheduled to be operational in 2012 and 2014 respectively. Additionally, the Department of Transport and Main Roads has confirmed the upgrade of stage 1 and 2 of the Port of Brisbane Motorway, to provide dual lane access from the existing Gateway Motorway to the start of Port Drive.
- Expansion of the Sunshine Coast airport and proposed development of a new airport in the Lockyer Valley will facilitate increased freight movement.
- Queensland’s primary north–south railway, which runs through the region, is currently under-utilised and considered inefficient for agricultural freight distribution. Improvements to the system for freight movement could help minimise road transportation of agricultural freight.

¹ Psi-Delta Pty Ltd 2011, *Prefeasibility study on the use of recycled water for irrigation in the Logan River area*, Queensland Water Commission.

- Due to the proximity of agricultural production to areas of more urban concentration, there is an opportunity to expand manufacturing, processing, transport, logistics and knowledge industries (including biotech industries). Ipswich City Council, for example, promotes Ipswich as a base for major food processing facilities. With close agricultural economies in Lockyer, Somerset and Scenic Rim local government areas, this will greatly enhance regional agricultural profitability.
- The region is suited to using renewable energy to reduce energy costs (e.g. biofuel from bagasse and wood, solar and wind energy).

Threats

The threats to agricultural production in the region include the following:

- Urban encroachment is a significant issue across the region for the long-term future of agricultural activities. The incompatibility of agricultural activities with the lifestyle decisions of some peri-urban residents plays a large role in location of industries. Inappropriate fragmentation of rural landscapes also impedes the ability of rural industries to remain profitable into the future.
- A number of local government areas are subject to coal seam gas and coal exploration permits—80 per cent of the Scenic Rim is covered by coal seam gas and coal exploration permits, and extensive areas of the Ipswich region are under mineral and coal exploration licences and it has significant identified resource areas.
- Seasonal climate variability and instability may impact future investment in new agricultural developments and expansion.
- Population growth places pressure on existing agricultural land and on future development including
 - competing demand for land for urban purposes—in many eastern local government areas, elevated land prices are a constraint to agricultural expansion
 - urban encroachment into areas of traditional rural activity—poultry is a contentious issue within a number of local government areas and horticulture is facing similar issues when areas are encroached upon by urban development (fertiliser, manure and spray usage, as well as noise and visual amenity concerns regarding structures and sheds, are problems facing some local government areas where urban expansion has been allowed to occur)
 - competition for power, water and transportation infrastructure for urban, commercial or industrial purposes
 - transport infrastructure used for urban purposes
 - rural land-use change to lifestyle/rural residential uses
 - fragmentation of rural land across many local government areas (hobby farms, rural living and equine industry) and small-sized lots
 - biosecurity risks—more movement of people, animals, plant materials and cultures, and a larger peri-urban population results in a potential faster spread of biosecurity risks.

Case study 13.1 Planning reform in Queensland

South East Queensland has experienced a decline in recorded farm land area, farm numbers, average farm sizes and gross farm output since the 1990s. Urban expansion to meet increasing population requirements has constrained land previously used for agriculture. For example, strawberry farmers in the Redland local government area are now replaced by urban development, and production has shifted north to the Sunshine Coast.

The cumulative impacts of land fragmentation include:

- increased land values, reducing ability to expand farming operations
- conflicting amenity values, leading to increased regulation
- sensitive land uses adjoining previously separated agricultural activities
- urban encroachment reducing the availability of quality land and water
- less sustainable agricultural activities on lower quality land requiring more farm inputs.

The subdivision of blocks into rural lifestyle ‘hobby farms’ and smaller rural residential blocks increases as urban centres expand and land prices rise. Residents not dependent on the land for primary income earning capacity value the land for its amenity and may object to lawful agricultural activities that do not meet their perception of amenity. Established farming operations may choose to relocate rather than address disputes arising from amenity concerns.

The *Sustainable Planning Act 2009* is the primary planning legislation from which statutory regional plans define the state framework for regional development, and local government plans address local planning context. Queensland has had policies to deal with urban rural conflict for 20 years. However, the loss of productive farm land has continued, partly due to the largely advisory role of the state in local government planning schemes and partly to a lack of specific growth management measures.

Planning reform, currently underway, will build on previous innovations and elevate the importance of preserving productive agricultural land by establishing a state interest for agriculture. The combination of consistent statewide land classification and state interest in agriculture will bolster the argument to protect quality agricultural land from fragmentation and urban encroachment. A single state planning policy will integrate planning policies into a single administrative package and empower local governments to balance conflicting land-use requirements.

13.1.3 Climate

The region has an average daily temperature range of 13.4–24.9 °C and, on average, South East Queensland receives 1114 mm of rainfall each year.

Rainfall in the region is influenced by tropical systems from the north and fluctuations in the high pressure ridge to the south. Long-range climate projections for the South East Queensland region include a decline in rainfall with increasing temperature and evaporation, in conjunction with more extreme climate events such as sea-level rise and cyclonic weather.

This may lead to new pests and diseases within the region. Increased temperature would allow species such as the Queensland fruit fly and cattle tick to move southwards into areas where they are currently excluded. This may affect interstate and international trade. While the estimated economic impact from fruit flies is currently thought to be around \$28.5 million per year, a southward spread in their population could add millions of dollars to this total.

Warmer winters may reduce stone fruit yields, extreme temperatures may increase the stress on intensively managed livestock and overall conditions may become more favourable for an increase in plant diseases, weeds and pests. Lower rainfall and increasing evaporation will also result in more frequent depletion of soil moisture, reduced ground cover and lower stock-carrying capacity.

13.1.4 Water resources

The water resources of South East Queensland are regulated under the *Water Act 2000* and associated water resource plans and resource operations plans (see Map 13.2).

A water resource plan defines water entitlement security and environmental flow requirements, and aims to balance competing social, economic and environmental demands for water. The four water resource plans relevant to the region are the Water Resource (Gold Coast) Plan 2006, Water Resource (Logan Basin) Plan 2007, Water Resource (Mary Basin) Plan 2006 and Water Resource (Moreton) Plan 2007. A resource operation plan has been developed for each water resource plan area. It provides a rules-based framework to meet the outcomes and objectives stated in the water resource plan.

Growing industrial and urban water use within the region significantly increases competition for access to reliable water supplies. This creates many issues for water managers.

The Queensland Competition Authority is reviewing water prices for Seqwater customers for the period 2013–17, for irrigators under the water supply schemes of the Central and Lower Lockyer Valley, Logan River, Warril Valley, Mary Valley and Central Brisbane River below Wivenhoe Dam.

South East Queensland contains 17 major surface water storages that have a total capacity of 2 509 565 ML. Major supplemented storages in South East Queensland include Wivenhoe Dam, Somerset Dam, North Pine Dam, Moogerah Dam, Maroon Dam, Wyaralong Dam, Hinze Dam, Baroon Pocket Dam and Atkinson Dam (see Map 13.2).

South East Queensland currently hosts nine supplemented water supply schemes, which supply water to high- and medium-priority water allocations. Table 13.2 shows the breakdown of supplemented water allocations for each water supply scheme.

Interim water allocations and water allocations are subject to announced allocations, which set the volume of water able to be taken in a particular year dependent on the total volume of water stored in the water supply scheme infrastructure. Interim water allocations in the region are tradeable on a temporary basis within rules set by an interim resource operations licence. Water allocations are permanently tradable within rules set by a resource operations licence and the rules set by a resource operation plan. Water trading provides options for people to source additional water supplies and improve their water availability and overall reliability. The main constraints to water trading are the resource operation plan rules and the normal supply and demand market mechanisms that dictate whether water is available for purchase.

Table 13.2 Water supply scheme supplemented allocations

Water supply scheme	High A (ML)	High B (ML)	Medium surface (ML)	Medium underground (ML)	Distribution loss (ML)	Total
Central Brisbane River*	279 000		7 041			286 041
Pine Valley*	59 000					59 000
Cressbrook Creek*	10 000					10 000
Central Lockyer†			6 622	9 430		15 962
Logan River*	9 856	13 554			23 410	
Lower Lockyer†			11 278		1 500	12 778
Warrill Valley†	890	8 560	20 536		3 714	33 700
Nerang*	84 000					84 000
Baroon Pocket*	36 500				36 500	

* Resource operations licence

† Interim resource operations licence

In addition to the supplemented water supplied through the water supply schemes identified above, significant volumes of water are also accessed from rivers and creeks via unsupplemented water entitlements not supplied by water supply scheme infrastructure. Most of these entitlements are water licences that specify a maximum area of irrigation or a maximum annual volume.

Water licences are attached to land and cannot be traded or relocated from one site to another. The water resource plans in South East Queensland limit the granting of new water licences. This means that, in most cases, a person seeking to establish a new enterprise reliant on surface water supplies will need to seek land with an attached water licence that has a purpose and entitlement suitable for the proposed enterprise.

Groundwater is managed in parts of South East Queensland. Management generally occurs where the level of use has approached the level of availability.

Groundwater use is managed within a groundwater management area associated with a water resource plan or as part of a subartesian area as defined in the Water Regulation 2002.

Within South East Queensland, groundwater is regulated in the following main areas (see Map 13.2):

- Lockyer Valley
- Cressbrook Creek, Toogoolawah
- Bremer River and Warrill Creek areas
- Clarence–Moreton Groundwater Management Area (Great Artesian Basin water resource plan—Toowoomba range to Boonah and beyond).

Groundwater on the islands also contributes to water supplies in South East Queensland. Additionally there are areas where significant use of groundwater may occur but management has not been introduced.

The most significant groundwater area within South East Queensland is in the Lockyer Valley. Within this area, only the Central Lockyer Valley (also called the Clarendon subartesian area) is a declared subartesian area and is managed under an interim resource operations licence. The rest of the valley is not currently licensed. Groundwater in the Lockyer Valley supports a wide range of agricultural produce and, for much of the valley, is the dominant source of water for irrigation. The valley is best known for growing vegetables and lucerne.

The Logan Basin resource operation plan currently specifies unallocated water, with 37 000 ML of strategic reserve from the Logan River catchment and 150 ML of town water supply reserve from Canungra Creek.

The Logan Basin resource operation plan outlines the process for applying for this water.

The Gold Coast water resource plan currently specifies 500 ML of general reserve. A process for granting this water is not currently outlined in the resource operation plan.

The Mary Basin water resource plan currently specifies 150 000 ML of strategic reserve identified primarily to meet future water demands in South East Queensland. A process for granting this water is not currently outlined in the resource operation plan.

13.1.5 Infrastructure

South East Queensland has experienced a period of significant population growth. The sustained growth of the region has brought with it new challenges, including housing affordability and transport congestion. Significant population growth in South East Queensland has led to a marked increase in public transport patronage, private vehicle use and freight movements.

Greater Brisbane is expected to house a large proportion of the total development proposed for South East Queensland. In outer areas such as Caboolture and Redland, most of this development will occur on large hectare sites currently or previously used for agricultural production.

Transportation of goods and services is vital to the region's economic development and growth. The freight task in Queensland has accelerated rapidly over the past 9 years, with forecast data suggesting it will more than double in South East Queensland by 2020. Expected demand is driven by strong population growth and economic activity. This will place increasing pressure on key road and rail corridors, particularly those supporting the Port of Brisbane's rapidly expanding import and export activities (see Map 13.3).

The region is well serviced by key processing and marketing centres. Additional processing capacity, servicing all agricultural industries, occurs within South East Queensland. Major meat processors, banana ripeners, timber processors, fruit and vegetable processors, value-adding and packing facilities, dairy processors and wholesale fruit and vegetable markets are located in the region (see Map 13.3), as well as export-focused grain and cotton terminals at the Port of Brisbane.

Congestion and road deterioration concerns in South East Queensland impact transport costs and times. The D'Aguiar and Brisbane Valley highways require upgrading as they are carrying an increasing amount of traffic. Road access to the South Burnett also requires upgrading following multiple years of extreme weather conditions.

The Warrego Highway is over capacity. It is the second-highest trafficked rural national highway after the Bruce Highway. Current traffic volumes in Ipswich vary, with an average daily usage of over 40 000 vehicles per day.² Upgrades between Dinmore and Goodna and other upgrades to improve freight movement from Ipswich in the west to the Rocklea markets have marginally reduced congestion along the Ipswich Motorway.

² Department of Transport and Main Roads 2012, 'Current performance', in *Warrego Highway upgrade strategy: Brisbane to Charleville—connecting Queensland's regions: February 2012*, State of Queensland, <<http://www.tmr.qld.gov.au/About-us/Corporate-information/Publications/Warrego-Highway-Upgrade-Strategy.aspx>>.

13.1.6 Vegetation

The South East Queensland regional plan identifies around 80 per cent of the region as regional landscape and rural production area. The coastline of this region currently provides diverse ecological, economic, recreational and cultural values.

The South East Queensland region is under the management of the *Regional vegetation management code for South East Queensland bioregion—version 2*.³ This code outlines all vegetation management restrictions put in place throughout the region that are able to be assessed under the *Vegetation Management Act 1999*. These activities include, but are not limited to, fodder harvesting, thinning, ensuring public safety and control of non-native weeds or declared pests (see Map 13.4).

This code is consistent with the South East Queensland regional plan, which endorses the protection of biodiversity through measures such as maintaining habitat connectivity, conserving regional ecosystems and protecting regional biodiversity.

There are restrictions on clearing areas of land within the South East Queensland region under the *Vegetation Management Act 1999* (see Map 13.4)—325 860 hectares (15.1 per cent) requires further verification before clearing can occur, 747 310 hectares (34.6 per cent) cannot be cleared and 1 078 357 hectares can be cleared, has already been cleared or is naturally open.

The geology for the region is characterised by metamorphic and acid to basic volcanic hills and ranges (Beenleigh, D’Aguilar, Gympie and Yarraman Block); sediments of the Moreton, Nambour and Maryborough basins; extensive alluvial valleys; and quaternary coastal deposits.

Notable vegetation communities include:

- *Eucalyptus*, *Lophostemon* and *Syncarpia* tall, open forests
- eucalypt open forests and woodlands
- subtropical rainforests, often with hoop pine (*Araucaria cunninghamii*) emergents
- small areas of cool, temperate rainforest dominated by Antarctic beech (*Nothofagus moorei*) and semi-evergreen vine thickets
- broad-leaved paperbark (*Melaleuca quinquenervia*) wetlands
- low banksia woodlands, heaths and mangrove/saltmarsh communities.

The South East Queensland bioregion includes the Brisbane, Mary and Burnett river catchments. The riparian areas within all the subregions are in fair condition, although all are trending towards decline. The major threatening processes are fragmentation of remnants, exotic weeds, feral animals, impacts of agriculture, timber production and urbanisation.

Amendments to the *Vegetation Management Act 1999* (tabled in Parliament in March 2013) will remove constraints on clearing high-value regrowth vegetation on freehold land across the state, and create opportunities to clear vegetation for high-value agriculture. The audit mapping will be updated in the future to reflect these amendments when the laws come into force.

3 Department of Environment and Resource Management 2009, *Regional vegetation management code for South East Queensland bioregion—version 2*, State of Queensland, <http://www.derm.qld.gov.au/vegetation/pdf/seq_code_nov_2009.pdf>.

13.2 Current and potential agricultural land use

Note

The mapping of potential agricultural land uses in South East Queensland is limited. There are significant areas within the region where detailed soils data does not exist and, as a result, a data gap has occurred in the mapping. This represents 12.7 per cent of the region (see Table 13.3).

To address this, the audit has highlighted these areas as a grey zone. The main areas affected are located throughout the region, with large areas in the southern, western and northern areas. The mapping of current land use is unaffected by this data gap and will be overlaid accordingly.

The predominant industries are poultry production across the region, grazing in the Scenic Rim and Somerset local government areas, and production horticulture in the Lockyer Valley, Sunshine Coast and Moreton Bay local government areas. Plantation and native forestry is a strong industry across the north-eastern areas of the region (see Map 13.5 and Table 13.3).

The production horticulture industry in the Lockyer Valley and Sunshine Coast local government areas contribute significantly to the state's overall horticultural production and economic outlook.

Strawberries and pineapples are the predominant horticultural industries on the Sunshine Coast, and vegetable production is dominant in the Lockyer Valley local government area.

Table 13.3 Current and potential land area

Queensland Land Use Mapping Program (1999, 2006 and 2009)	Current land use			Potential land use*	
	Area (ha)	Percentage of region	Percentage of ALUC† that occurs in region	Area (ha)	Percentage of region
Broadacre cropping	35 992	1.67	1.01	161 538	7.48
Sugarcane	15 847	0.73	2.8	10 113	0.47
Perennial horticulture	16 521	0.77	18.81	138 900	6.43
Annual horticulture	24 587	1.14	52.13	171 987	7.96
Grazing	1 115 600	51.67	0.75	1 378 691	63.84
Sown pastures [§]	173 790	8.05	1.08	72 528	3.36
Intensive livestock	11 623	0.54	30.7	290,501	13.45
Aquaculture	608	0.03	13.37	6 776	0.31
Other land use (non-agricultural land uses and also may include some forestry)	938 427	43.46	4.68		
Agricultural land class data gap	275 575	12.76			
Total	2 159 206	100			
Forestry* (see Section 13.2.2)					
Managed in silvopastoral systems (mixed native or plantation forestry and grazing)	309 402	14.33	0.3		

Note: Refer to Section 13.2.2 (under 'Forestry') and Section 13.3 ('Data confidence') for a further explanation regarding the forestry datasets and methodology used.

* Potential areas includes where the majority of current production occurs as well as where production could potentially occur. Refer to section 13.3 ('Data confidence').

† Agricultural land-use category

§ Sown pasture potential is to be considered in addition to currently sown pasture areas. An estimate of total potential of sown pastures for the region needs to consider areas currently sown as well as those with sown pasture potential.

‡ Forestry includes land, irrespective of tenure, that has been established as forestry (native or plantation), but can also be used for other purposes such as grazing. Current plantation forestry locations are developed from data from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), HQPlantations Pty Ltd and Forest Enterprises Australia Holdings. Current native forestry is based on data from the Department of Agriculture, Fisheries and Forestry (Queensland) and the Department of Environment and Heritage Protection. See Section 13.2.2 (under 'Forestry') for further information about forestry data.

13.2.1 Important agricultural areas

In the South East Queensland region, three areas have been identified as important agricultural areas.

An important agricultural area is an area that has all the requirements for agriculture to be successful and sustainable, is part of a critical mass of land with similar characteristics and is strategically significant to the region or the state. Map 13.6 shows the general location of the important agricultural areas for the South East Queensland region.

Lockyer Valley

The soils and biophysical properties of the area make the Lockyer Valley one of the major annual horticulture areas in Australia. The area supports the growing and further processing of a number of commercially successful agricultural production enterprises, supplying major supermarkets and the food service industry along the eastern seaboard.

The Lockyer Valley is located within close proximity to markets, reliable access to transportation infrastructure and established service support.

Annual horticulture production in the Lockyer Valley contributes 26.5 per cent of the vegetable value of commodity for the state (raised for seed and human consumption combined), with a value of \$209 million in 2010–11. The area has the biophysical capacity to expand; however, market demand and commodity profitability has impacted on the extent to which this has occurred. The primary horticultural products in the Lockyer Valley are broccoli, cauliflower, potatoes, onions, pumpkins, lettuce, corn, green beans and carrots.

The area also supports poultry, broadacre cropping and grazing industries to a lesser extent. Poultry production in the area consists of breeder farms, as well as broiler facilities and a small number of egg facilities. Broadacre cropping tends to be forage and hay, valued at \$7.8 million (21 per cent of the state's value of hay crops in 2010–11).

The Lockyer Valley has a unique climate (situated at the foothills of the Great Dividing Range), underground water supply, fertile soils and extensive farming history. The combination of these features enables the area to be a significant winter, autumn and spring vegetable production area, supplying large quantities of produce to the Australian domestic market as well as exporting on a demand-based basis. The export market is an extension of the domestic market, and price determines where produce is sold. The export market is currently of minor importance as Australian produce struggles to compete on price in the world market.

Reliable transportation infrastructure, technical support and professional services are readily available in this region for agricultural development.

Scenic Rim

The Scenic Rim local government area supports a diverse range of horticultural crops, extensive poultry production, dairy and grazing.

Horticultural production within the Scenic Rim is primarily in the Fassifern Valley area. The horticultural products grown in the area are mainly carrots, onions, green beans and kiwifruit. Fruit and vegetable production represented 2 per cent of the state's total fruit and vegetable production and was valued at \$39 million in 2010–11. Broken into commodities, this represents 64.9 per cent for carrots (\$8.7 million), 16.5 per cent for onions (\$5.8 million) and 93.3 per cent for kiwifruit (\$1.4 million) for the state as a whole.

The biophysical potential of the region indicates opportunities to expand the production areas for perennial horticulture, cropping, annual horticulture and grazing.

Meat poultry production occurs in the southern area of the Scenic Rim. It represented 11.6 per cent (\$46 million) of the meat poultry value of production and 14.2 per cent (\$36.6 million) of the milk product value for Queensland in 2010–11.

As with the Lockyer Valley, established, reliable transportation infrastructure, technical support services and professional services are accessible. Soils, water supply and a mild winter climate allow for development of significant agricultural enterprises within close proximity to the Brisbane markets.

Sunshine Coast and upper Moreton Bay

The Sunshine Coast and upper Moreton Bay area supports an important contribution to the value of agricultural production in Queensland.

The Sunshine Coast and Moreton Bay local government areas contribute \$150.6 million to the value of poultry produced in Queensland (38 per cent of the value of production for the state in 2010–11). The area is located within close proximity to the largest poultry production facilities in Queensland. Reliable transportation infrastructure, feed manufacturing and professional services contribute to the growth of the industry. However, peri-urban development and smaller lot sizes are constraining expansion of the industry in this area.

Forestry plantations are a long established industry in the region. These plantations supply almost 25 per cent of Queensland's annual softwood log timber harvest to a number of wood processors, which provide wood and timber products to support the growth and requirements of the state's building and construction industry.

Cultivated turf is a considerable industry in the area due to its close proximity to urban customer bases within the area and to the south in Brisbane and surrounds. In 2010–11, the value of turf production in the Sunshine Coast and Moreton Bay local government areas represented \$25 million (27.9 per cent of the state's total value of turf production).

There is extensive perennial horticulture established in this area, including high-value berry and niche crops. Strawberries, raspberries, pineapples, citrus, custard apples, macadamia nuts and lychees are the predominant horticultural crops. Strawberry production represents 79.4 per cent of the total strawberry value of production for the state (\$59 million) and pineapples contribute \$22 million to the state's value of pineapple production (43.9 per cent).

13.2.2 Industry profiles

Broadacre cropping

Current

There is minimal cereal cropping undertaken in the South East Queensland region. Those areas that undertake small-scale cereal production include Coominya (south-east of Crows Nest) that grows maize, peanuts and soya beans, and the Lockyer Valley that grows sorghum in summer and wheat or barley in winter (see Table 13.3 and Map 13.7).

The value of cereal production in South East Queensland was \$3.3 million in 2010–11, representing just 0.5 per cent of the state's value of cereal production. Cropping occurs in the Lockyer Valley, Scenic Rim and Somerset local government areas.

Traditionally, the Albert–Logan area grew crops (maize and sorghum) to supply local dairy and intensive livestock industries. In response to changing markets and location of dairy production, the area currently produces irrigated forage, lucerne and hay.

There are no water storage facilities in the area; however, the Albert–Logan area has high rainfall and river access for irrigation water (including a weir south of Beaudesert).

The remainder of cropping in the South East Queensland region is predominantly forage, lucerne and hay production, which is concentrated in the Albert–Logan area east of Kilcoy (around the Stanley River), Brisbane Valley (between Toogoolawah and Esk) and Fassifern Valley (between Fassifern and Mutapilly)—see Map 13.7.

Forage crops, lucerne and hay production in the region contributed 21 per cent of the state's total value of pasture, hay and forage crops in 2010–11 (valued at \$23.7 million). The majority of this production occurs in the Lockyer Valley (32 per cent of the region's value of commodity produced in 2010–11), Scenic Rim (40 per cent) and Somerset (14 per cent) local government areas.

Broadacre cropping in the region varies significantly year to year according to seasonal rainfall and market demand.

Potential

There are 161 538 hectares of the region identified as having potential for cropping (see Table 13.3 and Map 13.7). Approximately 11 per cent of the areas identified as having potential for broadacre cropping is currently used for cropping. The remaining areas are primarily used for grazing (59 per cent), horticulture (12 per cent) and sugarcane (4 per cent)—see Map 13.7.

Between the Brisbane Valley Highway and Brisbane River (south-west of Kilcoy), large areas of land are identified as having potential; however, grazing is the dominant activity due to market forces.

The alluvial areas of the Lockyer Valley have equal potential for horticulture or broadacre cropping, and are currently under intensive horticulture production. In the Lockyer Valley, broadacre cropping is undertaken on the lighter soils, with horticulture predominantly occurring on the heavier soils.

The alluvial area following the Albert and Logan river systems comes under the data gap for the South East Queensland region, as outlined at the start of Section 13.2. Historically (30–40 years ago), this area had significant areas of land under broadacre cropping. While the audit is unable to determine potential based on biophysical classification, there is historical evidence that suggests potential for broadacre cropping.

The Coominya district shows potential for development of broadacre cropping. However, the soils suitable for cropping are too fragmented to support large areas of production, with class A soils mixed with pockets of class B and C soils.

The Fassifern Valley also shows potential for broadacre cropping. Currently, this area is used for horticulture, grazing or dairy production.

Sugarcane

Current

The sugarcane industry is still an active industry in the Jacobs Well and Beenleigh areas of the region, with one mill in operation at Rocky Point. The value of sugarcane production in South East Queensland for 2010–11 was \$12 million (1.3 per cent of the state's commodity value).

The coastal region has a predominance of acid sulphate soils prone to waterlogging, which (combined with high rainfall) makes most broadacre cropping unviable. Sugarcane can, however, grow in such environments.

Sugarcane production did occur in the Sunshine Coast area in the north of the region prior to population expansion and the Nambour mill closure in 2003.

The area currently under sugarcane production within the South East Queensland region is 15 847 hectares (0.7 per cent of the region)—see Table 13.3 and Map 13.8.

Potential

There are 10 113 hectares of the region identified as having potential for sugarcane production (see Table 13.3). Approximately 44.9 per cent of the area identified as having potential for sugarcane production is currently used for sugarcane production. The remaining areas are primarily used for other non-agricultural land uses (23.1 per cent), grazing (20.9 per cent), forestry (3.4 per cent) and horticulture (4.3 per cent).

There are scattered areas of potential between Caloundra and Caboolture; however, this is predominantly under plantation forestry.

A small proportion of the sugarcane is being harvested for supply to stockfeed and juicing processing plants.

Horticulture

Current

South East Queensland is considered one of the state's largest vegetable growing regions (see Maps 13.9 and 13.10). In 2010–11, annual horticulture production represented 31 per cent of the state's vegetable value and 88 per cent of berry fruit. The predominant crops are beans, carrots, lettuce, onions, broccoli, cauliflower, mushrooms and tomatoes. The Lockyer Valley local government area is the major area for vegetable production, contributing 19 per cent of the state's vegetable value in 2010–11.

Berry production is strong in the South East Queensland region and the primary crop is strawberries (valued at \$65 million for 2010–11). Other minor berry crops include raspberries (\$6 million) and blueberries (\$100 000). The main growing areas are the Moreton Bay and Sunshine Coast local government areas. These areas contribute 60 per cent and 20 per cent respectively to the state's value of berry production, and 57 per cent and 22 per cent to the state's strawberry production.

Ginger has been a strong crop in the north of the region for a considerable time. However, the growing areas are relocating to neighbouring areas within the Wide Bay Burnett region due to soil disease issues such as the *Pythium* species of fungus.

The Palmwoods and Nambour areas were productive horticulture areas prior to population growth and urban expansion. Urban encroachment fragments agricultural land and leads to conflicting interests in the land's value. Remnant orchards are not being managed effectively, causing high levels of biosecurity issues.

The Beerwah, Glasshouse Mountain and Wamuran areas are still important areas for horticultural production. These areas primarily produce pineapples, strawberries, macadamias and avocados, with some turf and custard apple production.

Cultivated turf production is significant in the South East Queensland region, representing 77 per cent of the state's value of turf production (valued at \$69.8 million). This is widespread throughout the region. The Somerset local government area represents 24.8 per cent of the region's value of turf production, Moreton Bay represents 20.9 per cent, Logan represents 19.6 per cent, the Sunshine Coast represents 14.9 per cent and the Scenic Rim represents 11.5 per cent.

Potential

There are 171 987 hectares of the region identified as having potential for annual horticulture production (see Table 13.3 and Map 13.9). Approximately 11.6 per cent (20 001 hectares) of the area identified as having potential for annual horticulture production is currently used for annual horticultural production. The remaining areas are primarily used for grazing (66.9 per cent) and cropping (11.4 per cent).

There are 138 900 hectares of the region identified as having potential for perennial horticultural production (see Table 13.3 and Map 13.10). Approximately 1.8 per cent (2607 hectares) of the area identified as having potential for perennial horticulture production is currently used for perennial horticulture production. The remaining areas are primarily used for grazing (77.4 per cent), cropping (6.6 per cent) and annual horticulture (4.6 per cent).

Annual horticulture is best suited to areas of alluvial soil with minimal slope. Access to moderately reliable water supply is one of the biggest resource-based constraints to development of annual horticulture. However, it is not a resource issue that is preventing people from entering the annual horticulture industry—market access, supply-chain dominance by larger enterprises and oversupply across most fruit and vegetable categories result in a decline in grower returns and profitability.

Along the upper Brisbane River, there are considerable areas of potential not currently being used for horticultural production. The Bremer River also provides areas of expansion potential, but water is considered to be more of a constraint in the Bremer and Fassifern Valley areas.

Areas around Kilcoy and along the Brisbane River have considerable impediments to horticultural production—frost and reliability of water supply limit opportunity to only a few perennial crops. There are some existing avocado, lime and olive orchards established west of Toogoolawah; however, frost along the valley floors and water limitation will impact profitability.

The industry in the region, as with other regions in Queensland, is constrained by the size of operation required to achieve profitability. Significant capital investment is required to establish a new operation of a size that can maintain profitability. This factor, combined with low return on capital investment, is preventing some expansion and new entrants to the industry.

Oversupply of the horticultural market and poor returns act as a constraint to future expansion of the industry. Excess supply into markets brings the price of produce down and limits profitability.

The strawberry industry is considered to be oversupplied, with little opportunity for new entrants. Land prices in the primary berry growing areas north of Brisbane are becoming too expensive to purchase outright. Leasing or sharefarming is a more viable option for those growers who need increased production to chase profitability, but can't afford to purchase land outright.

Macadamia nut production areas are predominantly rain-fed and located around the Glasshouse Mountains and Beerwah. The Cooroy area (Sunshine Coast local government area) has established irrigated macadamia plantations. However, due to land prices and the slope of the land, expansion is not considered viable.

The Wamuran area, north-west of Caboolture, supports multiple crops and has potential for expansion of existing crops. The high rainfall in this area is more of a risk-management issue for the established industries. High rainfall can be managed to some extent by altering farm management techniques, allowing possible crop expansion. Some of the area's most successful strawberry and pineapple farms are in this area.

The Beerwah area supports well-drained, red earths sitting on sandstone, which are suited to macadamia and avocado production.

Intensive livestock

Current

Meat poultry is the largest intensive livestock industry in the South East Queensland region (see Map 13.11 and Table 13.3). The meat poultry produced in the region accounted for 71 per cent of the value of Queensland's poultry meat in 2010–11 (worth \$283.4 million) and is the highest valued animal production industry in the region.

The three major meat poultry growing areas within the South East Queensland region account for almost half of the state's commodity value, with the remaining 21 per cent distributed throughout the region. The three main growing areas are the Moreton Bay local government area (26.2 per cent of the state's value), Sunshine Coast local government area (11.9 per cent) and Scenic Rim local government area (11.6 per cent).

Dairy represents 30.4 per cent (\$78.1 million) of the state's value of milk production. The three major dairy areas are parts of the Scenic Rim local government area (contributing 14.2 per cent or \$36.6 million), Sunshine Coast local government area (6.1 per cent or \$15.7 million) and Somerset local government area (3.6 per cent or \$9.3 million).

Intensive livestock, primarily poultry production, is limited mainly by local government regulations. Some local government areas limit the allocation of land for intensive livestock. There are a few feedlots and piggeries in the region, predominantly in the northern inland areas of the region.

There are a range of aquaculture enterprises throughout the South East Queensland region, including prawns and barramundi farming.

Potential

There are 290 501 hectares (13 per cent) of the region identified as having potential for intensive livestock production (see Map 13.11 and Table 13.3). Approximately 1.9 per cent (5471 hectares) of the area identified as having potential for intensive livestock production is currently used for intensive livestock production (pigs, poultry, dairy and aquaculture). The remaining areas are primarily used for grazing (74.7 per cent), cropping (7.7 per cent) and annual horticulture (7.5 per cent).

Meat chicken farms must be appropriately located on suitable sites, having particular regard to the scale of the farm, land size and location, topography, potential for environmental impacts and potential for impact on surrounding sensitive land uses. New farms should be located on land that is suitably separated from sensitive land uses, yet within proximity to feed suppliers and processing facilities.

Animal welfare considerations need to be managed with location of chicken meat production areas. The code of practice for transportation of meat chickens recommends a maximum of 2 hours (approximately 200 km) transportation distance from farm to processing facilities.

The provision of separation distances between meat chicken farm developments reduces conflict between the development of the meat chicken industry and concerns of the community.

Biosecurity factors, urban encroachment and very specific site suitability factors associated with regulatory and planning constraints limit the potential locations for the expansion of the industry. The industry is seeking to identify suitable areas for industry expansion and/or relocation.⁴

Aquaculture in South East Queensland has some areas of potential; however, the area is relatively minor compared to northern regions in Queensland. The potential areas represent 0.3 per cent (6776 hectares) of the region and occur along the coastal strip. These are coastal aquaculture systems that are land based and discharge to tidal waters (e.g. prawn farms). This requires access to tidal water and specific levels of soil clay content. Aquaculture systems such as land-based recirculating systems or red claw farms do not have the same constraints as coastal aquaculture systems and, therefore, there are many more potential areas for these types of aquaculture development.

Beef feedlots and piggeries are unlikely to expand in the South East Queensland region because of a number of limiting factors, including access to land for effluent disposal, vicinity to feed grain supplies and urban encroachment within the region. Other regions have been identified as having greater capacity to support expansion of these industries.

Grazing

Current

The grazing industry is most evident along river valleys throughout the region (see Maps 13.12, 13.13 and 13.14). The Stanley, Albert and Upper Brisbane river valleys support extensive sections of high yearly pasture production. The Mary River Valley also supports large areas of medium to high yearly pasture production levels.

The Esk and Toogoolawah areas support larger sized properties; however, the quality of the pastures declines on land further away from river valley areas. The lot sizes are larger, as the quality of landscape diminishes to the east of the area and the area supports high yearly pasture production levels overall.

The Fassifern Valley, Upper Lockyer and Boonah areas support grazing; however, as with the Brisbane River Valley, the quality of the landscape declines on land further away from the valley floors.

Considerable fodder production in the region further supports the grazing industry.

Areas closer to peri-urban development—such as Beechmont, Tamborine, the Sunshine Coast hinterland, North Pine and Mt Mee—all provide grazing production areas. However, the smaller lot size across the majority of these areas and the small scale of operations diminish profitability and the ability to operate as a commercial venture. These areas are also popular for horse breeding and management facilities. This constrains accessibility to good-quality grazing country for cattle production within peri-urban fringe areas.

The grazing industry in the South East Queensland region is a major contributor to the value of agricultural commodities for the region (based on 2010–11 figures). Grazing contributed \$122.6 million to the value of agricultural commodities for the region (3.6 per cent of the state's grazing value).

The major grazing production areas within the region are the Scenic Rim, Somerset and Sunshine Coast local government areas (33.8 per cent, 30.8 per cent and 12.3 per cent of the region's value of commodity for grazing respectively)—see Maps 13.12, 13.13 and 13.14. Substantial areas of grazed forested country are also used for native forestry and managed as silvopastoral systems—production systems that combine grazing and forestry in a mutually beneficial way.

⁴ Queensland Farmers' Federation 2011, 'Poultry industry planning—Bromelton', in *Planning case studies: agriculture*, Queensland Farmers Federation, <www.qff.org.au/wp-content/uploads/2012/12/ag-planning-case-studies_incover.pdf>.

Potential

The decline in dairy production in the south and north of the region has opened new opportunities for grazing.

Pasture production across most of the region is considered high, supporting high stocking rates. The region has potential for high-value breeding and finishing operations.

Under current land conditions, the areas of highest potential for grazing in the region are along river valleys (see Map 13.13). Improvements to land management practices and introduction of sown pastures could see production capacity expanded considerably (see Maps 13.13 and 13.14). Currently, 8.0 per cent (173 790 hectares) of the region is used for sown pastures, with potential for expansion of an additional 3.4 per cent (72 528 hectares).

Opportunities exist for increased grazing and timber production in some native forested grazing areas where commercial timber tree species naturally occur. Managing trees through thinning and harvesting to reduce competition and allow remaining trees to grow larger, quicker, also reduces competition on pastures resulting in increased grazing production.

Forestry

Current

South East Queensland is an important forestry production and timber processing region. The region accounts for approximately 15–20 per cent of Queensland’s plantation softwood forestry production and around 20 per cent of native hardwood forestry production for the Queensland timber processing industry.

Forestry production predominately comes from timber resource areas (native and plantation) on state-owned lands administered under the *Forestry Act 1959*, native forest practice notification areas on private (freehold) land under the *Vegetation Management Act 1999* and plantation forestry areas on private land. Most of this land is also grazed and generally managed as silvopastoral systems—production systems that combine forestry and grazing in a mutually beneficial way (see Maps 13.15 and 13.16).

Native forestry currently occurs on state-owned land and private land that is generally also used for grazing (see Map 13.15). Native forestry, which is mostly hardwood in the South East Queensland region, produces a number of forest products including sawlogs, poles, bridging girders, fencing timbers and craftwood for a broad range of appearance, construction and mining purposes. Hardwood fencing timbers are an important resource for grazing and other agricultural land uses.

The key commercial native forestry tree species in the South East Queensland region include spotted gum, forest red gum, grey gum, ironbark, blackbutt, stringybark and rose gum.

On private land (freehold), forest practice notifications (managing, selective felling and removal of native trees for commercial purposes) cover 152 115 hectares (7 per cent of the region)—see Table 13.4. The actual area of production is restricted to the forested areas within those areas (see Map 13.15).

On state-owned land, the denotation of a management unit (MUID)⁵ on the lot on plan indicates commercial native forestry (or quarry material) interests. However, the actual production area is restricted to the forested area within the parcel. There are currently timber interests based on MUIDs on 111 090 hectares (5.1 per cent of the region) (see Table 13.4), recognising that the actual area of native forestry production on state land is restricted to the forested areas. Harvesting of these MUIDs is scheduled on a routine basis in conjunction with the current state timber supply commitments and market demand.

5 MUID—management unit inventory data

Plantation forestry (particularly softwood) in the region is significant in comparison to other Queensland regions, totalling 46 197 hectares (2.1 per cent of the region) (see Table 13.4), predominately located in the higher rainfall and coastal areas. Map 13.16 shows some of the region's softwood plantations growing outside the potential plantation projected areas, which is mostly due to the limitations of the rainfall measurement recording stations. Plantation forestry produces a number of forest products including sawlogs, poles, other round timbers and pulpwood for a broad range of appearance and construction timber processing purposes.

Most of the softwood plantations in the region were established by the Queensland Government for sawlog production from the 1930s to the 1980s. Hardwood plantations in the region were established from the 2000s by private investors and the Queensland Government. The plantation forestry estate on state-owned land was licensed, and on freehold land sold, to private interests in 2010 by the Queensland Government.

The region's softwood plantation estate, just under 40 000 hectares (see Table 13.4), is mostly made up of exotic softwood pine located around Caboolture, Beerburrum and Beerwah, with some smaller areas scattered along the more coastal areas. Other softwood plantation areas are predominately native hoop pine in the Yarraman, Kilcoy and Nanango areas.

The softwood plantation forestry tree species are exotic pine varieties that perform well across a range of soils, particularly less-fertile soils that receive annual average rainfall of greater than 800 mm for 7 out of 10 years, as well as native hoop pine that performs well on the more fertile soils that receive an annual average rainfall of greater than 700 mm for 7 out of 10 years.

The emerging hardwood plantation estate of just over 5000 hectares is located in smaller plantations scattered across the region (see Map 13.16). Hardwood plantations are generally managed as silvopastoral systems. Hardwood plantation forestry tree species are mostly spotted gum, with some Dunn's white gum, Gympie messmate, blackbutt and rose gum. There are also a number of other tree species used in small single- and mixed-species plantations across the region.

Spotted gum and Gympie messmate are performing best over a range of different research trials across the region, although on some specific 'niche' sites and soil types other species have performed as well and sometimes better. Spotted gum is performing quite well across a range of soil types (excluding vertosol soils) that receive annual average rainfall of greater than 700 mm for 7 out of 10 years. Gympie messmate is performing quite well, particularly across more fertile soil types (excluding vertosol soils) that receive annual average rainfall of greater than 700 mm for 7 out of 10 years.

The South East Queensland region supports a number of large, medium- and small-sized plantation timber processing facilities (see Maps 13.15 and 13.16), including a large plantation exotic pine softwood timber processor located near Caboolture. Forest products from the region's native hoop pine plantations are processed at timber processing facilities located inside the region and in the neighbouring Wide Bay Burnett region. The vast majority of hardwood plantations in the region are presently immature and expected to come onstream for harvest after 2025.

The South East Queensland region includes a number of the state's large, medium- and small-sized native hardwood timber processing facilities within or just outside the region that use the region's forest products (see Map 13.16). There are also a number of portable sawmills and fencing timber processors operating in the region that are not mapped. Commercial haul distances can be 400 km or more, although the value of the product will determine the extent of the haul distance.

Potential

There is potential for increased forestry production in the South East Queensland region. Increased forestry production would provide further resource for existing timber processing facilities inside and near the region once increased supply comes onstream.

The potential high, medium and low production areas identified for native forestry expansion in the South East Queensland region are considerable—high 618 852 hectares, medium 151 542 hectares and low 154 725 hectares (28.7, 7.0 and 7.2 per cent respectively of the region's area)—see Table 13.4 and Map 13.15. Opportunities exist to create silvopastoral systems by increasing native forestry production on the mapped potential areas on a long-term basis, while having minimal impacts on the other pastoral land uses.

The potential area identified for plantation forestry expansion in the South East Queensland region is generally limited to the higher rainfall areas—softwood 240 216 hectares and hardwood 210 310 hectares (11.1 and 9.7 per cent respectively of the region's area). The current land uses on potential hardwood plantation areas are grazing (69.9 per cent), sugarcane (5.7 per cent) and other non-agricultural uses (11.4 per cent). For potential softwood plantation areas, the existing land uses are grazing (68.4 per cent), sugarcane (5.5 per cent) and other non-agricultural land uses (17.9 per cent).

Exotic pine (softwood), spotted gum (hardwood) and Gympie messmate (hardwood) varieties are considered the best potential forestry plantation performers for plantation expansion, given the results of research trials in the region. Hardwood plantation forestry expansion has the advantage of being able to be integrated into the existing grazing landscape, particularly with spotted gum and similar tree varieties, by being managed as silvopastoral systems.

High land prices have, in recent times, constrained further plantation forestry development in the region. However, the region has:

- areas with good rainfall that have the capability to produce commercial growth rates (in the areas mapped as potential)
- potential access to a range of existing timber processing facilities, domestic markets (broader south-eastern Queensland) and access to port facilities (Brisbane)
- a low risk of severe cyclone damage and, for some hardwood species, a medium risk of pest/disease damage.

Most existing timber processors in the region have some capacity to expand production if increased log timber becomes available. Demand for hardwood forest products is high, and demand for exotic softwood plantation forest products is medium to high. Demand for forest products is forecast to remain strong in the medium to long term.

Overall, the region is one of the more important forestry production and timber processing output regions in Queensland. There is reasonable opportunity for forestry production growth, which in turn will support growth in the downstream timber processing sector.

Table 13.4 Current and potential land area for forestry

Forestry [†]	Current land use			Potential land use*	
	Area (ha)	Percentage of region	Percentage of ALUC [‡] that occurs in region	Area (ha)	Percentage of region
Plantation forestry (ABARES, HQPlantations, FEA Holdings)					
<i>Hardwood</i>	5 064	0.24	12.13	210 310	9.74
<i>Softwood</i>	39 987	1.85	19.28	240 216	11.12
<i>Mixed species (softwood and hardwood)</i>	61	0.00	20.47	101 316	4.69
<i>Fallow (where plantation not currently planted to trees)</i>	1 085	0.05	6.20		
Total	46 197	2.14			
Native forestry					
<i>State-owned land timber interests (area based on entire lot on plan, forestry restricted to forested area within that)</i>	111 090 [§]	5.14	0.11		
<i>Private land (native forest practice notifications)</i>	152 115	7.04	4.71		
High potential				618 852	28.66
Medium potential				151 542	7.02
Low potential				154 725	7.16
Total	263 205	12.19		925 119	42.84

* Potential areas includes where the majority of current production occurs as well as where production could potentially occur. Refer to Section 13.3 ('Data confidence').

[†] Forestry includes land, irrespective of tenure, that has been established as forestry (native or plantation), but can also be used for other purposes such as grazing. Current plantation forestry locations are developed from data from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), HQPlantations Pty Ltd and Forest Enterprises Australia Holdings (FEA Holdings). Current native forestry is based on data from the Department of Agriculture, Fisheries and Forestry (Queensland) and the Department of Environment and Heritage Protection. 'High potential' = higher value commercial timber species of suitable height for sawlog production. 'Medium potential' = commercial species but trees not of sufficient height for sawlog production or no height information available. 'Low potential' = areas with tree cover but not commercially viable species or may include timber species suitable for forest products other than sawlogs.

[‡] Agricultural land-use categories

[§] MUIDs (management unit inventory data) over leasehold land and reserves generally cover the entire lot on plan, though the actual native forest production area is restricted to the forested area within the lot on plan. Therefore, this figure does not represent the actual area of production.

13.3 Data confidence

The data confidence map (see Map 13.17) indicates that the agricultural land class dataset used as the basis for most of the maps developed for the South East Queensland region (excluding grazing and forestry) was highly varied.

The confidence levels indicate how well the line work, soil data and soil quality information provided match reality. They are determined by how spatially accurate the lines around different soil types are on the map, how much information was available for soil data, how soil quality information was collected, what was collected and the skill of those collecting the information.

Data confidence varies greatly across the South East Queensland region. The majority of the region was considered a low confidence level. There are smaller areas in the Fassifern, Lockyer and Brisbane River valley areas that have a high confidence level. In the north of the region there is a small area of medium confidence. Some areas are mapped as having no data.

Most of the current land-use information used in the audit has been obtained through the Queensland Land Use Mapping Program (QLUMP). Land use is determined through available databases, satellite imagery and aerial photos. As there are difficulties with differentiating land uses using imagery, local expert knowledge and some field surveys have been conducted to verify the data.⁶

The current locations of intensive animal production facilities are derived from the Intensive Livestock Environmental Regulation Unit, within the Department of Agriculture, Fisheries and Forestry (Queensland). The area for intensive land use is based on QLUMP data. Current plantation forestry locations are developed from data from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), HQPlantations Pty Ltd and Forest Enterprises Australia Holdings (FEA Holdings). The location of egg production is based on the Safe Food Production Queensland egg register as at October 2012.

Apart from forestry and intensive livestock (where more up-to-date and specific datasets are available), QLUMP data represents the best available dataset for the other land uses and was used in the identification of current areas of agricultural production.

The QLUMP forestry data is based on state forest boundaries and some plantation forest information is also included (see Table 13.4). However, there is also native forestry on private land and other state land (for which state government information is available). There are also more accurate and up-to-date plantation forestry datasets available from ABARES, HQPlantations and FEA Holdings. Therefore, the forestry analysis (which is based on non-QLUMP datasets) is presented in Table 13.4.

As there will be differences between the current Intensive Livestock Environmental Regulation Unit forestry information and the QLUMP dataset, the current land-use information based on QLUMP data does not represent exact and current figures for land area (as it is a combination of 1999, 2006 and 2009 datasets), but relative areas between the different land-use types.

Intensive animal operations represent a relatively small agricultural footprint. Therefore, differences in datasets for intensive livestock are not likely to significantly impact on the relative proportions of other land uses.

Grazing can be a mixed land use; therefore, the difference between the total area for forestry from QLUMP data and that derived from the other datasets will largely occur in areas where grazing and forestry are occurring on the same land.

When determining the potential for each of the different land uses, a number of assumptions had to be made (as a result of issues such as uncertainties in the mapping). The net result of these assumptions is that the area figures contained in Table 13.3 over-estimate the true potential area for each agricultural land-use category.

⁶ The methods QLUMP apply to mapping land use are described in full in the ABARES handbook *Guidelines for land use mapping in Australia: principals, procedure and definitions* (4th edition), available at http://adl.brs.gov.au/data/warehouse/pe_abares99001806/GuidelinesLandUseMappingLowRes2011.pdf.

13.4 Sources of information

13.4.1 Bibliography

Australian Bureau of Statistics 2010, 8165.0—Counts of Australian businesses, including entries and exits, June 2007 to June 2009, Australian Bureau of Statistics, Canberra.

Australian Bureau of Statistics 2012, 7503.0—Value of agricultural commodities produced, Australia, 2010-11, Australian Bureau of Statistics, Canberra.

Australian Bureau of Statistics 2012, Census of population and housing, 2011 (basic community profile—B17), Australian Bureau of Statistics, Canberra.

Department of Environment and Heritage Protection 2012, *Climate change in the South East Queensland region*, State of Queensland, viewed 15 Jan 2013, <www.ehp.qld.gov.au/climatechange/pdf/regionsummary-seq.pdf>.

Department of Environment and Resource Management 2009, *Regional vegetation management code for South East Queensland bioregion—version 2*, State of Queensland, <www.derm.qld.gov.au/vegetation/pdf/seq_code_nov_2009.pdf>.

Department of Transport and Main Roads 2012, 'Current performance', in *Warrego Highway upgrade strategy: Brisbane to Charleville—connecting Queensland's regions: February 2012*, State of Queensland, <www.tmr.qld.gov.au/About-us/Corporate-information/Publications/Warrego-Highway-Upgrade-Strategy.aspx>.

Psi-Delta Pty Ltd 2011, *Prefeasibility study on the use of recycled water for irrigation in the Logan River area*, Queensland Water Commission.

Queensland Farmers' Federation 2011, 'Poultry industry planning—Bromelton', in *Planning case studies: agriculture*, Queensland Farmers Federation, <www.qff.org.au/wp-content/uploads/2012/12/ag-planning-case-studies_incover.pdf>.

13.4.2 Further studies

Pre-amalgamation shire handbooks

- Boonah Shire (1973)
- Gatton Shire (1972)
- Laidley Shire (1973)
- Beaudesert Shire (1972)
- Caboolture Shire (1973)
- Esk Shire (1973)
- Kilcoy Shire (1971)
- Maroochy Shire (1976)
- Noosa Shire (1972)

Studies

The references marked with an * are available to view (or download) from the Department of Environment and Heritage Protection electronic library at www.ehp.qld.gov.au (click on the 'Library catalogue' link).

Use the search function and the title of the reference to access the relevant documents in PDF format.

Note: Some of these documents are very large (up to 50 MB).

***Beckmann, GG 1967, *Soils and land use in the Beenleigh–Brisbane area, southeastern Queensland*, CSIRO, Melbourne, 59 pp.**

Abstract: The soils of the district—which are derived from sedimentary and metamorphic sedimentary rocks, basalt and alluvium—are described and their behaviour under land use is discussed. Twenty-six associations of the great soil groups present have been mapped and described. Chemical data of significance to agriculture is presented for the major soils.

***Capelin, MA 1987, *Horticulture land suitability study: Sunshine Coast southeast Queensland*, land resources bulletin QV87001, Queensland Department of Primary Industries, 111 pp.**

Abstract: This study (1:100 000) covers an area of approximately 240 000 hectares over part of the shires of Caboolture, Landsborough and Maroochy. The aims of the study were to assess the existing and potential areas for growing horticultural crops, recommend and promote land management practices necessary to maintain a viable horticultural industry, and delineate alternative production areas for horticultural crops on the Sunshine Coast. The electronic version has a full PDF report and maps.

***Christianos, N & Leverington, A 1986, *Irrigation suitability of Teviot Brook area, Boonah, south-east Queensland*, Queensland Department of Primary Industries, 38 pp.**

Abstract: This project was undertaken at a scale of 1:100 000 to identify areas suitable for irrigation and determine likely problems such as salinity. The study area comprises approximately 53 610 hectares from the proposed dam site near Croftby to the junction of Teviot Brook and Logan River. This project consists of digital data, a report and three published maps.

Department of Natural Resources and Mines 2012, *Grazing land management land types—Wet Tropics*, State of Queensland, <<http://dds.information.qld.gov.au/dds/>>.

Abstract: This map is the spatial representation of Queensland grazing land management (GLM) land types. GLM land types are described in terms of their landform, woody vegetation, expected pasture composition (including suitable sown pastures and introduced weeds) and soil characteristics. Limitations of the GLM recommendations are also provided. More than 230 land types from 19 GLM regions in Queensland have been described.

***Forster, BA 1989, *Availability of suitable land for sugar-cane growing: Rocky Point sugar mill area*, Department of Natural Resources and Mines, 40 pp.**

Abstract: The objectives of the study were to provide information on the availability of land suitable for sugarcane growing that is accessible to the mill, and to use this information for long-term land-use planning. This project consists of digital data, a report and eight published maps. The electronic version has PDFs of the full text report and soil maps.

***Franks, HD 1971, *A review of land use and development in south coastal Queensland*, Department of Natural Resources Mines and Energy, Queensland, 48 pp.**

Abstract: This is a generalist document with information on geology, topography, vegetation, pastures and major industries. The electronic version has PDFs of the full report and documentation.

***Harms, BP & Pointon, SM 1999, *Land resource assessment of the Brisbane Valley, Queensland*, DNRQ990065, Department of Natural Resources, Queensland, 149 pp.**

Abstract: The objectives of this project were to survey and document the land resources of the upper Brisbane Valley area for land suitability classification; use the land resource inventory as a basis of classifying land suitability for dryland cropping, irrigated crops, pastures and beef cattle grazing; assess the current state of land degradation in the area; and recommend appropriate agronomic, soil conservation and other land management practices. The electronic version has a full text report and mapping.

***Holtz, GK 1979, *Rocky Point: a sugar cane land suitability study*, technical bulletin no. 38, Department of Natural Resources and Mines, Queensland, 51 pp.**

Abstract: A sugarcane land suitability study was completed for 15 200 hectares within the Rocky Point mill area. The mill is located approximately 40 km south of Brisbane and 12 km east of Beenleigh. Sugarcane production in the Rocky Point mill area in 1977 was 29 683 tonnes of sugarcane from 123 growers and worth nearly \$6 million. Initially, the land was mapped into land units that had similar soils, vegetation and topography. These were delineated following air photo interpretation and field traverses. The 10 land units described were then evaluated in terms of their suitability for growing sugarcane. Within the study area, 9010 hectares were found to be suitable for cane production and 6190 hectares unsuitable. This area of suitable land should provide for at least a 50 per cent expansion above the current mill peak of 33 340 tonnes of sugar. The electronic version has PDFs of a full text report and soil maps.

***Leverington, AR 1985, *Potential irrigation areas of south-east Queensland*, QO85010, Queensland Department of Primary Industries, 44 pp.**

Abstract: This project was an inter-departmental study into potential water requirements for industrial, agricultural and urban use in south-eastern Queensland. Knowledge of potential water requirements is necessary for the future planning and allocation of water supplies. The region is an important agricultural zone. Although it contains only 5 per cent of Queensland's total area, it contains over 50 per cent of the state's current cropping lands, the majority of which are on the Darling Downs. Only 4 per cent of the area cropped in the study region is currently irrigated. Salinity and erosion are the two major land degradation issues of importance in the study. The electronic version has a PDF of the full report.

***Loi, JK & Armbruster, JV 1997, *Soils and land suitability: the Beechmont Plateau south east Queensland*, land resources bulletin DNRQ97161, Department of Natural Resources, Queensland, 22 pp.**

Abstract: A resource survey was conducted to provide an understanding of the physical constraints on land use and the criteria that determine land suitability for specific land uses. The soil and land characteristics of a total of 51 sites were described in detail. Land was assessed for climatically suitable agricultural land uses—macadamia, forage crops and kikuyu pasture. The electronic version contains PDFs of a full text report and mapping.

***Loi, JK, Griffiths, SC & Steentsma, W 2005, *Land and agricultural suitability assessment of the Boonah area south east Queensland*, lands resource bulletin QNRM05241, Queensland Department of Natural Resources and Mines, 61 pp.**

Abstract: This assessment of the Boonah area is a medium-intensity soil survey at 1:50 000 and 1:100 000 in the steeper areas. The recommended uses are agricultural production areas, pasture production areas, management of small catchments and shire planning (agricultural areas). The electronic version has PDFs of a full text report and maps.

***Loi, JK & Malcolm, DT 1998, *Soils and land suitability: the Kilcoy–Woodford area south east Queensland*, DNRQ980015, Department of Natural Resources and Mines, Queensland, 83 pp.**

Abstract: The Kilcoy–Woodford area covers an area of about 18 700 hectares. The land resource survey scale was also to provide an understanding of the physical constraints on land use and the criteria that determine land suitability for specific land uses. Land was assessed for climatically suitable crops—sorghum, maize, crucifers, potatoes, macadamia, citrus and rye grass. The electronic version has PDFs of the full report and maps.

***Loi, JK, Malcolm, DT & Armbruster, JV 1998, *Soils and land suitability: the Kenilworth–Conondale area south east Queensland*, DNRQ97165, Department of Natural Resources and Mines, Queensland, 66 pp.**

Abstract: The Kenilworth–Conondale area covers an area of about 4800 hectares. The land resource survey was to provide an understanding of the physical constraints on land use and the criteria that determine land suitability for specific land uses. The soils and land characteristics of 131 sites were described in detail. Land was assessed for climatically suitable crops—sorghum, maize, soybean, crucifers, potatoes, macadamia, citrus and rye grass. The electronic version has a full text report and maps.

***Paton, TR 1971, *A reconnaissance survey of soils in the Boonah–Beaudesert district, Queensland*, soils and land use series no. 52, CSIRO, Adelaide, 47 pp.**

Abstract: The main rural industries are dairying and grazing for beef production, using native pastures with some supplementary forage crops. Potatoes are grown under irrigation in the upper valleys of Reynolds and Warrill creeks. Rural development is generally of a low intensity, except in the Fassifern scrub area and along the main valley floors. About 10 per cent of the total area is too steep or broken to be used economically under the present farming system. The electronic version has a full text report and soil maps.

Pitayarak, A 1986, 'An assessment of land capability for irrigation in a subcatchment of the Lockyer Valley', Dip.Agr.St thesis, University of Queensland, <https://www.researchgate.net/publication/36252709_An_assessment_of_land_capability_for_irrigation_in_a_subcatchment_of_the_Lockyer_Valley>.

Abstract: This thesis examines irrigation response and soil characteristics of land in a sub-catchment of the Lockyer Valley (includes maps).

***Powel, BJ, Loi, JK & Christianos, NG 2002, *Soils and irrigated land suitability of the Locker Valley alluvial plains, south-east Queensland*, QNRM01215, Department of Natural Resources and Mines, Queensland, 116 pp.**

Abstract: The Lockyer Valley is located east of the Great Dividing Range in south-eastern Queensland. It is a major tributary catchment for the Brisbane River, and a fertile valley of 2890 km² that is used for intensive agriculture. The climate is subtropical with summer-dominant rainy seasons. At present, over 25 000 hectares of soils occupying the alluvial plain and colluvial footslopes are intensively irrigated and produce about 40 per cent of Queensland's vegetable requirements. The alluvial soil landscapes on which these activities are based have been surveyed at a 1: 50 000 scale and assessed for suitability for a range of crops. The electronic version has a full report and soil maps.

Queensland Government 2002, *Acid sulfate soils of the Logan–Coomera area, south-east Queensland*, State of Queensland, <<http://dds.information.qld.gov.au/dds/>>.

Abstract: This dataset is an acid sulfate soils map for the Logan–Coomera area of south-eastern Queensland. It shows the presence, type and average depth of acid sulfate soil layers in polygons interpreted as relatively homogenous acid sulfate environments. A combination of soils description, laboratory testing, elevation and geology data, and air photo interpretation was used to construct the map. This mapping is at a nominal scale of 1:25 000 and is restricted to coastal areas below 5 m Australian Height Datum. However, the effective scale of each map polygon varies based on the number of soil description sites within it. This map may be used for strategic land-use planning. It is also appropriate for a very general preliminary assessment of acid sulfate hazard at property scale.

Queensland Government 2003, *Acid sulfate soils—Tweed Heads to Nerang River, south-east Queensland*, State of Queensland, <<http://dds.information.qld.gov.au/dds/>>.

Abstract: This dataset is an acid sulfate soils map for the Tweed Heads to Nerang River area of south-eastern Queensland. It shows the presence, type and average depth of acid sulfate soil layers in polygons interpreted as relatively homogenous acid sulfate environments. A combination of soils description, laboratory testing, elevation and geology data, and air photo interpretation was used to construct the map. This mapping is at a nominal scale of 1:25 000 and is restricted to coastal areas below 5 m Australian Height Datum. However, the effective scale of each map polygon varies based on the number of soil description sites within it. This map may be used for strategic land-use planning. It is also appropriate for a very general preliminary assessment of acid sulfate hazard at property scale.

Queensland Government 2006, *South East Queensland (part catchment) NRM region landuse 2006*, State of Queensland, <<http://dds.information.qld.gov.au/dds/>>.

Abstract: This dataset is a digital land-use map of the South East Queensland sub-catchments comprising Noosa, Maroochy, Caboolture, North Pine, South Pine, Bremer, Logan, Albert and Stanley. Note that the remaining sub-catchments of Brisbane, Lockyer Creek, Coomera and Nerang, and Stradbroke and Moreton islands have not been mapped. As near as possible it indicates the primary use or management objective of the land for the region in 2006.

Summers, P 1995, *Agriculture and agricultural land use in Noosa Shire*, Noosa Town Planning Department, Noosa Shire Council, Queensland, 28 pp.

Abstract: This is a review of land use in the Noosa Shire.

Thompson, WP 1991, *Main report agricultural land capability study: Blackall Range, for Shire of Maroochy*, Resource Planning Services, Maroochy Shire Council, Queensland, 29 pp.

Abstract: This is a study of agricultural capability and soil types of the Blackall Range.

Map 13.2 Water resources

This map provides an overview of current water resources and water infrastructure.

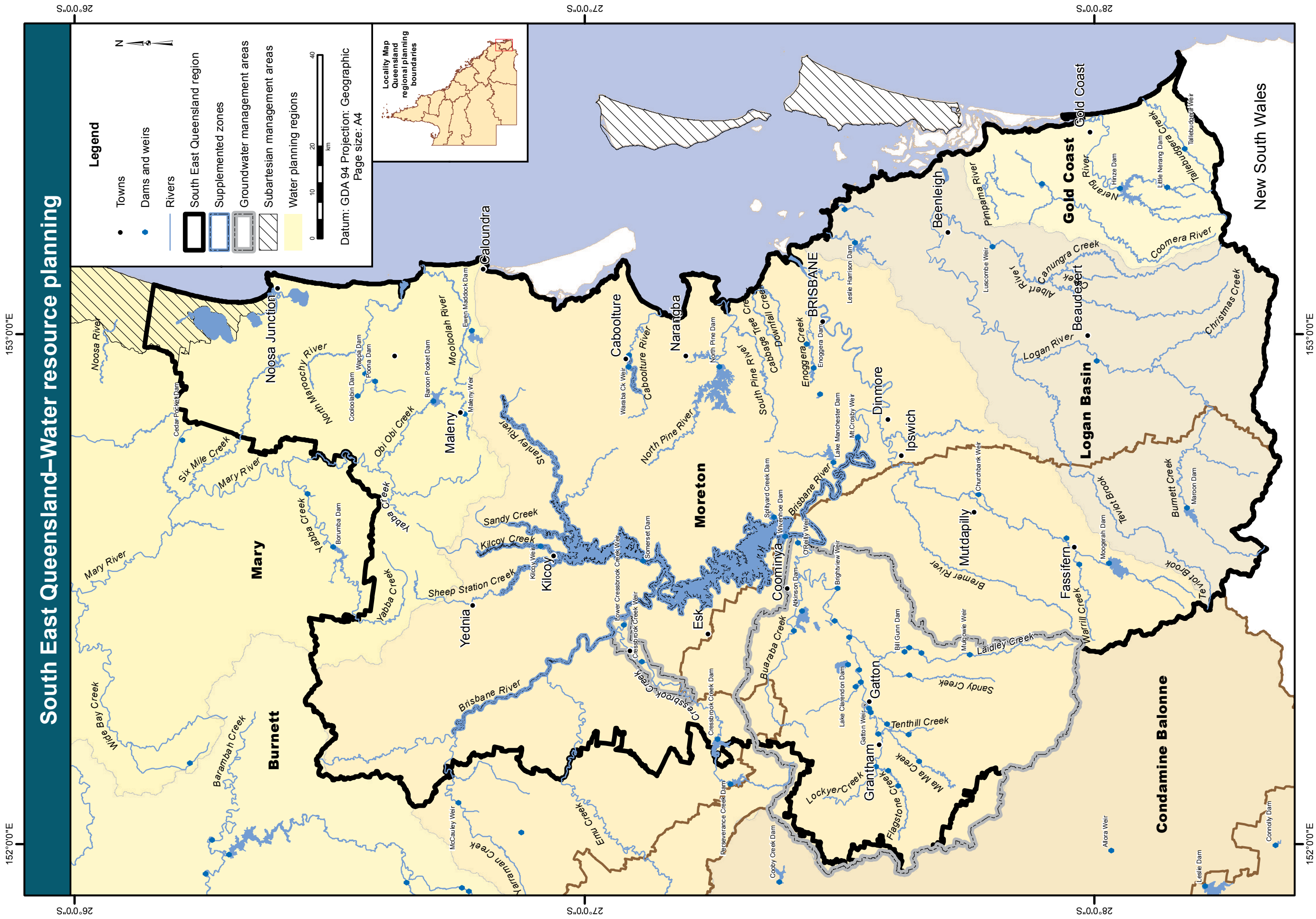
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South East Queensland—Water resource planning



Map 13.3 Infrastructure

This map shows key infrastructure components, major agricultural processing plants and natural features relevant to current and future agricultural development within the region.

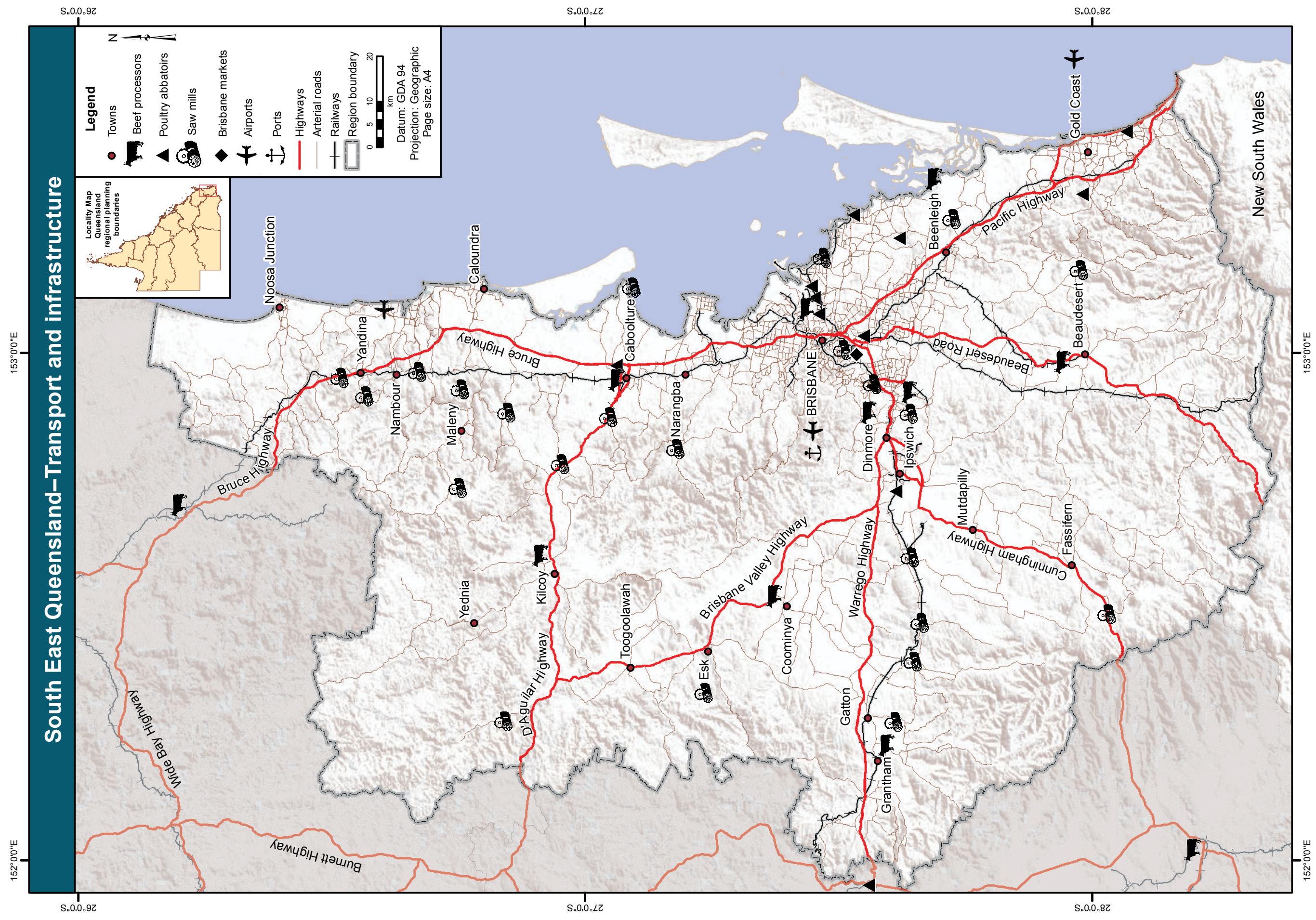
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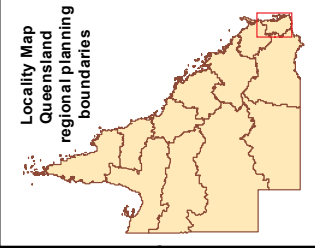
South East Queensland—Transport and infrastructure



Legend

- Towns
- Beef processors
- Poultry abattoirs
- Saw mills
- Brisbane markets
- Airports
- Ports
- Highways
- Arterial roads
- Railways
- Region boundary

Datum: GDA 94
Projection: Geographic
Page size: A4



Map 13.4 Vegetation management

This map shows land where, based on currently available information, agricultural use is potentially impacted by the provisions of the *Vegetation Management Act 1999* or associated Regulations protecting native vegetation. It has been compiled from information available to the audit at 28 September 2012 and reflects the legislative and policy regime in place at that time. The map shows areas where no clearing is permitted and areas where clearing requires further verification.

'Clearing requires further verification' can be split into two categories. Category A is where clearing for agriculture purposes may be constrained to varying levels under the Vegetation Management Act. These areas need further verification on the ground, depending on the types of activities taking place. Land that is category A has been denoted:

- high-value regrowth
- or
- Schedule 4 Grassland regional ecosystem—homogeneous or heterogeneous polygons
- or
- Schedule 5 Grasslands—heterogeneous polygons.

Category B indicates land for which regional ecosystems have not been reliably mapped. This land may or may not contain areas of regional ecosystems where clearing for agriculture purposes is constrained under the Vegetation Management Act. This land requires regional ecosystem mapping before its status can be confirmed. Land that is in this category has been denoted remnant vegetation on the 'remnant map' as per the description on the Department of Environment and Heritage Protection website at www.ehp.qld.gov.au (search 'remnant vegetation').

'No clearing permitted' identifies land for which clearing for agriculture purposes is constrained under the Vegetation Management Act. This land has been denoted:

- remnant vegetation other than Schedule 4 Grasslands on the regional ecosystem map and
- category A or B on a PMAV.

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**South East Queensland
Restrictions on clearing
based on the
Vegetation Management Act (1999)**

Uncoloured areas within region are
already cleared or have no restrictions
to clearing

Legend

- No clearing permitted
- Clearing requires further verification
- National parks and state forests
- Region boundary
- Roads
- Rivers
- Towns

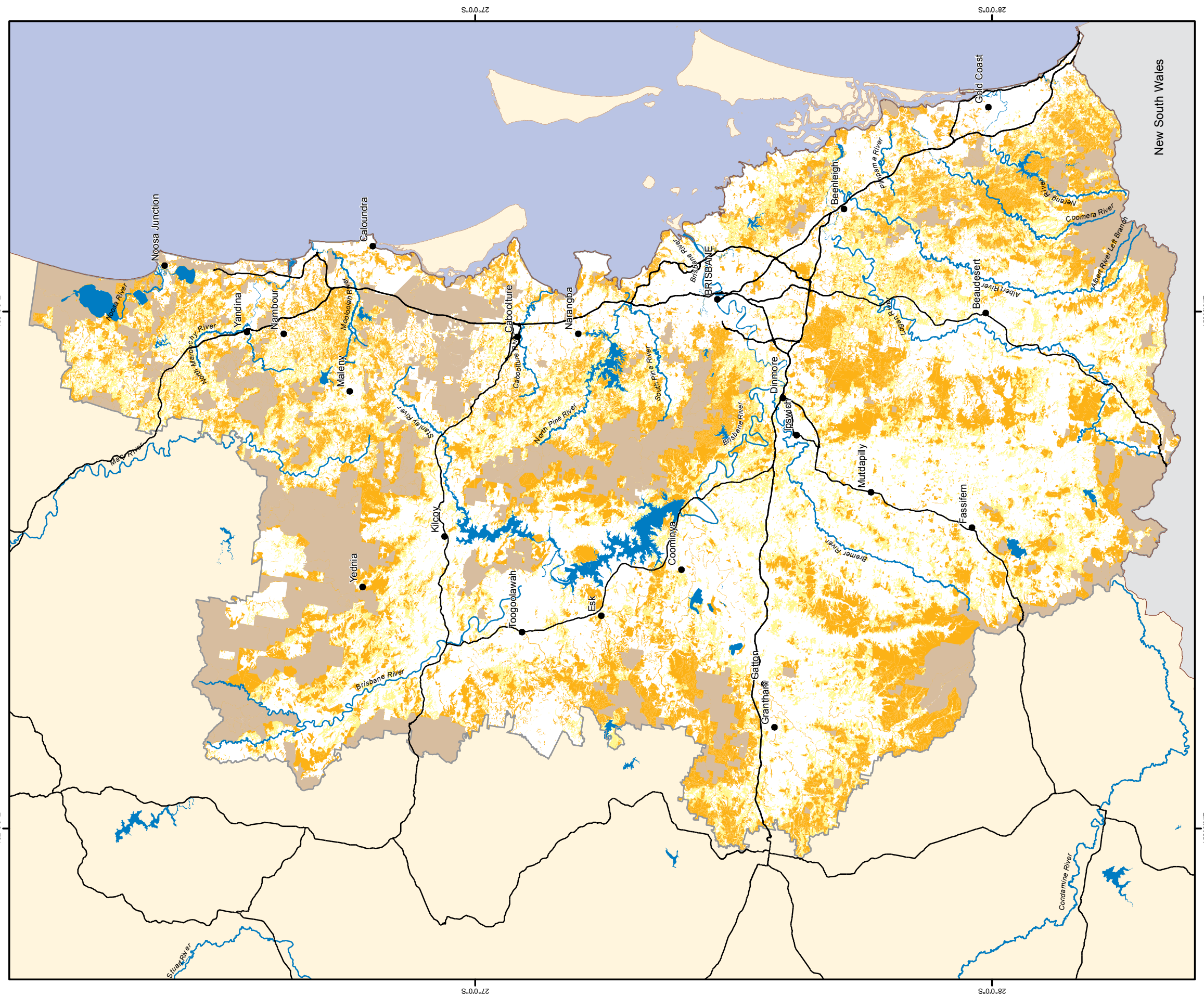
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Page size: A3

1:750,000

0 5 10 20 30 40 km

N

Locality Map
Queensland
regional planning
boundaries



Map 13.5 Current land use

This map shows the extent and distribution of land used for each of the agricultural land-use classes adopted by the audit. It has been produced mainly using data collected by QLUMP. QLUMP mapping has been generated using a combination of satellite image interpretation and ground validation. Its nominal scale is 1:100 000 and for this region it is current as at 1999, 2006 and 2009. Visit www.derm.qld.gov.au (search 'QLUMP') for further information about QLUMP. Forestry plantations are mapped using data provided by ABARES and HQPlantations and state forest boundaries have been extracted from the Queensland Government tenure spatial layer.

Data sources are under licence from:







































































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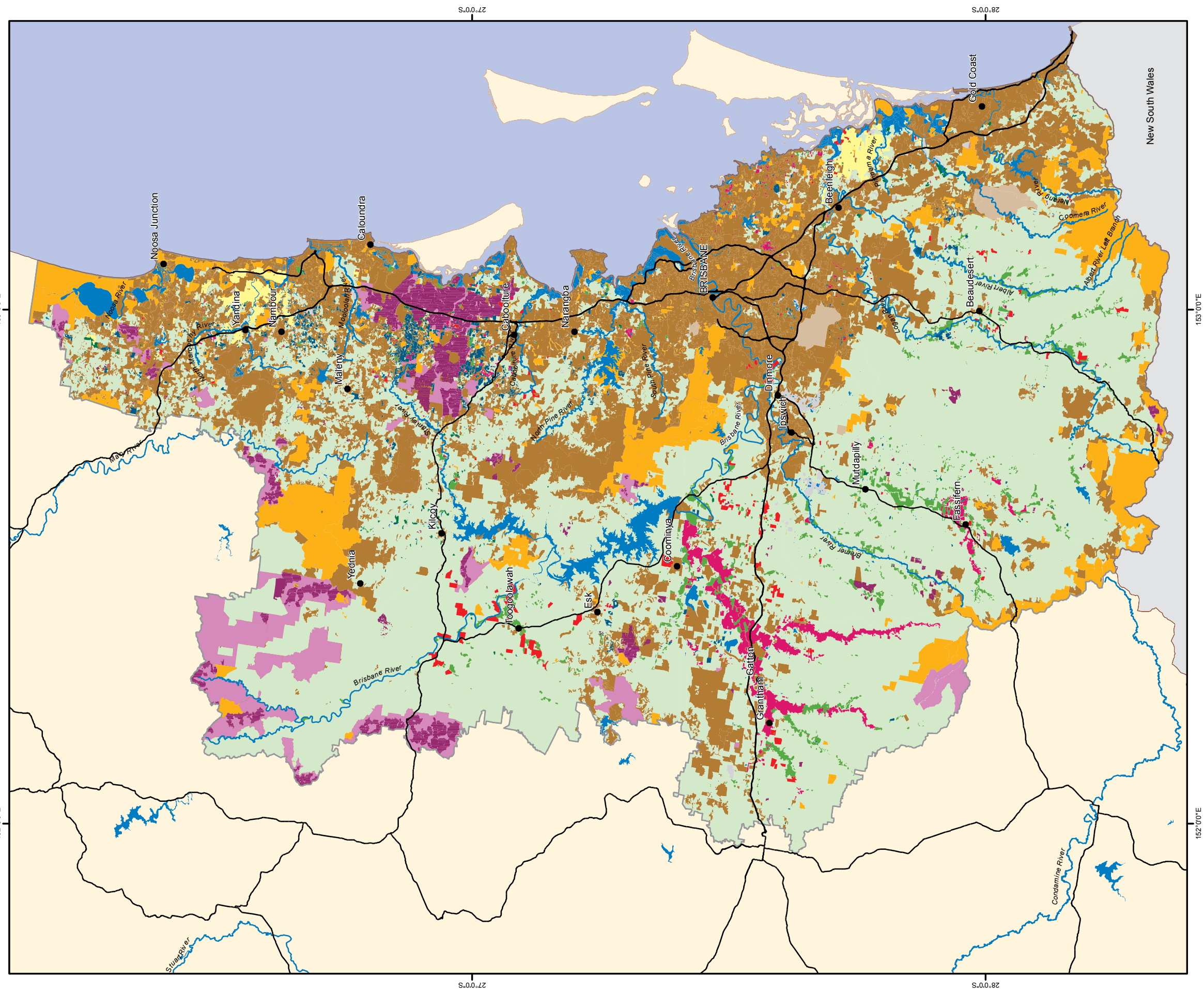
**South East Queensland
Current land use based on QLUMP
data (fragmented areas dated
1999, 2006 and 2009) and other
data sources for forestry
(see explanatory notes)**

Legend

 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Grazing	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation
 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Mining	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation
 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Water	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation
 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Region boundary	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation
 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Roads	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation
 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Rivers	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation
 Current forestry plantations	 State Forest	 Annual horticulture	 Perennial horticulture	 Cropping	 Towns	 Intensive animal production	 Sugarcane	 Defence	 Nature conservation

Datum: GDA 94 Projection: Geographic
Page size: A3
Scale: 1:750,000

Locality Map
Queensland
regional planning
boundaries



Map 13.6 Important agricultural areas

This map shows the important agricultural areas identified by the audit within this region. An area is identified by the audit as being important for agriculture if it has all the requirements for agriculture to be successful and sustainable, is part of a critical mass of land with similar characteristics and is strategically significant to the region or the state. The areas shown on this map have been identified by the audit on the basis of advice from regional and industry experts and from synthesis of maps and information on current and potential use of land for the range of agricultural land uses considered by the audit. The information used to derive this map varies in its spatial accuracy and resolution. In recognition of these limitations, the information has been generalised for use in strategic decision-making at the regional level. It is indicative only of broad areas within which land important for agriculture is located. More detailed investigation to map the spatial extent and location of important land would be required before the information is suitable for finer scale decision-making such as in statutory land-use planning.

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South East Queensland
Important agricultural land areas

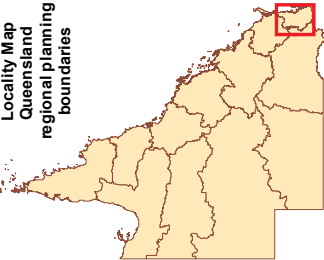
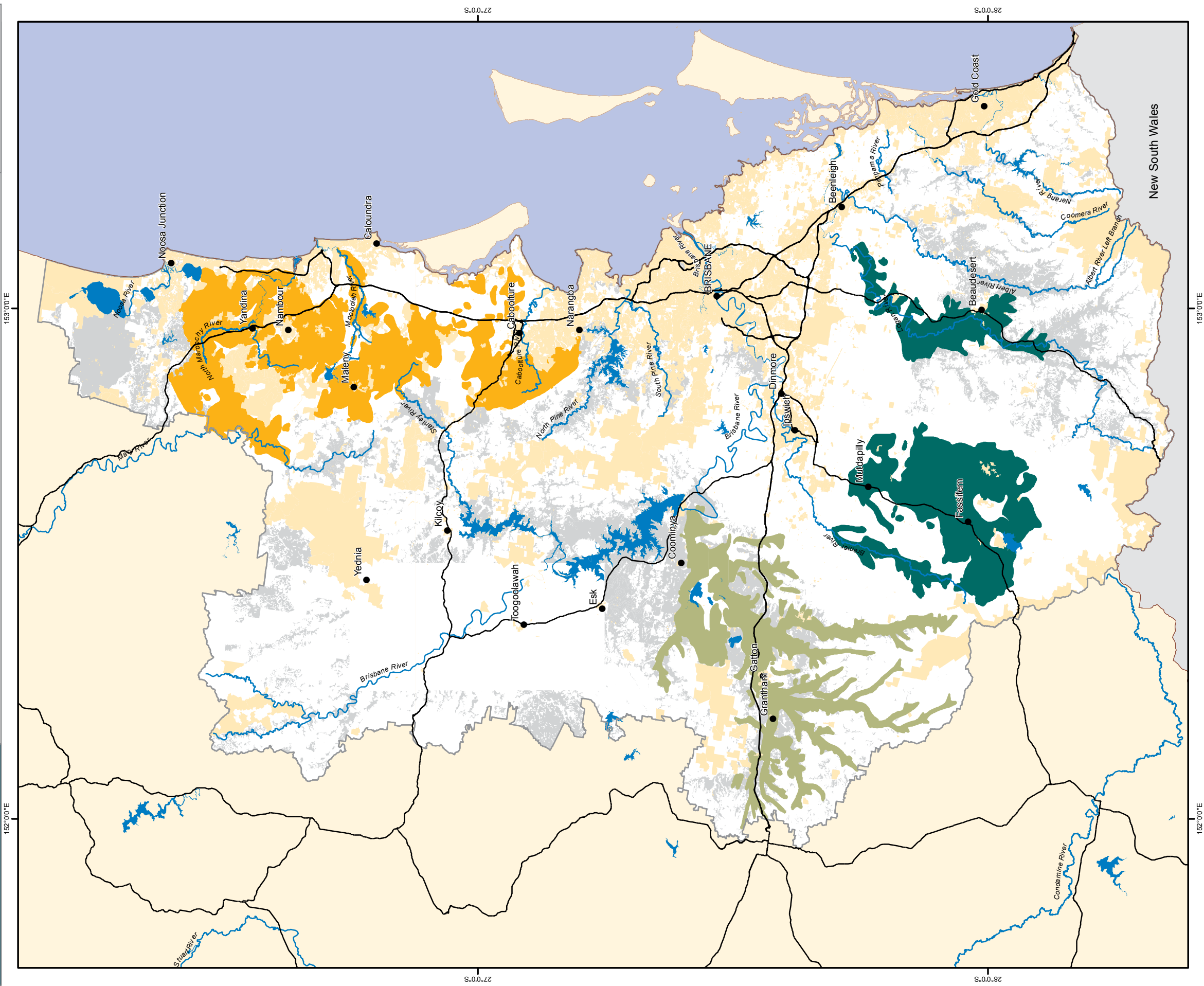
Legend

 Lockyer Valley	 ALC data gaps
 Scenic Rim	 Region boundary
 Sunshine Coast and Upper Moreton	Roads
 Areas excluded from potential (see explanatory notes)	Rivers
	Towns

Datum: GDA 94, Projection: Geographic
Page size: A3

Scale: 1:750,000
0 5 10 20 30 40 km

Locality Map
Queensland regional planning boundaries

Map 13.7 Broadacre cropping

This map shows land identified by the audit as currently being used for the agricultural land-use category 'broadacre cropping' (rain-fed or irrigated). It also shows land identified as not currently used for broadacre cropping but having potential to be used for this purpose. Land shown as currently being used for broadacre cropping has been identified on the basis that it was mapped by QLUMP as secondary class 'cropping' or 'irrigated cropping'.

Land shown as having potential for broadacre cropping:

- a) **includes** land of agricultural land class (ALC) A with slope less than 8 per cent and mean annual rainfall greater than 450 mm for 7 out of 10 years
- b) **excludes** land that is urban, intensive use (such as mining), national park, state forest, managed by the Department of Defence or permanently under water.

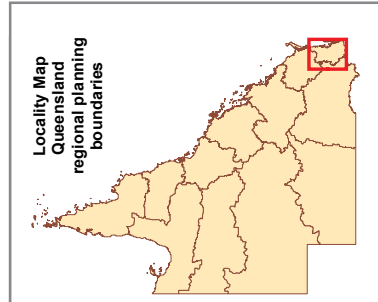
In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for broadacre cropping should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water for irrigation (see Map 13.2). See Section 13.1 for further constraints.

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Legend

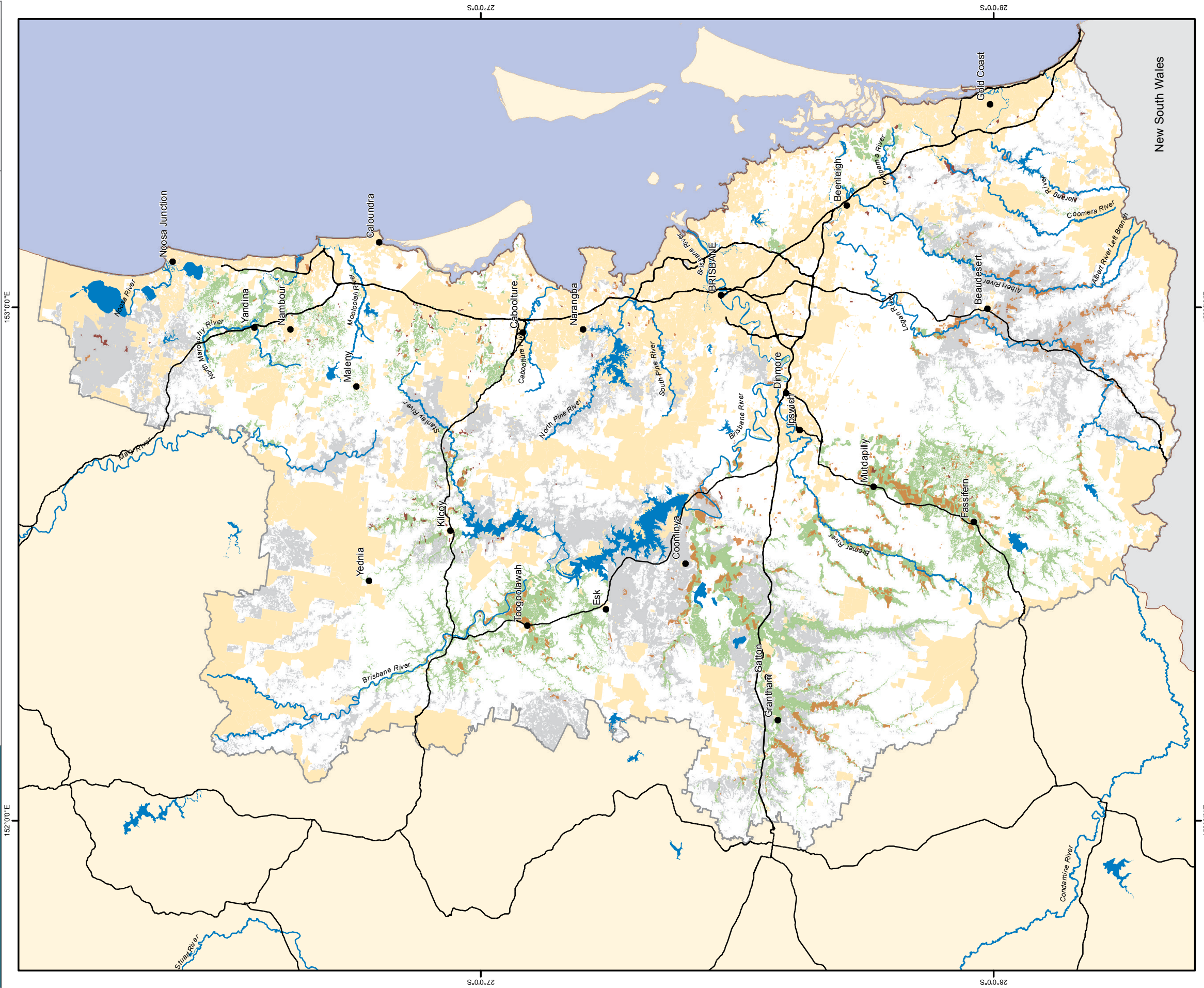
Potential cropping	ALC data gaps
Current cropping	Region boundary
Current irrigated cropping	Roads
Areas excluded from potential (see explanatory notes)	Rivers
	Towns

Datum: GDA 94, Projection: Geographic
Page size: A3

Scale: 1:750,000
0 5 10 20 30 40 km

**South East Queensland
Biophysical potential for
broadacre cropping and
current broadacre cropping**

Potential based on ALC 'A', slope <8%,
rainfall >450mm 7 in 10 years



Map 13.8 Sugarcane

This map shows land identified by the audit as currently being used for sugarcane cultivation. It also shows land identified as not currently used for sugarcane cultivation but having potential to be used for this purpose. Land shown as currently being used for sugarcane cultivation has been identified on the basis that it was mapped by QLUMP as tertiary class 'sugarcane'.

Land shown as having potential for sugarcane cultivation:

- a) **includes** land of agricultural land class A and class B with slope less than 5 per cent and fewer than 55 days per year with a minimum temperature of 9 °C or less
- b) **excludes** land that is urban, intensive use (such as mining), national park, state forest, managed by the Department of Defence or permanently under water.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

Access to a sugar mill is an important consideration in determining the potential for land to be used for growing sugarcane. The locations of current mills are shown on the map for information.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for sugarcane cultivation should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water for irrigation (see Map 13.2). See Section 13.1 for further constraints.

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**South East Queensland
Biophysical potential for sugarcane
and current sugarcane**

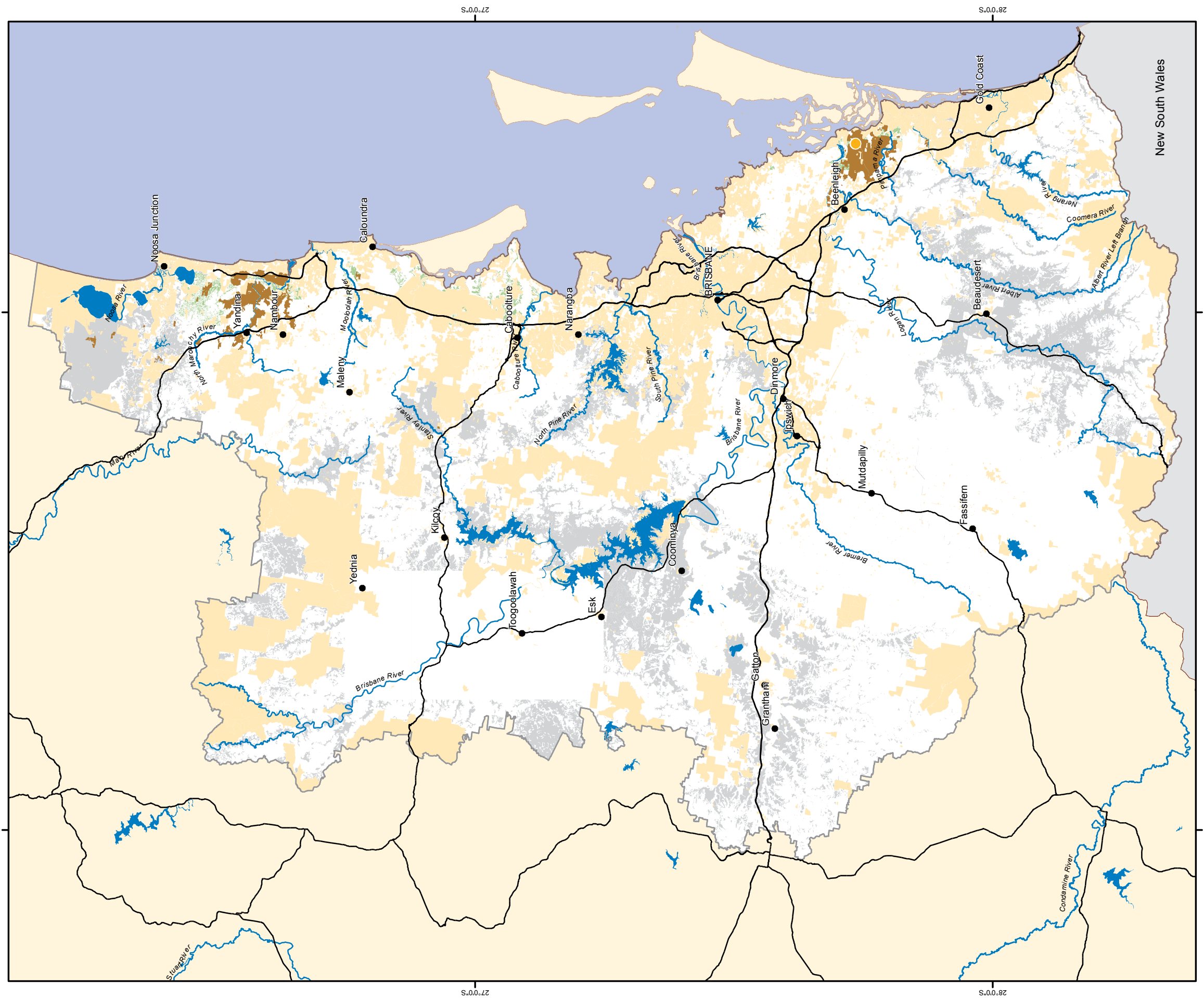
Potential based on ALC 'A' and 'B',
slope <5%, <55 days per year where
minimum temperature $\leq 9^{\circ}\text{C}$

Legend

- Potential sugarcane
- Current sugarcane production
- Areas excluded from potential (see explanatory notes)
- ALC data gaps
- Region boundary
- Sugar mills
- Roads
- Rivers
- Towns

Datum: GDA 94 Projection: Geographic
Page size: A3
1:750,000
0 5 10 20 30 40 km

Locality Map
Queensland
regional planning
boundaries



Map 13.9 Annual horticulture

This map shows land identified by the audit as currently being used for the agricultural land-use category 'annual horticulture'. It also shows land identified as not currently used for annual horticulture but having potential to be used for this purpose. Land shown as currently being used for annual horticulture has been identified on the basis that it was mapped by QLUMP as 'seasonal horticulture', 'irrigated seasonal horticulture' or 'intensive horticulture'.

Land shown as having potential for annual horticulture:

- a) **includes** land of agricultural land class A and class B with slope less than 8 per cent and April to October rainfall less than 600 mm
- b) **excludes** land that is urban, intensive use (such as mining), national park, state forest, managed by the Department of Defence or permanently under water.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

Also, the audit **did not consider** temperature or flood risk. Temperature is a major determinant of suitability of land for horticulture. It affects whether a crop can grow and its performance. However, due to the large range of different horticultural crops grown in Queensland and the widely variable temperature requirements for these crops, it is not possible to determine meaningful criteria for temperature for the category 'annual horticulture'. Flood risk is similarly difficult to map. Reliable data on flood frequency and severity currently exists for comparatively few parts of the state and the extent to which agricultural land use and management are affected by flooding varies greatly from farmer to farmer depending on their individual circumstances and perceptions.

Availability of labour, especially during harvest season, is an important consideration in selecting suitable land for many forms of annual horticulture. To reflect this, areas that are within 50 km of a centre with a population of 2000 or more are highlighted on the map. However, labour is not always a critical factor (e.g. for crops that are mechanically harvested) and the size and proximity of the nearest population centre is not always the best surrogate for labour force availability (e.g. many horticultural businesses make extensive use of itinerant seasonal workers or backpackers).

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for annual horticulture should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water for irrigation (see Map 13.2). See Section 13.1 for further constraints.

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**South East Queensland
Biophysical potential
for annual horticulture and
current annual horticulture**

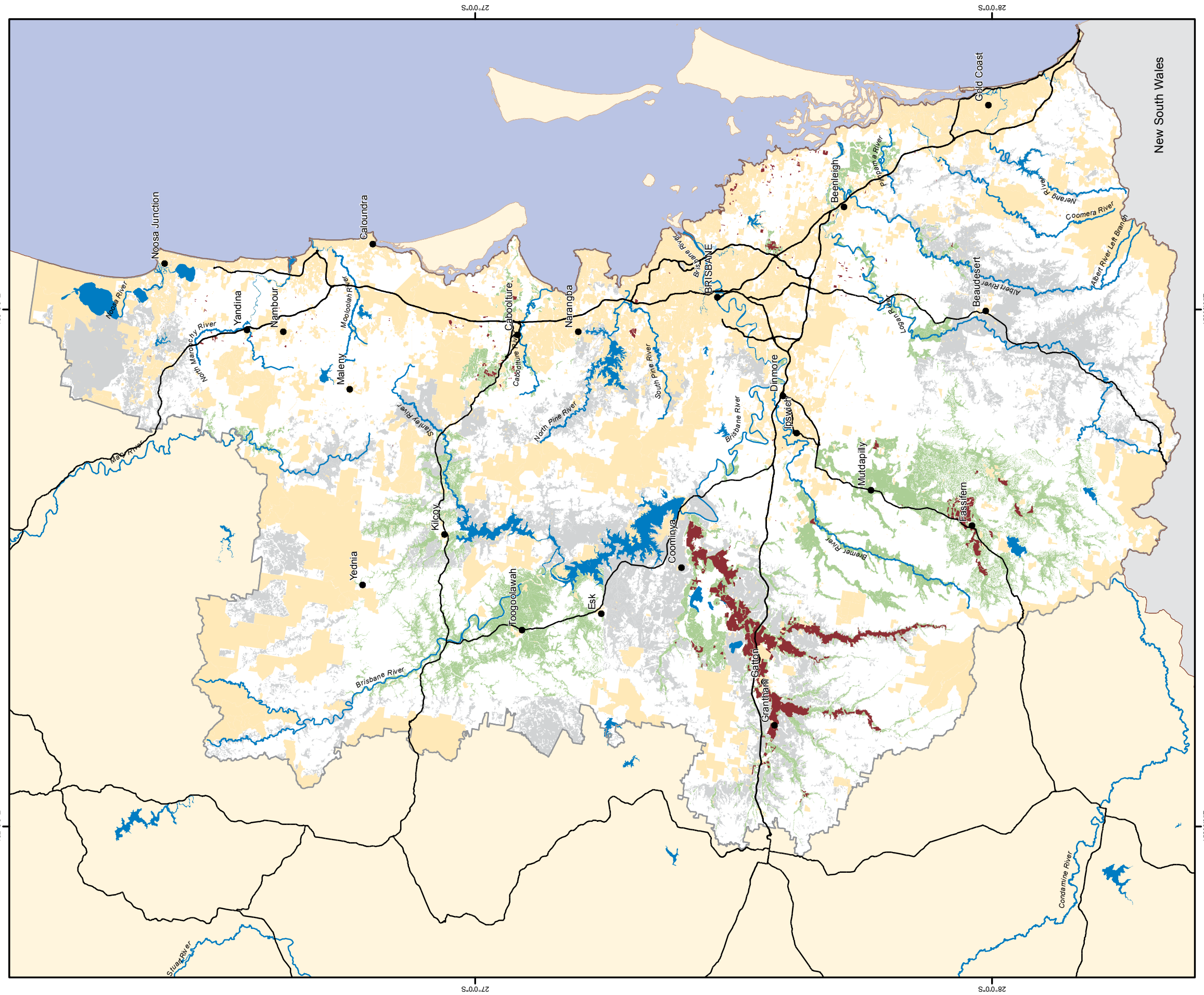
Potential based on ALC 'A' and 'B',
slope <8%,
April - October rainfall <600mm

Legend

- Potential annual horticulture
- Current annual horticulture
- Areas excluded from potential
(see explanatory notes)
- ALC data gaps
- Region boundary
- Roads
- Rivers
- Towns

Datum: GDA 94, Projection: Geographic
Page size: A3
1:750,000
0 5 10 20 30 40 km

Locality Map
Queensland
regional planning
boundaries



Map 13.10 Perennial horticulture

This map shows land identified by the audit as currently being used for the agricultural land-use category 'perennial horticulture' (rain-fed or irrigated). It also shows land identified as not currently used for perennial horticulture but having potential to be used for that purpose. Land shown as currently being used for perennial horticulture has been identified on the basis that it was mapped by QLUMP as 'perennial horticulture' or 'irrigated perennial horticulture'.

Land shown as having potential for perennial horticulture:

- a) **includes** land of agricultural land class A and class B with slope less than 15 per cent and April to October rainfall less than 600 mm
- b) **excludes** land that is urban, intensive use (such as mining), national park, state forest, managed by the Department of Defence or permanently under water and land that has cracking clay soils.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

Also, the audit **did not consider** temperature or flood risk. Temperature is a major determinant of suitability of land for horticulture. It affects whether a crop can grow and its performance. However, due to the large range of different horticultural crops grown in Queensland and the widely variable temperature requirements for these crops, it is not possible to determine meaningful criteria for temperature for the category 'perennial horticulture'. In addition, the inability to map microclimates at the appropriate scale means that temperature cannot be included in the criteria. Flood risk is similarly difficult to map. Reliable data on flood frequency and severity currently exists for comparatively few parts of the state and the extent to which agricultural land use and management are affected by flooding varies greatly from farmer to farmer depending on their individual circumstances and perceptions.

Availability of labour, especially during harvest season, is an important consideration in selecting suitable land for many forms of perennial horticulture. To reflect this, areas that are within 50 km of a centre with a population of 2000 or more are highlighted on the map. However, labour is not always a critical factor (e.g. for crops that are mechanically harvested) and the size and proximity of the nearest population centre is not always the best surrogate for labour force availability (e.g. many horticultural businesses make extensive use of itinerant seasonal workers or backpackers).

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for perennial horticulture will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water for irrigation (see Map 13.2). See Section 13.1 for further constraints.

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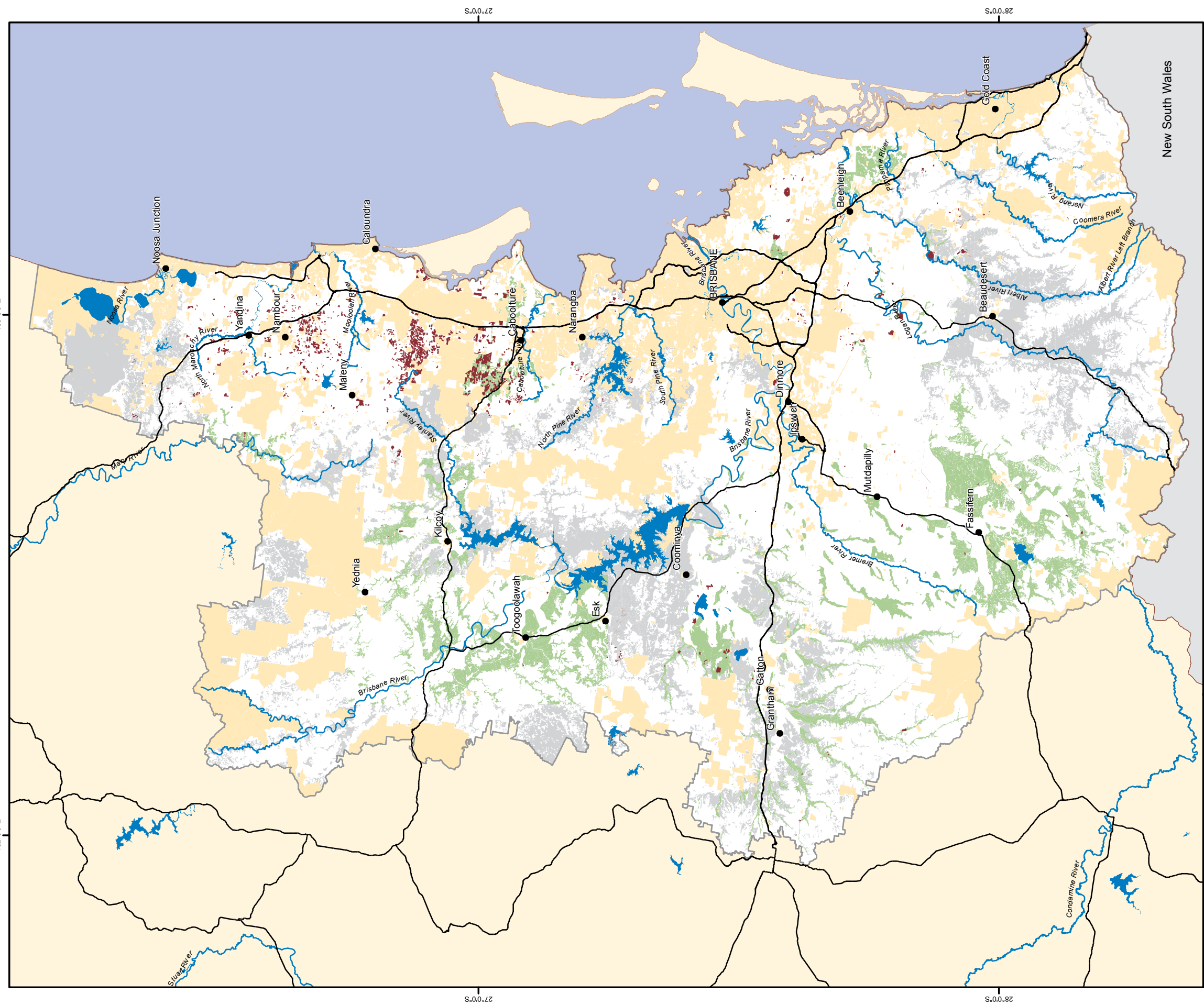
**South East Queensland
Biophysical potential for
perennial horticulture and
current perennial horticulture**

Potential based on ALC 'A' and 'B',
slope <15%,
April - October rainfall <600mm,
no cracking clays

Legend

- Potential perennial horticulture
- Current perennial horticulture
- Areas excluded from potential
(see explanatory notes)
- ALC data gaps
- Region boundary
- Roads
- Rivers
- Towns

Scale: 1:750,000
Datum: GDA 94, Projection: Geographic
Page size: A3



Map 13.11 Intensive livestock

This map shows land identified by the audit as currently being used for the agricultural land-use category ‘intensive animal industries’ (feedlot cattle and pigs). It also shows land identified as not currently being used for intensive animal industries but having potential to be used for that purpose. Land shown as currently being used for intensive animal industries has been identified on the basis that it is listed in the database of the Department of Agriculture, Fisheries and Forestry (Queensland) Intensive Livestock Environmental Regulation Unit. Cattle feedlots are only included where they have a capacity greater than 150 head. Individual intensive animal enterprises are smaller in area than enterprises involved in other agricultural land-use categories and most intensive animal enterprises would not be visible when represented to scale on audit maps. Because of this, the spatial extent of each current intensive animal enterprise is not shown; instead, each enterprise is mapped using a symbol centred on the centroid of the property.

Major beef abattoirs are shown on the map for information. Their locations have not been used in the analysis to identify land with potential for intensive beef industries as the location of many other smaller-scale abattoirs or country butchers that process animals was not available and therefore it could not be determined where access to processing was a constraint on potential intensive animal production.

Land shown as having potential for intensive animal industries:

- a) **includes** land of agricultural land class A and class B (and class C1 where it is within 10 km of current cropping) with slope less than or equal to 8 per cent
- b) **excludes** land that is urban, intensive use (such as mining), national park, state forest, managed by the Department of Defence or permanently under water.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for intensive animal industries should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water (see Map 13.2) and natural resource regulations such as those for vegetation management.

Aquaculture—current and potential

This map shows land identified by the audit as currently being used for the agricultural land-use category ‘aquaculture’. It also shows land identified as not currently used for aquaculture but having potential to be used for that purpose. Land shown as currently being used for aquaculture has been identified on the basis that it was mapped by QLUMP as the tertiary class ‘aquaculture’. Individual aquaculture enterprises are smaller in area than enterprises involved in other agricultural land-use categories and most aquaculture enterprises would not be visible when represented to scale on audit maps. Because of this, the spatial extent of each current aquaculture enterprise is not shown; instead, each enterprise is mapped using a symbol centred on the centroid of the property.

Land shown as having potential for aquaculture:

- a) **includes** land that is within 2 km of an estuarine water source, is above the highest astronomical tide and has an elevation less than 10 m, slope less than 5 per cent and clay content greater than 20 per cent
- b) **excludes** land that is urban, intensive use (such as mining), national park, state forest, managed by the Department of Defence, permanently under water, fish habitat area, of high ecological significance or mapped as containing acid sulfate soils.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

The map also shows areas where there are vulnerable groundwater systems. Contamination of groundwater systems is an important consideration in selecting sites for aquaculture enterprises. However, mapping of groundwater vulnerability in Queensland is relatively coarse and a range of measures can be used to mitigate this risk. Therefore the occurrence of vulnerable groundwater is not included in the criteria for mapping potential for aquaculture but is shown on the map for information.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for aquaculture should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water for irrigation (see Map 13.2). See Section 13.1 for further constraints.

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**South East Queensland
Biophysical potential for cattle
feedlots, piggeries and marine
aquaculture and current intensive
animal production and aquaculture**

Feedlots and piggeries potential: 'A' + 'B'
class land + 'C1' class land within 10km
of current cropping, slope ≤8%

Marine aquaculture potential: within 2km
of estuarine water source, above HAT,
<10m elevation, soil >20% clay content

Legend

Beef processors	Potential marine aquaculture area
Current cattle feedlots (over 150 head)	Current aquaculture sites
Poultry abattoirs	Areas excluded from potential (see explanatory notes)
Current poultry producers	ALC data gaps
Egg processors	Region boundary
Current egg producers	Roads
Current piggeries	Rivers
	Towns

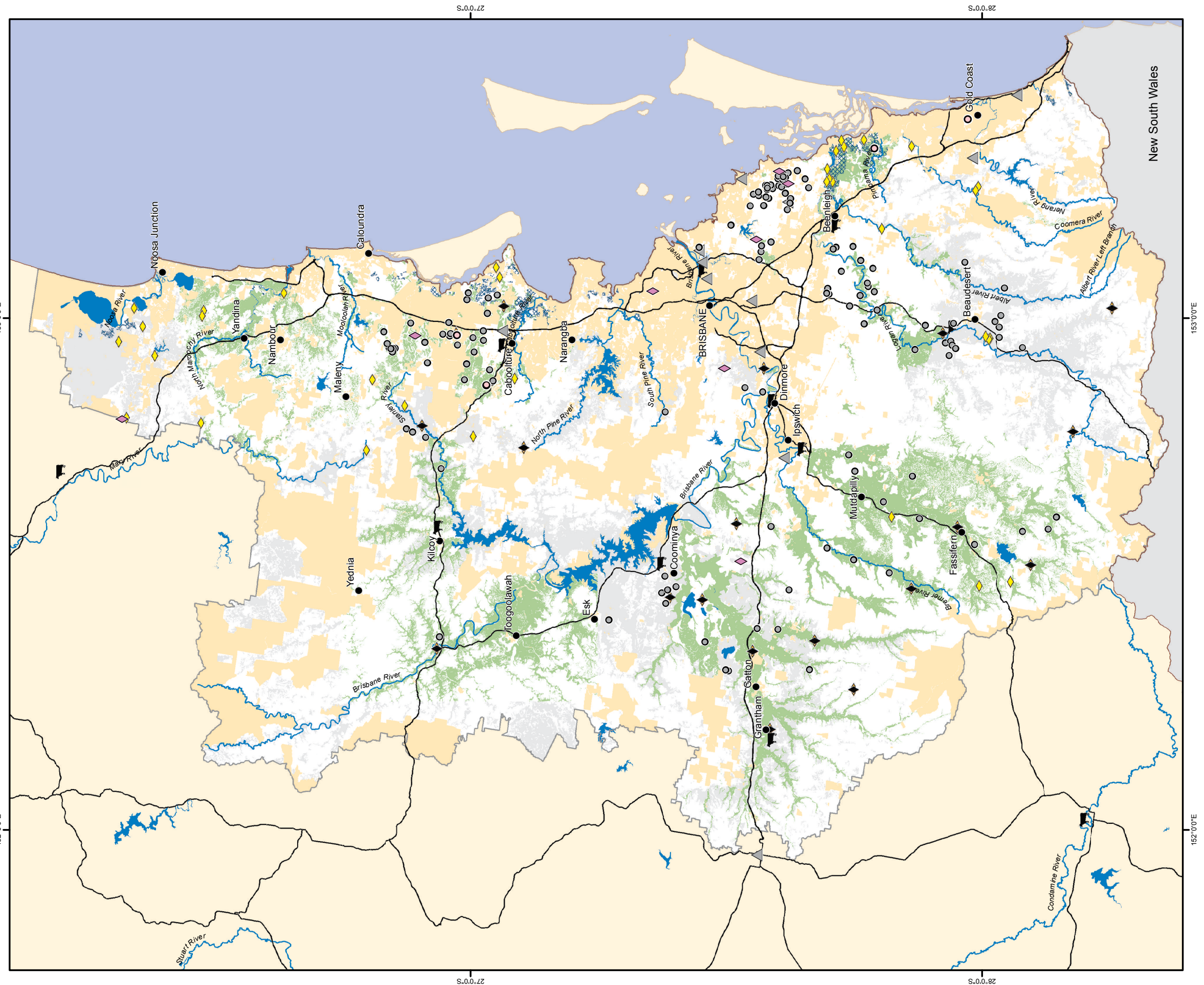
Datum: GDA 94 Projection: Geographic
Page size: A3

Scale: 1:750,000

0 5 10 20 30 40 km

N

Locality Map
Queensland
regional planning
boundaries



Map 13.12 Current pasture production (land condition B)

This map shows the current pasture biomass production that was modelled by the audit. For the purpose of this modelling, the land was assumed to be in fair condition (grazing land management (GLM) class B).

Current modelled pasture biomass production of land:

- a) is **calculated** using the GRASP model of pasture biomass production (www.longpaddock.qld.gov.au—search ‘GRASP’) parameterised for each GLM land type (<http://futurebeef.com.au>) and discounted according to the amount of existing tree basal area on the land (as mapped by SLATS) and with pasture condition set to B (<http://futurebeef.com.au>)
- b) **excludes** production from land that is urban, intensive use (such as mining), national park, managed by the Department of Defence or permanently under water.

In modelling this production, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses or competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

It should not be assumed from this study that the current modelled pasture biomass production of all land (or any particular portion of land) will be achieved. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by natural resource regulations such as those for vegetation management.

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South East Queensland
Current yearly pasture production
 (long term average)

GRASP model, modified by
 tree basal area and land condition (B)

Legend

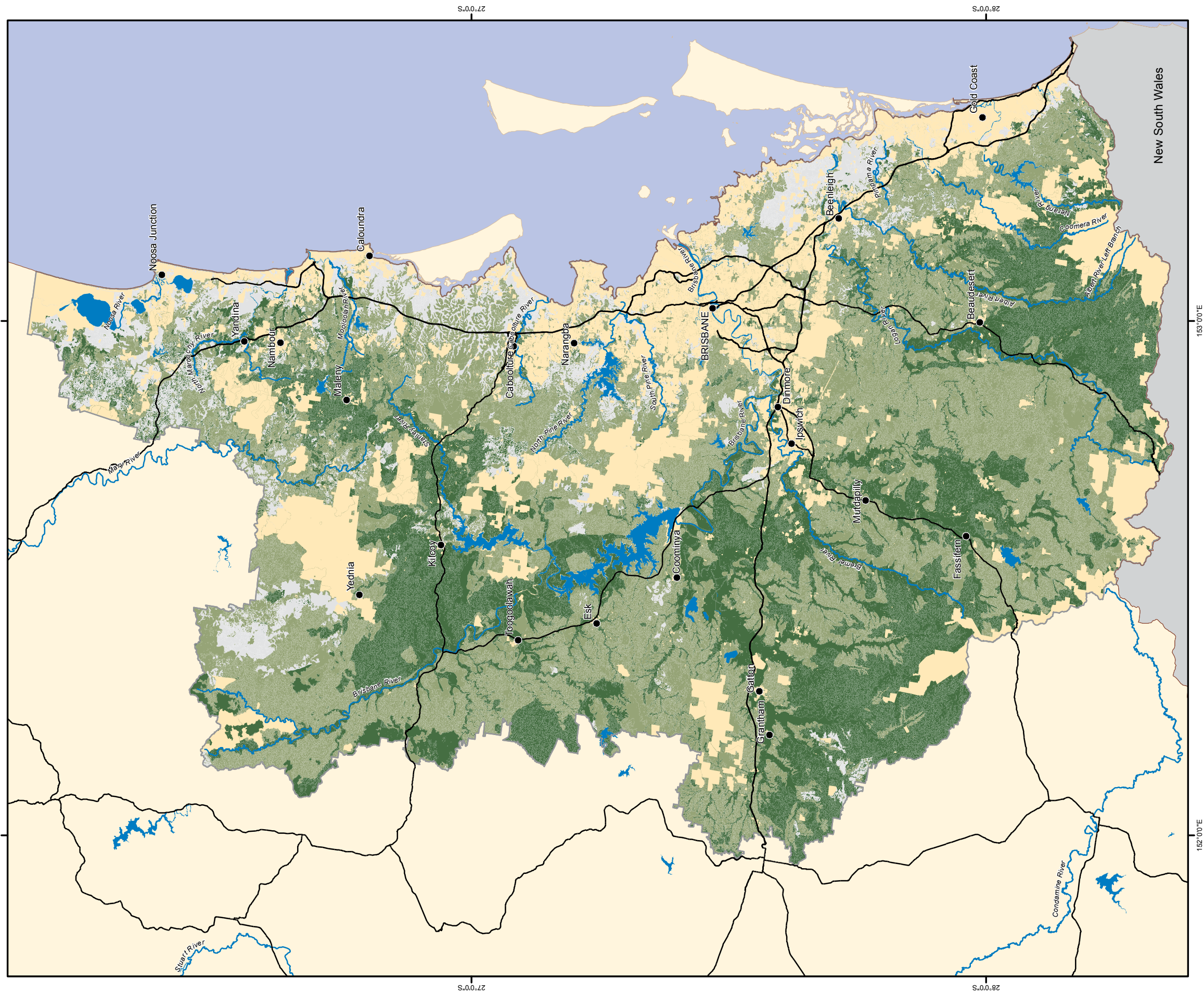
Yearly pasture production (long term average) (Dry matter yearly growth in kg/ha)	Areas excluded from potential (see explanatory notes)
High >3500	Region boundary
Medium 1500-3500	Roads
Low <1500	Rivers
	Towns

Datum: GDA 94 Projection: Geographic
 Page size: A3

1:750,000

0 5 10 20 30 40 km

Locality Map
 Queensland
 regional planning
 boundaries



Map 13.13 Potential pasture production (land condition A)

This map shows the potential pasture biomass production that was modelled by the audit. For the purpose of this modelling, the land was assumed to be in good condition (GLM class A).

Potential modelled pasture biomass production of land:

- a) is **calculated** using the GRASP model of pasture biomass production (www.longpaddock.qld.gov.au—search ‘GRASP’) parameterised for each GLM land type (<http://futurebeef.com.au>) and discounted according to the amount of existing tree basal area on the land (as mapped by SLATS) and with pasture condition set to A (<http://futurebeef.com.au>)
- b) **excludes** production from land that is urban, intensive use (such as mining), national park, managed by the Department of Defence or permanently under water.

In modelling this production, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

It should not be assumed from this study that the potential modelled pasture biomass production of all land (or any particular portion of land) will be achieved. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by natural resource regulations such as vegetation management.

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South East Queensland
Potential yearly pasture production
(long term average)

GRASP model, modified by
 tree basal area and land condition (A)

Legend

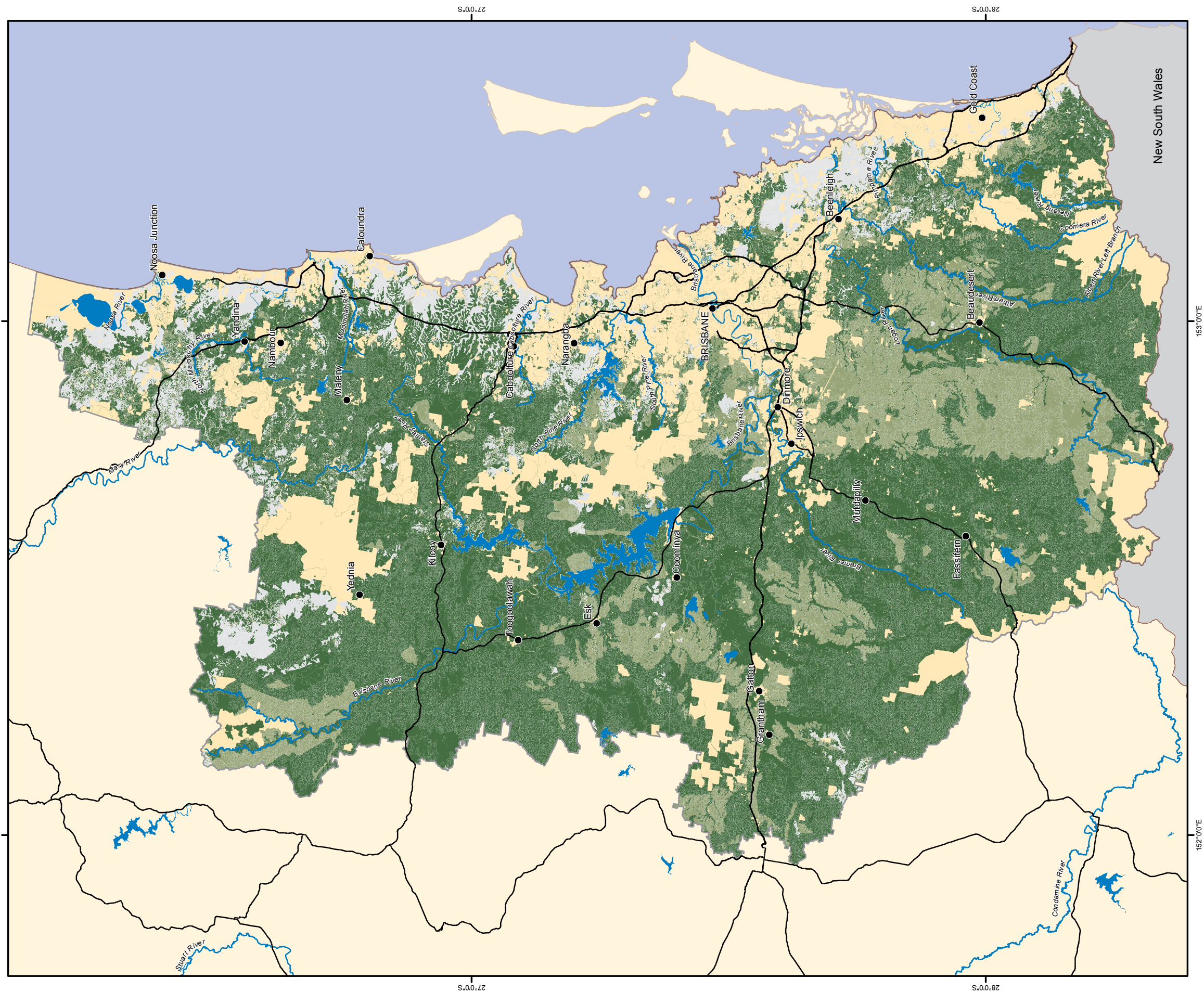
Yearly pasture production (long term average) (Dry matter yearly growth in kg/ha)	Areas excluded from potential (see explanatory notes)
High >3500	Region boundary
Medium 1500-3500	Roads
Low <1500	Rivers
	Towns

Datum: GDA 94 Projection: Geographic
 Page size: A3

Scale: 1:750,000

0 5 10 20 30 40 km

Locality Map
 Queensland
 regional planning
 boundaries



Map 13.14 Sown pastures

This map shows land identified by the audit as currently sown to pasture grasses. It also shows land identified as not currently sown to pasture grasses but having potential to be used for that purpose. For the purpose of the audit, sowing of pastures is considered to be the deliberate introduction of pasture grass varieties and species. It includes distribution of pasture grass seed preceded by cultivation or other management actions (such as fire) to create conditions conducive to successful establishment of the introduced grasses. It does not include naturalised introduction of exotic grasses without deliberate management or the supplementation of native grass pastures with introduced legumes. It is not possible with the data and tools available to the audit to map the occurrence of these supplemented pastures.

Land shown as currently sown to pasture has been identified using the approach outlined by Peck et al. (2010). This is land that currently has no (or very little) tree cover, has a mean annual rainfall greater than 500 mm and is of a GLM land type (<http://futurebeef.com.au>) that is considered to be suitable for pasture improvement. Land that is urban, intensive use (such as mining), national park, managed by the Department of Defence, permanently under water or currently cropped is **excluded**.

Land shown as having potential to be used for sown pastures:

- a) **includes** land of a GLM land type that is considered to be suitable for establishing and maintaining sown pasture but currently has trees on it
- b) **excludes** land that is urban, intensive use (such as mining), national park, managed by the Department of Defence or permanently under water.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses or competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to support improved pastures will or should be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example natural resource regulations relating to vegetation management.

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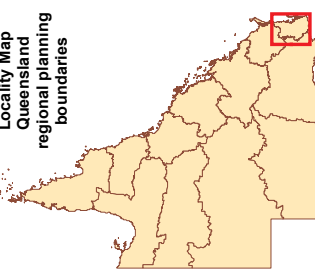
South East Queensland
 Areas suitable for grass species
 and areas predicted to have
 sown grass species established

Legend

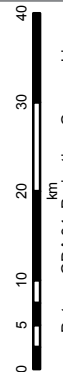
- Sown grasses present in a significant density
- Potential for broadscale introduction of sown grass species
- Low potential for broadscale introduction of sown grass species
- Areas excluded from potential (see explanatory notes)
- Region boundary

- Roads
- Rivers
- Towns

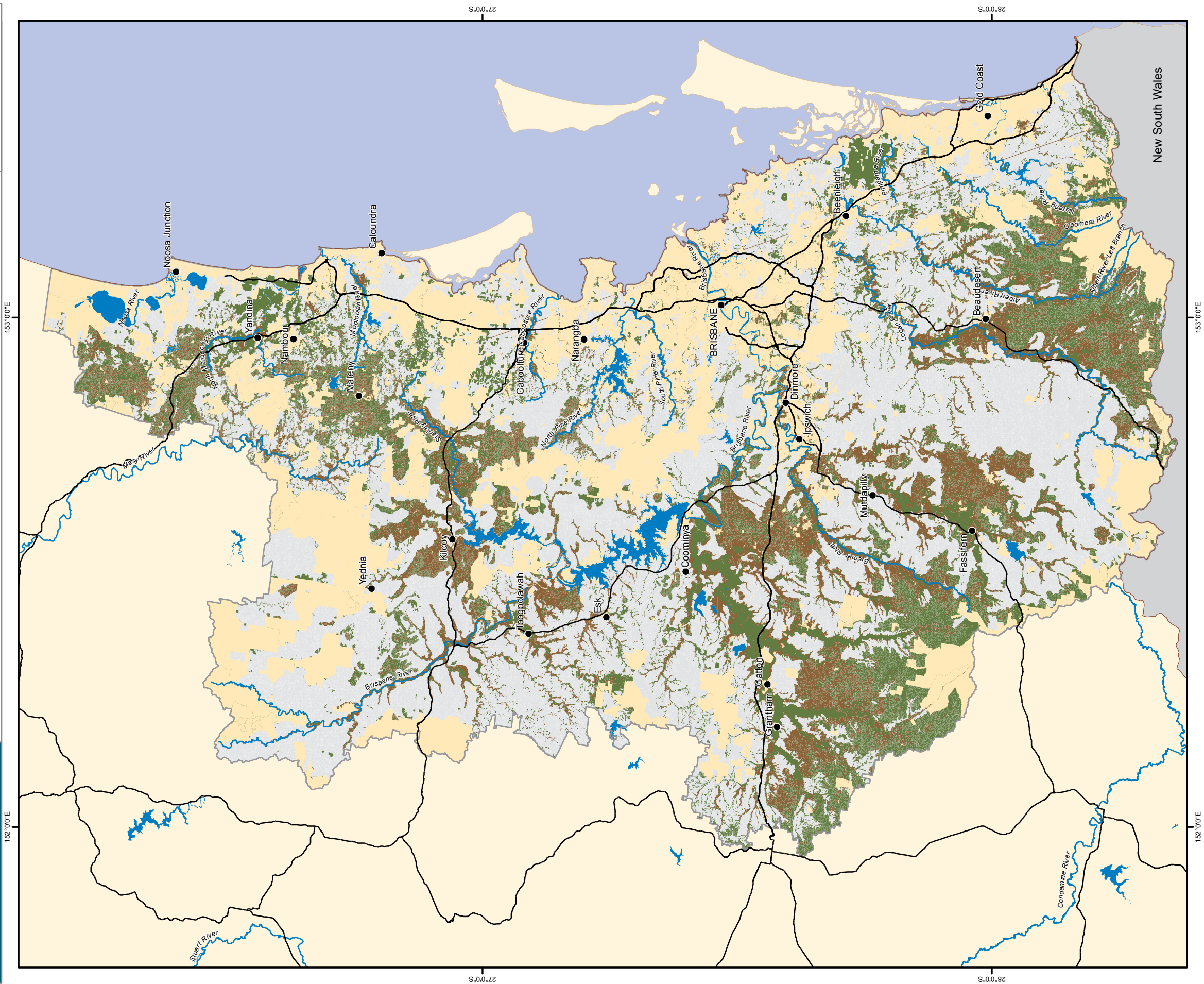
Locality Map
 Queensland regional planning boundaries



Scale: 1:750,000



Datum: GDA94 Projection: Geographic Page size: A3



Map 13.15 Native forestry

This map shows land identified by the audit as currently being used for production of sawlogs and/or other timber products from native forestry. This land has been identified on the basis that it is either freehold land that is covered by a forest practice notification under the *Vegetation Management Act 1999* or is state-owned land over which the Queensland Government has a timber interest (as indicated by it being covered by a Department of Agriculture, Fisheries and Forestry (Queensland) Forestry Division MUID).

The map also shows land identified as not currently being used for production of sawlogs and/or other timber products from native forestry but having potential to be used for that purpose.

For land to be rated by the audit as having potential for sawlog as well as non-sawlog timber production, it must also be a regional ecosystem that contains species (as listed in the REDD description) known to produce commercial sawlogs. For land to be listed as high potential for sawlog production, the canopy top height for that regional ecosystem must also exceed the threshold determined by the audit as indicating high-productivity site conditions for production of sawlogs of that type.

Land shown as having potential for native forestry:

- a) **includes** land that is mapped as currently having a woody vegetation canopy of greater than 15 per cent (SLATS foliage projective cover)
- b) **excludes** land that is cleared of forest, urban, intensive use (such as mining), national park, managed by the Department of Defence or permanently under water.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

Access to processing facilities can also be a major consideration in determining the potential for land to be used for native forestry. However, it was not possible in this analysis to determine with any confidence what the critical threshold distances are. Therefore, while the locations of existing sawmills are shown on the map as a general guide to those interested in considering this factor, distance from sawmills has not been included in the analysis.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for native forestry should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by natural resource regulations such as those for vegetation management.

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**South East Queensland
Biophysical potential
for native forestry
and current native forestry**

Potential based on commercial tree
species, tree height, FPC >15%

Legend

- High potential for sawlog and non-sawlog products
- Potential for sawlog and non-sawlog timber products
- Potential for non-sawlog timber products only
- Forest practice notifications on private land (Vegetation Management Act 1999)
- State owned land timber interests (Forestry Act 1959)
- Areas excluded from potential (see explanatory notes)

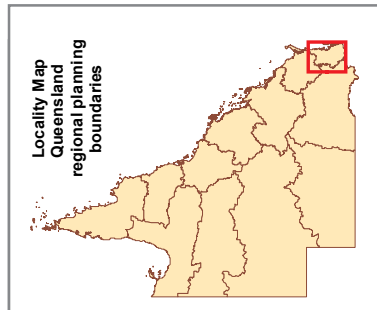
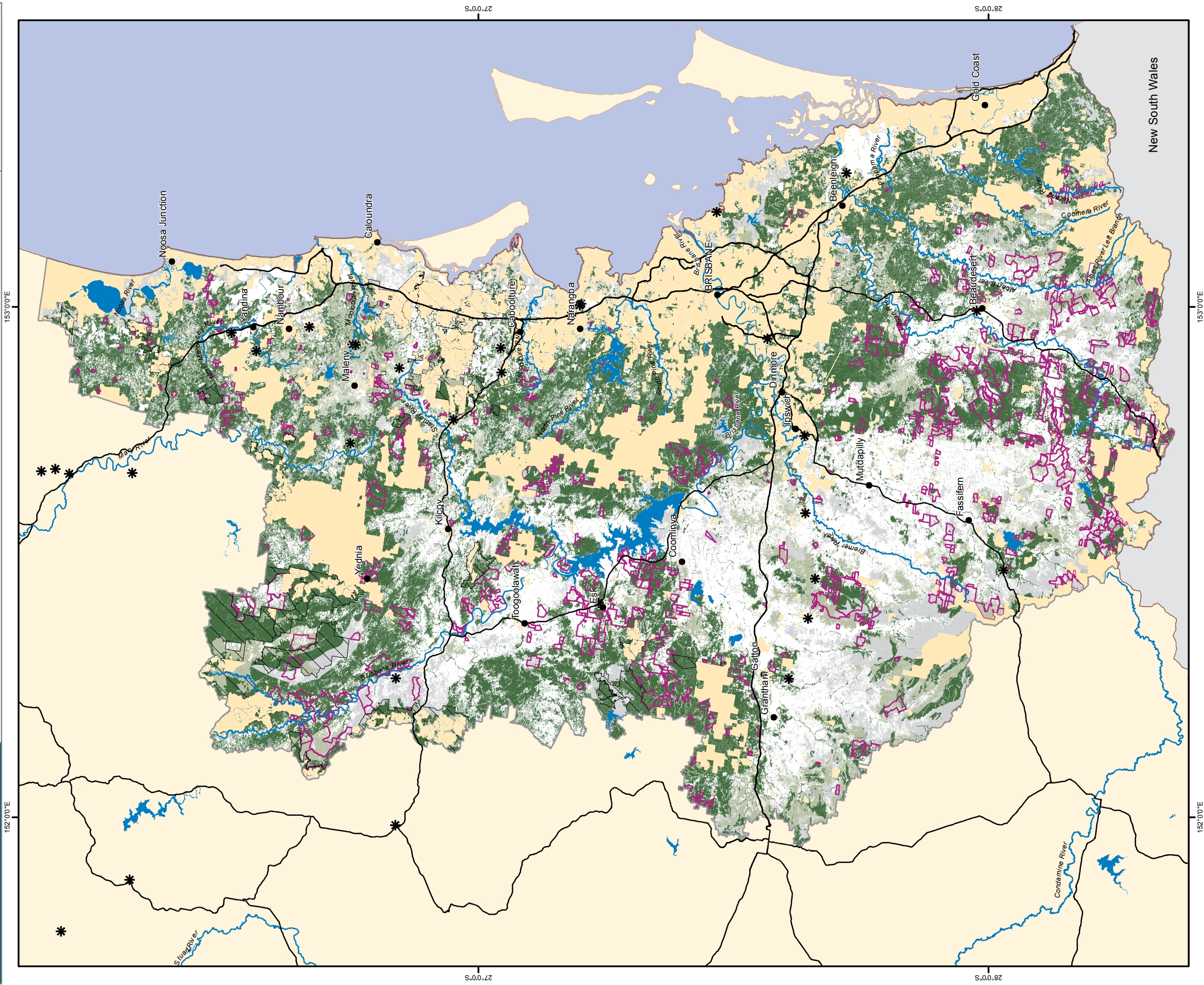
- Region boundary
- Saw mills for native timber (within 100km of region)
- Roads
- Rivers
- Towns

N

1:750,000

0 5 10 20 30 40 km

Datum: GDA 94 Projection: Geographic Page size: A3



Map 13.16 Plantation forestry

This map shows the land identified by the audit as currently being used for the agricultural land-use category 'plantation forestry'. It also shows land identified as not currently used for plantation forestry but having potential to be used for this purpose. Land shown as currently being used for plantation forestry has been identified from mapping provided by HQPlantations, ABARES and FEA Holdings. Areas represented in this mapping have been classified as either hardwood or softwood by experts with local knowledge.

Land shown as having potential for plantation forestry:

- a) **includes** land of agricultural land class A, class B and class C1 (as well as class C2 and class C3 for softwoods) that has slope less than 25 per cent and rainfall greater than 700 mm (or 800 mm for softwood) for 7 out of 10 years
- b) **excludes** land that is urban, intensive use (such as mining), national park, managed by the Department of Defence or permanently under water as well as land that has cracking clay soils.

In identifying this land, the audit **did not consider** a range of business factors (such as markets, pre-existing land uses and competing potential land uses) that are important influences on management decisions made by producers who drive land use. These factors and how farmers respond to them are highly variable across space and through time. It was not possible to measure the effects of these factors with any confidence within the time and resources available to the audit.

Access to processing facilities can also be a major consideration in determining the potential for land to be used for plantation forestry. However, it was not possible in this analysis to determine with any confidence what the critical threshold distances are. Therefore, while the locations of existing sawmills that predominantly process plantation timber are shown on the map as a general guide to those interested in considering this factor, distance from sawmills has not been included in the analysis.

It should not be assumed from this study that all (or any particular portion of) land identified as having potential to be used for plantation forestry should or will be converted to that use. Land potential has been identified by the audit using a limited number of criteria for which mapping is readily available. Also, the extent to which the potential identified on this map is realised (or realisable) is strongly influenced by constraints that have not been included as criteria in the mapping, for example the availability of water for irrigation (see Map 13.2). See Section 13.1 for further constraints.

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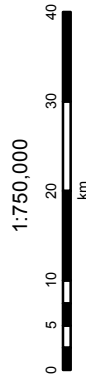
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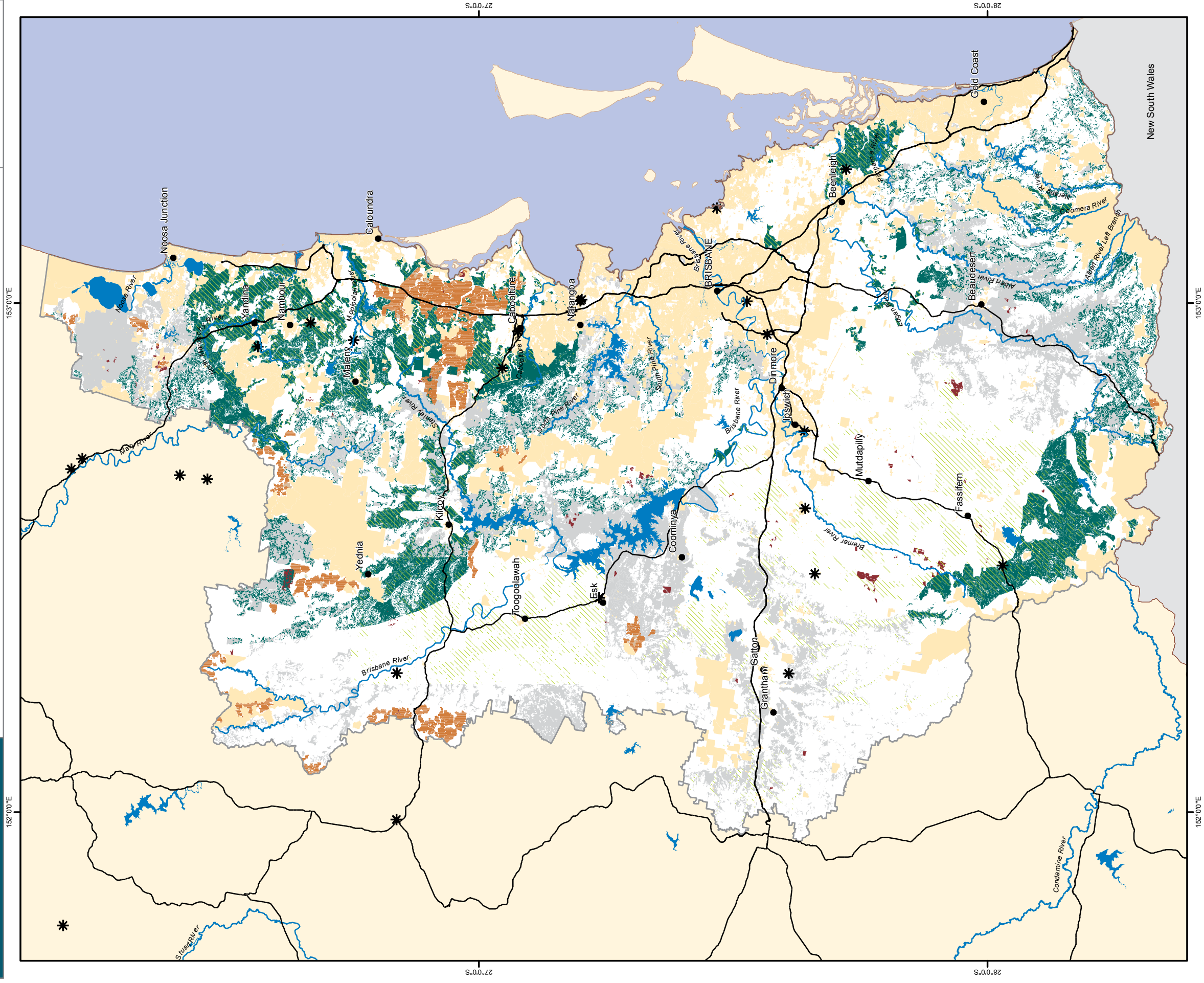
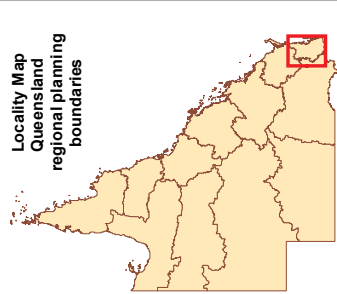
South East Queensland Biophysical potential for rainfed plantation forestry and current plantations

Hardwood potential based on ALC 'A', 'B' and 'C1', slope <25%, rainfall >700mm and 7 in 10 years, no cracking clays
Softwood potential based on ALC 'A', 'B', and 'C', slope <25%, rainfall >800mm and 7 in 10 years, no cracking clays

- Legend**
- Potential softwood plantation
 - Potential hardwood plantation
 - Current fallow
 - Current hardwood
 - Current mixed species
 - Current softwood
 - Areas excluded from potential (see explanatory notes)
 - ALC data gaps
 - Region boundary
 - Sawmills for plantation timber
 - Roads
 - Rivers
 - Towns



Datum: GDA 94 Projection: Geographic
Page size: A3



Map 13.17 Data confidence in soil mapping

This map shows the variation in the relative confidence in the audit's mapping of land-use potential across the region. Land-use potential maps have been generated by the audit by combining a number of different datasets. The level of confidence in the final product is determined by the most limiting of the datasets used. This is generally the agricultural land class mapping, which was derived from a number of different land resource studies, each covering different parts of Queensland often at differing scales of resolution and with different standards of information reported. Confidence in land resource data ranges from high (where mapping is detailed and map units are described in terms of their suitability for a full range of relevant crop types and uses) to low (where mapping is coarse and map units are described in general terms only). For some parts of the state, the only available land resource information is from the *Atlas of Australian soils*. The quality of this information is considered inadequate for the audit; therefore, those areas are shown on this map as having no data.

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