Chapter 4

Queensland Agricultural Land Audit

Cape York

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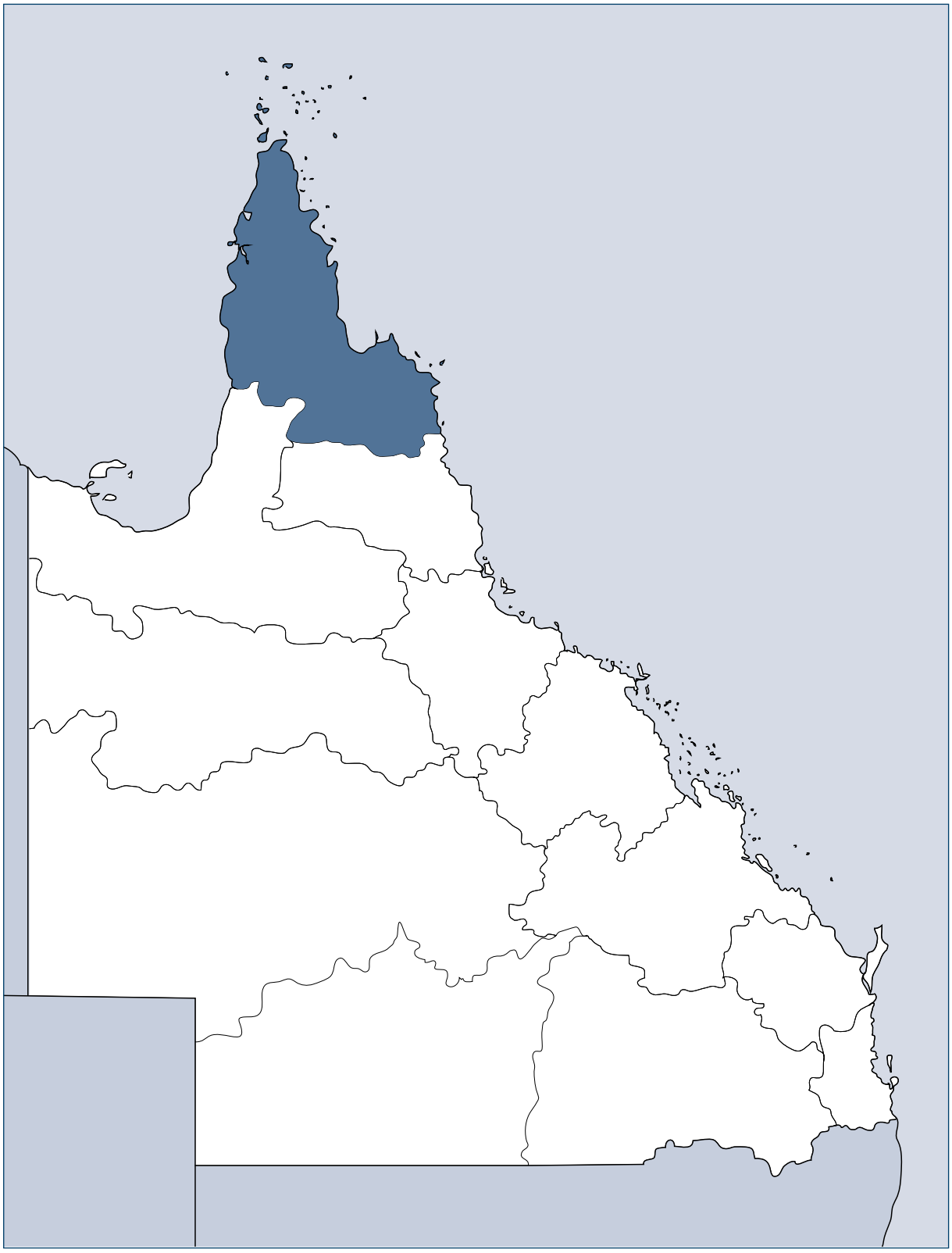
Map 4.1 Location of the Cape York Agricultural Land Audit region



4.1.1 Economic profile

The Cape York region comprises 10 local government areas including Aurukun, Cook, Hope Vale Aboriginal, Lockhart River Aboriginal, Mapoon Aboriginal, Pormpuraaw Aboriginal, Napranum Aboriginal and Torres shires, the Northern Peninsula Area Regional Council and Weipa Town Authority (see Map 4.1). It has a total area of 126 000 km^2, or 7.3 per cent of the total area of the state.

According to the 2011 census, agricultural production in the Cook Shire was valued at approximately $53.4 million, with cattle production accounting for $49.8 million and fruit production $1.3 million.[1] While the region has a relatively large area set aside for conservation, grazing is the dominant land use.

The Lakeland Downs area supports a wide range of minor crops including pasture cut for hay, barley, maize, sorghum, bananas, melons, limes, tropical fruit and passionfruit.

No agricultural production was recorded outside of the Cook Shire for value of commodity data; however, there are small areas of banana production in Hope Vale and mixed horticulture in Napranum. These crops were only recently introduced into the region and so may not have been captured by the latest data collection.

Crops of sugarcane and hemp have been grown on a trial basis in the region. However, the transport costs to the closest sugar mill and the price of raw sugar (and similar issues with hemp) made these crops economically unviable.[2]

At 30 June 2011, the estimated population of the region was 15 531 people[3] or 0.3 per cent of the state's population. The Indigenous population represents 53 per cent of the region's population compared to 3.6 per cent for the state.

Cape York residents are among the most disadvantaged in Queensland. The region has a high unemployment rate (13.8 per cent) compared with the state (5.5 per cent).[3] Hope Vale community recorded the highest unemployment rate at 18.8 per cent.

Cape York has a narrow economic and employment base. The two key sources of revenue are pastoralism and mining. The majority of the workforce is based in the Weipa local government area and represents 34 per cent of the employed population for the region.

At the time of the 2011 census[4], public administration and safety, health care and social assistance, and education and training contributed the majority of employment to the region. Of the market sectors, mining, accommodation and food services, construction and retail trade were the highest employers at 14.2 per cent, 6.0 per cent, 5.5 per cent and 5.5 per cent respectively. Combined, the non-market sectors represented 38.3 per cent of employment in the region.

Agriculture, forestry and fisheries enterprises provided 4.2 per cent of employment in the Cape York region. Employment within these industries is predominantly in the Cook Shire local government area. Of those employed in these industries across the Cape York region, 85 per cent are employed within Cook Shire region—this is equivalent to 3.61 per cent of all employment within the Cape York region.

1 Australian Bureau of Statistics 2012, Value of agricultural commodities produced, Australia, 2010–11, cat. no. 7503.0, Australian Bureau of Statistics, viewed 18 January 2013, ‹http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/7503.0Main+Features12010-11?OpenDocument›.

2 Howley, C & Stephan, K (Environmental Consultants) 2005, *Laura–Normanby catchment management strategy*, written on behalf of the Laura–Normanby Catchment Management Group.

3 Australian Bureau of Statistics 2012, dataset from Queensland regional profiles (generated 27 November 2012), Office of Economic and Statistical Research, Queensland Treasury and Trade.

4 Australian Bureau of Statistics 2011, 2011 census of population and housing, basic community profile B44, Australian Bureau of Statistics, Canberra.

The 2011 census indicated that professionals comprised 16 per cent of the local workforce; the state average for this was 19 per cent. The Cape York region had figures higher than the state average for labourers (16 per cent compared to 11 per cent) and machinery operators (12 per cent compared to 7 per cent). The regional figure and state average for technicians and trades were both 15 per cent.

The Australian Government is committed to gaining World Heritage listing for parts of Cape York, dependent on the wishes of the traditional owners of Cape York land. World Heritage status does not prevent agricultural industries such as grazing; however, new intensive irrigation activities must comply with the *Environment Protection and Biodiversity Conservation Act 1999*.

The average market value of agricultural land across the region is difficult to determine due to the large areas of land under deed of grant in trust (DOGIT) arrangements and lack of sale data from which a market value could be derived. The Cook Shire is the only area in which there was adequate data to derive a market value per hectare (Table 4.1). Mixed forest was the predominant agricultural land type in the area and an indicative price per hectare is $25, which is one of the lowest values for that land type in Queensland. However, this represents a 150 per cent increase in land market value since 2001.

Table 4.1 The change in land values for the Cape York 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		
Aurukun Shire Council*	—	—	—	—	—	—
Cook Shire Council	Mixed forest	10	45	25	+150	25 to 100
Hope Vale Aboriginal Shire Council*	—	—	—	—	—	—
Lockhart River Aboriginal Shire Council*	—	—	—	—	—	—
Mapoon Aboriginal Shire Council*	—	—	—	—	—	—
Napranum Aboriginal Shire Council*	—	—	—	—	—	—
Northern Peninsula Area Regional Council*	—	—	—	—	—	—
Pormpuraaw Aboriginal Shire Council*	—	—	—	—	—	—
Weipa Town Authority†	—	—	—	—	—	—
Torres Shire Council†	—	—	—	—	—	—

* Deed of grant in trust (DOGIT) communities where there is no active or liquid market from which a market value could be derived.

† No agricultural land in the local government area from which a market value for agricultural land could be derived.

4.1.2 Strengths, weaknesses, opportunities and threats

Key regional issues

- Any development in the Cape York region has inherent biosecurity risks that need to be considered.
- Extreme weather patterns limit transport during the wet season and there can be extensive damage to crops during the cyclone season.
- The distance from processing and markets is considerable and transport is expensive.
- Traditional means of grazing limit live export opportunities as they do not allow producers to meet the quantity and quality of supply required.

Strengths

The strengths of the region include the following:

- The horticultural season is early, due to the climate. Tropical fruit market demands are not usually met by the current supply at this time, so growers have the advantage of high early season prices. Pawpaw and passionfruit, for example, mature 3 weeks earlier than in other regions, so producers in the Cooktown and Lakeland Downs areas can supply these to southern markets approximately 1 month ahead of other Queensland producers. However, this advantage is likely to be eroded if the tropical fruit supply in the region expands.
- Banana producers have benefitted from low supply and high prices following cyclones Yasi and Larry. This has attracted large players in the industry and resulted in increased plantings in the Lakeland Downs area (see Case study 4.1).
- Large properties comprised of predominantly long-term leasehold land allow for development and investment over long periods.
- Existing large areas of native forestry (a hardwood timber resource) are generally integrated with grazing operations.
- There is potentially a large local Indigenous workforce who understand the region and its limitations. Pastoral industry work is a preferred choice of Indigenous workers and so is the main employer in the region.

Weaknesses

The weaknesses of the region include the following:

- Excessively high summer temperatures limit opportunities for agricultural production, especially in the northern and western areas. The high summer rainfall (especially the monsoon) and risks of cyclonic weather can severely limit crop production and impact on capability to operate a successful enterprise.
- Lack of local processing and value-adding limits the possibility of establishing new crops. For example, the closest sugar mill is at Mossman, so transport costs are high and quality downgrade during transit is likely. This makes sugarcane growing economically unviable.
- While extensive areas of land have potential for development, the region has wide-ranging constraints (such as climatic extremes, biosecurity risks and limited infrastructure) that limit its development. As a result, there is very little land in the region that can be used for large-scale agricultural development.
- Management of grazing stock is predominantly by a wild harvest method—that is, cattle are left wild and harvested every 1–2 years. Therefore, it is not possible to manage the quality and condition of livestock or implement basic management routines.
- An abundance of native and feral animals, particularly feral pigs, makes it difficult for farmers to protect their crops.

- Biosecurity risks from northern neighbouring countries are high. The region is viewed by many as offering a buffer between these countries and the wider Australian agricultural industry. Expanding agricultural development in the Cape York region would increase the risk of transferring pests and diseases from these countries to other parts of Australia. Sentinel beef herds have been placed in Seisia, north of Bamaga, and they are regularly examined by Australian Quarantine Inspection Service officers for signs of pests and disease.[5]
- External parasites such as cattle tick, buffalo fly, midges and lice (and the diseases they can vector) pose a threat to the cattle industry. Costs to control initial outbreaks and manage resultant disease are considerable. Infectious diseases such as leptospirosis, vibriosis and trichomoniasis also pose a considerable additional cost in management of reduced reproductive capacity and treatment for the industry. Lack of cattle management infrastructure makes routine disease and parasite management unrealistic.
- The information on and knowledge of soil types for the region is quite limited. The best available is 1:100 000 scale around Lakeland Downs, and the rest of the region is 1:250 000 scale. The southernmost part of the region (south of Lakeland Downs) is limited to 1:1 000 000 scale. The majority of the region has small-scale information unsuitable for anything but regional resource inventory or broad strategic land-use planning—it is not suitable for intensive agricultural land-use planning. All key areas of potential require closer study to ensure their suitability. (See Section 4.3 and Map 4.17 for information on data confidence.)
- Many of the soils have low levels of phosphorus and nitrogen, are deficient in other nutrients (including trace elements), are weakly structured and are prone to erosion when cleared.[6]
- The region is remote and living conditions are considered harsh. There are limited facilities for health, education and training, and general community services.
- Freight costs are high and services are limited due to distance and lack of public transport.
- There is only basic (and limited) infrastructure for transport (road and air, no rail), power and communications.
- Seasonal flooding and fires can cause property damage and reduce productivity. Extreme weather (due to seasonal cyclones from both the Coral Sea and the Gulf of Carpentaria as well as flooding wet season rains) impacts the ability to manage crops or livestock effectively. Roads and infrastructure are frequently disrupted during the wet season due to flooding and weight restrictions. (See Section 4.1.3 for more information on climate.)
- Groundwater supplies are over-committed in some existing supply areas, particularly the intensive production areas around Lakeland Downs. (See Section 4.1.4 for more information on water infrastructure and management.)

Opportunities

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

- Increase forestry production and timber processing, particularly in the existing large area of native forestry (a hardwood timber resource), which is generally integrated with grazing.
- Commercialise native plants unique to the region.
- Use significant areas of rehabilitated mining land for forestry-based industries such as hardwood and/or softwood timber plantations, sandalwood harvesting and bioenergy production.
- Establish new and/or expanded timber processing facilities to process pre-mining salvage timber from existing native forests where mining is to occur.
- Value-add to existing products or supply new markets with pastoral products. (This includes live export and farm-based tourism.)
- Expand existing port facilities at Weipa to provide an opportunity for live export of cattle. Currently the facility is predominantly used for bauxite.

5 Bateman, D 2011, 'AQIS unveils new weapon in environmental protection', *The Cairns Post*, 18 January 2011, viewed 19 September 2012, ‹http://www.cairns.com.au/article/2011/01/18/145075_local-news.html›.

6 Earth Tech 2005, *Cape York Peninsula natural resource management plan*, written by Earth Tech on behalf of the Cape York Interim Advisory Group.

Case study 4.1 Bananas in Cape York

Following the success of the development of the banana industry at Lakeland Downs, the Hope Vale Aboriginal Shire Council is spearheading a similar plantation development. There is suitable land, access to water and a community seeking sustainable employment opportunities.

The banana industry is labour-intensive and therefore this 80-hectare plantation could create 30–40 (or more) full-time jobs. The advantages of this development are:

- Bananas are generally in demand.
- Bananas are relatively easy to grow.
- The yields expected are comparable to those of other peak growing areas in Queensland.
- The fruit quality is considered high.
- The roads to Cooktown and Hope Vale are being continually improved.
- Bananas have a short lead-time, providing returns in the second year, which would make the project cash-flow positive in the early stages of its development.
- Hope Vale does not experience the effects of winter as do the more southerly regions.

Limited access to water could make it difficult for this project to reach the goal of 80 hectares; however, 30 hectares are already planted.

Threats

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

- More severe damaging cyclonic and monsoonal weather conditions are expected.
- Pests and diseases from outside of Australia (e.g. screwworm) could infest the region and spread to other regions.

4.1.3 Climate

The region has hot and humid wet seasons with higher rainfall reliability than most rangeland bioregions. Coastal climatic effects are pronounced, as the region is bordered by the Gulf of Carpentaria to the west and the Coral Sea to the east.

The region has an average daily temperature range of 20.8–31.4 °C (with regular summer peaks of 35–40 °C) and on average it receives 1400 mm of rainfall each year. It displays a distinct wet and dry season rainfall pattern—dry season rainfall is 100–300 mm and wet season rainfall is 800–1600 mm. Areas in the north receive higher wet season rainfall and inland communities experience lower rainfall for both the wet and dry seasons.

North-west monsoons bring heavy summer rains. Inland regions receive more than 90 per cent of their rainfall in summer, whereas only around 75 per cent of rainfall occurs in summer along the coast. There is only low to moderate variability in this rainfall, with droughts less likely to occur in the north.

Tropical cyclones are associated with the most widespread, heavy rainfalls and are followed by thunderstorms and monsoon depressions. It is anticipated that over the next 20 years storm surges will penetrate further inland, greatly increasing the risk to natural ecosystems and infrastructure and the chance of erosion in low-lying coastal regions.[7]

Long-range climate projections for the region include a slight decline in rainfall with increasing temperature and evaporation, in conjunction with more extreme climate events (particularly more hot days and days of heavy rainfall) and sea-level rise. Temperature projections indicate increasing average temperature as well as more hot days.

7 Department of Science, Information Technology, Innovation and the Arts 2012, *Climate change in the Cape York region*, State of Queensland, ‹http://www.ehp.qld.gov.au/climatechange/pdf/regionsummary-capeyork.pdf›.

Severe storms and cyclones pose a significant risk to the communities of Cape York. A high proportion of the region's population resides in coastal areas, which are at higher risk of damage from cyclones. The areas most likely to be affected are those closest to the coast, as they can incur flash flooding, wind damage and considerable structural damage from falling trees, impacting industry, infrastructure and roads. Coastal erosion and storm surges also threaten infrastructure such as airstrips, which are vital to emergency services.

The combination of high rainfall (averaging 1400 mm per year) and soils that contain very low concentrations of essential nutrients results in low beef productivity in the region. Long-range climate forecasting has identified further challenges for this industry, for example:

- Higher temperatures are likely to exacerbate existing problems of poor pasture quality and impact crop production, particularly of horticultural crops.
- Increased thermal stress of animals is very likely, particularly away from the coast. This can reduce production, decrease reproduction and increase mortality.
- Tropical weeds may increase in abundance and distribution.
- Overall, it is likely that pastures may decline in quality, with more woody and weed species causing lower animal production.[8]

4.1.4 Water resources

Extensive annual flooding during the wet season is normal for all watercourses in the Cape York region. In the lower parts of many catchments, floodwaters may extend for many kilometres across expansive floodplains. Other low-lying or poorly drained areas also typically become seasonally inundated for many months.

Sixteen river basins and two partial basins (flowing both east towards the Great Barrier Reef and west into the Gulf of Carpentaria) occur across Cape York (see Map 4.2).

Riparian vegetation is in good condition along most major water bodies and streams are virtually unmodified by dams or other works. Some groundwater resources are available in most parts of the region; however, limited yields often restrict usage to stock, domestic and small-scale developments.

While most of Queensland's water resources are managed through water resource plans, which are in turn implemented by resource operations plans, Cape York is largely not covered by such plans. The Mitchell water resource plan in the south of Cape York is the only plan for the region and only partly falls within the Cape York audit boundary.

The allocation of surface water and groundwater in the western Cape York area is associated with the bauxite mining province in the vicinity of Weipa and depends on the provisions of the *Commonwealth Aluminium Corporation Pty Limited Agreement Act 1957*, which gives extensive water rights to Rio Tinto.

Additionally, wild rivers declarations are currently in place for four river systems in Cape York—the Wenlock, Archer, Stewart and Lockhart river systems. The Queensland Government intends to repeal these declarations and is in the process of developing a Cape York regional plan to guide future development and planning decisions.

The Mitchell water resource plan covers an area of 70 000 km^2. The river system flows towards the south-west into the Gulf of Carpentaria near Kowanyama. The Mitchell River delta contains some of the Gulf of Carpentaria's most biologically productive aquatic areas. It contributes significantly to fisheries production in this region.[9]

The Mitchell water resource plan set aside additional volumes of water (unallocated water) to meet emerging water needs in the area. These include:

8 Department of Science, Information Technology, Innovation and the Arts 2012, *Climate change in the Cape York region*, State of Queensland, ‹http://www.ehp.qld.gov.au/climatechange/pdf/regionsummary-capeyork.pdf›.

9 Economic Associates 2006, *Mitchell draft water resource plan—economic and social assessment report*, Department of Natural Resources, Mines and Water, Queensland.

- an Indigenous reserve of 5000 ML to help Indigenous communities meet their social and economic development aspirations
- a general reserve of 35 000 ML to support irrigated agriculture development (some 7 times the volume held in existing water entitlements)
- a strategic reserve of 10 000 ML for projects of state or regional significance.

(A further 20 000 ML of general reserve is available in the water resource plan area, but it is outside the Cape York boundary for this audit.)

A water licence is typically required to take watercourse water for a purpose other than for stock and domestic water needs.

There is limited surface water available in eastern parts of the Cape York region. Broad-scale irrigation is limited as there are few areas of arable soil in the region that are suitable for this. Major CSIRO investigations[10] as well as previous reports[11] have identified some areas in the west of the region with soils suitable for irrigation, but water supply is not likely to be sufficient to support irrigated crops in most of these.

Allocations of artesian water under western Cape York are near full commitment and subject to restrictions under the *Commonwealth Aluminium Corporation Pty Limited Agreement Act 1957*.

In the eastern areas of Cape York, limited groundwater is available. The McLean Basalt aquifer at Lakeland Downs may already be at sustainable yield limits with current entitlement levels.

Some of the Great Artesian Basin aquifers are spatially restricted, and have limited or unknown recharge or low yields. Large-scale extraction of these aquifers could lead to dewatering or saltwater intrusion in coastal areas. Groundwater yields from upper formations are limited and in some areas water quality is poor.

The Great Artesian Basin water resource plan has set aside unallocated water held in general reserves for the Cape York management area (100 ML), Laura management area (500 ML), Gulf management area (1100 ML) and Carpentaria management area (400 ML). Conditions under the Great Artesian Basin resource operations plan must be met when releasing unallocated water from these reserves; these ensure the water needs of existing users and spring ecosystems are met.

Within the Cook and Duck Farm subartesian declared areas (under the Water Regulation 2002), a water licence is required to take groundwater unless the purpose is for stock watering or domestic water needs.

Water supplies from subartesian aquifers in the Mitchell water resource plan are highly variable in quantity and quality, and typically more suited to supporting small-scale uses, such as for stock watering, small mining operations and domestic supplies. Subartesian water under or adjacent to major streams in the Mitchell water resource plan area requires a water licence. This groundwater shares a close hydrologic connection with the river water and therefore is regulated as if it were water in the stream.

The Mitchell water resource plan allows for overland flow water to be taken without a water licence for stock and domestic purposes and small-scale storage. Landowners are allowed overland flow storages of less than 250 ML capacity without a water licence. However, for overland flow storages of more than 250 ML (except for stock and domestic purposes), landowners will require a licence to take the water.

10 Wilson, P, Ringrose-Voase, A, Jacquier, D, Gregory, L, Webb, M, Wong, TF, Powell, B, Brough, D, Hill, J, Lynch, B, Schoknecht, N & Griffin, T 2009, 'Chapter 2: Land and soil resources in northern Australia', in *Northern Australia land and water science review*.

11 Biggs, AJW & Philip, SR 1995, 'Soil survey and agricultural suitability of Cape York Peninsula', in *Cape York Peninsula land use strategy*, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra and Department of Primary Industries, Brisbane.

Overland flow is not managed in the rest of the region.

The main industries in the region that use water are mining (small and large scale), cattle grazing and irrigated agriculture. Commercial and recreational fishing and tourism, although they do not use water, are highly dependent on freshwater flows.

4.1.5 Infrastructure

There are multiple rural and remote communities and significant industry interests located across the region. Ensuring the resilience of roads, airstrips, communications, water supplies and energy supplies is an ongoing issue. Providing a reliable service across difficult terrain and through severe weather can be challenging.

Roads are predominantly classified as minor and unsealed. The condition of the main road (Peninsula Developmental Road) remains a barrier to development as repairs can only be made in the dry season and, as for other roads in the region, sections are inaccessible during the wet season.

A project commenced in mid-2012 to seal the final 15 km of the Peninsula Developmental Road between Lakeland Downs and Laura. Sealing of the road will assist in keeping the road open longer during the wet season, improve safety and travel time and reduce costs for the pastoral and tourism industries, which are heavily reliant on the road. However, this is a small section of a very long road (see Map 4.3). The Peninsula Developmental Road is unsealed north of Laura and has many river crossings to negotiate. Local residents need to obtain a special permit to use of sections of the road during the wet season.

Road upgrades in the south of the region have led to increased agricultural activity at Lakeland Downs and there has been increased tourism and economic development activity in Cooktown since sealing of the Mulligan Highway was completed.

Weipa Airport is the only airport that has a scheduled service. Other airports in the region have scheduled services but they are irregular and are frequently rescheduled due to insufficient passengers or bad weather.

The long distances to remote communities mean air services play an important public transport role in the region. They provide year-round access to business, education, medical, cultural and other services.

Electricity supplies are limited in the region with the majority of communities relying on major diesel power-generation systems. Only townships located in the south-east of the region are connected to the national power transmission grid.

There are two meat processing facilities currently in operation—one at Seisia in the far north and one south of Weipa in York Downs. These provide the local meat supply and employment. The York Downs meat processing facility is small with an estimated daily kill of 10 head of cattle.

Sea transport of agricultural produce from Weipa or Karumba is limited due to the lack of refrigerated sea freight facilities that come through the ports.

A live cattle export industry has infrequently operated in the past. However, cattle from York Downs and other properties were exported via the Port of Weipa in 2009.[12]

12 House of Representatives Standing Committee on Economics 2011, 'Chapter 2: Cape York—context and consultation', in *Inquiry into Indigenous economic development in Queensland and review of the Wild Rivers (Environmental Management) Bill 2010*, Commonwealth of Australia.

4.1.6 Vegetation

Some areas of land within the region are restricted from clearing under the *Vegetation Management Act 1999* (see Map 4.4). In the region, 73 026 hectares (0.6 per cent of the region) can be cleared, has been cleared or is naturally open and 542 887 hectares (4.3 per cent of the region) requires further verification or approval before clearing. Almost 11 million hectares (85.5 per cent of the region) cannot be cleared; this includes 2 million hectares (16.3 per cent of the region) declared as national parks or state forest.

The Cape York bioregion consists of a complex geology dominated by the Torres Strait volcanics in the north. It has north-trending ranges, which are surrounded by foothills and broad alluvial plains of low relief. The vegetation of the bioregion is predominantly eucalypt and melaleuca woodlands with Darwin stringybark as the dominant species. Rainforest is present along the east coast. Approximately half of the bioregion is used for pastoralism.[13]

There are nine sub-regions within the Cape York Peninsula bioregion, all of which have high ecosystem diversity. The ecosystem diversity encompasses rainforests, woodlands, shrublands, heaths, sedgelands, grasslands and mangroves, all in a relatively intact condition.

Mountains flank the east coast and ease to foothills and lowlands towards the west. Most of Cape York is characterised by country of low to very low relief. The rangelands in the south-eastern corner of the region, around Cooktown and Cape Flattery, consist of much smaller holdings. This section also has the highest rainfall in the region and supports areas of tropical rainforest. A strip along the west coast of Cape York consists entirely of Indigenous lands, reserves and mining areas. This section runs almost from the southern border of the region to the tip of Cape York and is around 70 km across. The majority of the pastoral leases are located in the centre of Cape York and across to areas on the east coast.[14]

A relatively large number of regional ecosystems (222) have been described for this bioregion. Under the *Vegetation Management Act 1999*, one of these is listed as 'endangered', and 97 are listed as 'of concern'.[13]

One of the significant values of the bioregion is its relative intactness. The overall condition of Cape York is good, although there are some declines in ecosystems, wetlands, riparian vegetation and species. Only limited clearing of vegetation has occurred in the bioregion. A main potential agent of change in the bioregion is the impact of altered fire regimes on vegetation.

The *Cape York Peninsula Heritage Act 2007* identifies the significant natural and cultural values of Cape York. It has provisions for cooperative land management, protection and the ecologically sustainable use of land, including pastoral land.

To identify and recognise the economic, social and cultural aspirations of Cape York's Indigenous community, a number of special provisions were considered and amendments made to the *Vegetation Management Act 1999* to allow clearing of vegetation for special Indigenous purposes in certain areas of the region.

13 Department of Sustainability, Environment, Water, Population and Communities 2008, *Rangelands 2008—taking the pulse. Cape York Peninsula bioregion*, Australian Government, ‹http:www.environment.gov.au/land/publications/acris/pubs/bioregion-cape-york-peninsula.pdf›.

14 Savanna explorer: North Australian information resource 2012, 'Sustainable grazing in Cape York', Tropical Savannas CRC, viewed 19 September 2012, ‹http://www.savanna.org.au/qld/cy/cygrazing.html›.

Under the *Cape York Peninsula Heritage Act 2007*, landholders of Indigenous, DOGIT communities or Aurukun Shire lease land can request that part of their property be declared an Indigenous community use area. Before the land is declared, it must be considered suitable for aquaculture, agriculture, animal husbandry or grazing use, without significantly impacting on the natural and cultural values of the region.

Under the *Cape York Peninsula Heritage Act 2007*, a person can apply to clear vegetation for any purpose on Indigenous, DOGIT communities and Aurukun Shire lease land within Cape York, provided the clearing:

- is of a minor nature
- does not involve 'endangered' or 'of concern' regional ecosystems
- is not for the purpose of planting high-risk species, or trees for woodchip for export.

Once an Indigenous community use area has been declared, landholders can make a request to clear limited vegetation for a specific Indigenous purpose.

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.

4.2 Current and potential agricultural land use

There is minimal agricultural infrastructure and activity in the Cape York region. The predominant agricultural land use is grazing (see Map 4.5). Table 4.2 presents the current and potential agricultural land uses for the region and shows that grazing is undertaken over approximately 57 per cent of the region. This is carried out with minimal infrastructure such as fencing, watering points and access. Cattle are harvested every 1 or 2 years and are otherwise left free to range over the region with minimal management or intervention.

The most recent data on current land use for the Cape York region is the 1999 Queensland Land Use Mapping Program (QLUMP) dataset. This dataset shows very small areas of plant production, with horticulture (53 hectares or 0.0005 per cent of the region) and broadacre cropping (5224 hectares or 0.04 per cent of the region) occurring in the south-eastern corner of the region. This is close to water access (for irrigation during the dry season), labour requirements and road access (for transport of produce). There is an opportunity to expand horticulture in the south-eastern areas of the region.

There are biosecurity and quarantine constraints to development of any horticultural industry in the northern areas of the region.

Sugarcane production is not undertaken in the Cape York region currently; however, significant areas (1.5 million hectares or 12 per cent of the region) have been identified as having potential for this use. As with horticulture, there are biosecurity and quarantine constraints to be considered before any future development.

Forestry occurs throughout the region (53.7 per cent of the region). It currently provides less than 5 per cent of the state's timber production for both native and plantation timber. Commercial native forestry activities on state-owned lands in Cape York are artificially constrained by the current restriction of annual sales of non-salvage native forest log timber to 2000 m^3, from limited areas. Consequently, timber processing activity in the region has also been limited. Almost all of the forestry land is also grazed and managed as silvopastoral systems—production systems that combine forestry and grazing in a mutually beneficial way. (See 'Forestry' in Section 4.2.2 for more detail.)

Table 4.2 shows that grazing is the predominant land use for the region (current 56.9 per cent and potential 69.3 per cent). In general, future agricultural development in the Cape York region will require significant investment in infrastructure and water access.

Quarantine restrictions under the Plant Protection Regulation 2002 cover Cape York. Sugarcane cropping is regulated under Part 11 of the Regulation and may also be affected by Part 17, Cape York Peninsula targeted pests.

The Regulation restricts the planting of non-approved sugarcane varieties and the movement of specific plants, soil and machinery that has been in contact with these plants. It also restricts the movement of any pest or any plant infested with a Cape York Peninsula targeted pest.

The Regulation covers the area of Cape York north of the latitude line 13°45' south (near Coen) and the list of targeted pests is reviewed and updated periodically. The area is referred to as the far northern pest quarantine area and is represented on all maps of affected industries.

Table 4.2 Current and potential land area

Queensland Land Use Mapping Program (1999)	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	5 224	0.04	0.15	188 285	1.49
Sugarcane	0	0.00	0.00	1 545 583	12.27
Perennial horticulture	45	0.00	0.05	1 963 592	15.58
Annual horticulture	8	0.00	0.02	1 893 887	15.03
Grazing	7 169 707	56.90	4.85	8 737 033	69.34
Sown pastures	40 843	0.32	0.25	625 537	4.96
Intensive livestock	0	0.00	0.00	1 086 908	8.63
Aquaculture	249	0.00	5.49	3 617	0.03
Other land use (non-agricultural land uses and also may include some forestry)	5 422 042	43.04	27.03		
Total	**12 597 275**	**100.00**			
Forestry‡ (see Section 4.2.2)					
Managed in silvopastoral systems (mixed native or plantation forestry and grazing)	6 763 492	53.68	3.52		

Note: Refer to Sections 4.2.2 (under 'Forestry') and 4.3 ('Data confidence') for a further explanation regarding forestry datasets and methodology used.

* Potential areas include where the majority of current production occurs as well as where production could potentially occur. Refer to Section 4.3 ('Data confidence').

† Agricultural land-use category.

‡ 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 4.2.2 (under 'Forestry') for further information about forestry data.

4.2.1 Important agricultural areas

In the Cape York region, one area has been identified as an important agricultural area.

An important agricultural area is an area that has all of 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 4.6 shows the general location of the important agricultural area for the Cape York region.

Lakeland Downs

The predominant agricultural area of the region, both currently under production (Map 4.5) and with potential, is the south-eastern corner (Map 4.6). This area has small areas of A and B class soils that can sustain small-scale horticulture and broadacre development. It has reasonable road access all year and is a viable distance from markets.

In 2010–11, the Cape York region contributed $53.4 million (1 per cent) to the state's value of agricultural commodities produced; all of this came from the Cook Shire local government area. Also, the area contributed $3.5 million (less than 1 per cent) to the state's value of crop commodities produced, which included $100 000 for rambutan (13 per cent of the state total) and $100 000 for rice (20 per cent of the state total).

4.2.2 Industry profiles

Broadacre cropping

Current

Currently there is limited cropping undertaken in Cape York; it accounts for only 0.04 per cent of total land use for the region (5224 hectares). According to the latest QLUMP data (1999), cropping is primarily undertaken around the Lakeland Downs area, largely along the Laura River (see Map 4.7). The Lakeland Downs area supports a range of broadacre crops including pasture cut for hay, barley, maize and sorghum.

Pockets of A class and B class soils exist in the south-eastern area of Cape York. These pockets are non-contiguous, and this limits the type, size and distribution of cropping potential.

The soils of the region have, in a general sense, low fertility, which would need to be improved to attain optimal crop production. However, with adequate management this can be achieved. Other cropping areas in the Far North Queensland and Charters Towers regions are good examples of how much production can be achieved on poor soils.

Any attempts to grow crops at a commercial scale within Cape York have generally failed. This is due to a wide range of factors including distance to markets, other socio-economic constraints and biophysical constraints.

Pests pose a threat to all existing cropping in the region. In the Lakeland Downs region, peanut crops have received high levels of damage from red-tailed black cockatoos (*Calyptorhynchus banksii*) and sulphur-crested cockatoos since the mid-1990s. This includes direct plant damage as well as damage to irrigation systems.[15] Also, existing cropping in the Lakeland Downs area is impacted by damage from feral pigs and magpie geese.

The climate of the region has two distinct rainfall patterns—wet and dry. During the wet season, multiple cropping is not possible due to high levels of flooding across the region.

15 Tracey, J, Bomford, M, Hart, Q, Saunders, G & Sinclair, R 2007, *Managing bird damage to fruit and other horticultural crops*, Bureau of Rural Sciences, Canberra.

Potential

Across the region, management of soil erosion, access to water in the dry season and use of fertiliser all need to be considered in the potential expansion of irrigated and dryland cropping. Only 1.5 per cent of the region has been identified as potentially suitable for cropping (Table 4.2 and Map 4.7). This is primarily in the central to northern areas of the region.

The main areas within the region that have been identified as having potential for expansion of broadacre cropping are around Lakeland Downs and in the south-eastern part of the region. These areas contain a mixture of soils ranging from red and yellow ferrosols, vertosols and dermosols (which have high capability for agricultural production) to tenosols (which are generally regarded as having low capability for agricultural production but in this region may still be suitable for cropping).

The characteristics of tenosols that most limit their suitability for agricultural production are low water-holding capacity, low chemical fertility and poor structure. The low water-holding capacity is mitigated to some extent in this region by the seasonal abundance of rainfall, while the other limitations can be addressed through additional inputs (such as organic matter and fertiliser) and management (such as specialised tillage practices). However, these additional inputs will add to the costs of farming, so the profitability of broadacre cropping on tenosols in these areas may be marginal, especially given the additional costs of transporting produce from these relatively remote areas.

There are limited areas outside the Lakeland Downs area that have been identified as having potential for cropping. The predominant soil types across the region are brown kandosols, which have low to moderate agricultural potential (low chemical fertility and low water-holding capacity).

One of the key limiting factors to expansion of broadacre cropping in the region is vegetation clearing (see Map 4.4). The majority of the region is identified as have no clearing permitted. Therefore, the opportunity to clear the large areas required to ensure profitability of broad-scale cropping is restricted.

Expansion of forage and feed grains for supply to feedmills in the tablelands may be possible. However, this may only offer marginal returns due to transport costs and a decline in the dairy industry in the area.

Biosecurity restrictions for the far northern pest quarantine area need to be considered for any potential development.

Sugarcane

Current

There is currently no sugarcane production within the Cape York region.

Potential

More than 1.5 million hectares (12.3 per cent) of the region has been identified as having potential for sugarcane production (Table 4.2 and Map 4.8). This is predominantly on the western coastal area inland to the Peninsula Developmental Road.

Processing of the sugarcane within the region and not removing it from the far northern pest quarantine area is the only feasible option for development, and this would require substantial investment. Currently there is no access to milling facilities in the north, so these facilities would need to be established.

The closest mill is at Mossman, and this has only marginal potential for processing of sugarcane from the Cape region. The 3-hour road trip with sugarcane from the Lakeland Downs area to Mossman would result in deterioration of the sugarcane product and would lower its value. During periods of high raw sugar prices, road transport could be considered a viable option; however, when prices are poor, the profitability of road transport over these distances is extremely questionable.

The transport of harvesting equipment would also be unlikely, given the road conditions to the north of the region. Biosecurity risks would also need to be considered with the movement of large machinery into and out of the far northern pest quarantine area.

Access to water in and around Weipa is limited and controlled under the *Commonwealth Aluminium Corporation Pty Limited Agreement Act 1957*. This restricts access to water in and flowing through the mining lease areas. All development that impacts the water supply in this area needs to be coordinated in cooperation with Rio Tinto. However, without year-round reliable water supplies, sugarcane is not viable.

Sugarcane has potential for local biofuel production around Weipa. However, to be viable, small-scale ethanol for localised power supply or to supply local machinery operators would need to be developed in partnership or joint venture agreement with a similar large consumer of power and/or fuel. Expansion of mining or other industry in the region could assist to increase demand for power and/or fuel.

Feral pig damage to crops must be considered in the expansion of cropping in Cape York. Pigs can damage almost all crops from sowing (uprooting seeds and seedlings) through to harvest (feeding on or trampling mature crops).[16]

Horticulture

Current

There are limited production areas for horticulture in the Cape York region. Annual and perennial horticulture, combined, account for less than 0.01 per cent of land use (53 hectares) in the region (Maps 4.9 and 4.10).

Small-scale annual horticulture is undertaken around Weipa to supply local consumers with fresh produce.

Plans are in place to develop a locally focused vegetable production area associated with the Hope Vale Indigenous community agricultural development project. The project has already commenced with a banana plantation, which is being developed in conjunction with a multinational agricultural company and is expected to expand to over 80 hectares in 2013. Other major banana producers in Queensland have also established or are planning to establish new plantations in the area.

The market garden phase of the agricultural development project is awaiting approval due to planning and vegetation management restrictions on the 36 hectares of land in question. The aim is for this development to supply local communities with fresh produce such as lettuce, tomatoes and carrots.[17]

Soils around the Lakeland Downs region are rich, basaltic and capable of supporting a range of crops. Coffee, tropical fruit and bananas have been successfully grown in the area. The free-draining soils are well suited to growing watermelons, which have a tolerance to slightly acidic soils (common in the region).

16 Department of Employment, Economic Development and Innovation 2010, *Feral pigs in Queensland—distribution, ecology and impact*, declared class 2 pest animal factsheet series, State of Queensland, viewed 19 September 2012, ‹http://www.daff.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Feral-Pigs-Qld-PA6.pdf›.

17 Polyhon, N 2012, ‘LNP set to open Cape York’, ABC News, viewed 17 September 2012, ‹http://www.abc.net.au/news/2012-09-07/lnp-set-to-open-cape-york/4249646›.

Potential

Both annual and perennial horticulture production potential has been identified in large areas of the Cape York region. The areas of potential are approximately 15 per cent of the region for each production system. Due to the similar biophysical requirements for both production systems, there are overlaps in the areas of potential identified.

Despite the widespread biophysical potential, the actual possibility of horticulture production is limited. Horticulture production, in reality, would be limited to the south-eastern corner of Cape York, primarily along the Peninsula Developmental Road.

The main areas within the region that have been identified as having potential for expansion of horticulture are around Lakeland Downs and in the south-eastern part of the region. These areas contain a mixture of soils ranging from red and yellow ferrosols, vertosols and dermosols (which have high capability for agricultural production) to tenosols (which are generally regarded as having low capability for agricultural production but in this region may still be suitable for cropping).

The characteristics of tenosols that most limit their suitability for agricultural production are low water-holding capacity, low chemical fertility and poor structure. The low water-holding capacity of these soils is mitigated to some extent in this region by the seasonal abundance of rainfall (especially for short-season summer crops), while the other limitations can be addressed through additional inputs (such as organic matter and fertiliser) and management (such as specialised tillage practices). These additional inputs will add to farm costs and reduce profitability. However, intensive horticulture (orchards and vegetable production) and other high-value row crops where high farm management inputs (such as irrigation and fertiliser application) are standard for the industry may still be economically viable.

Bananas show a lot of potential for this region. Soils in the region are inherently acidic, but bananas, unlike many horticultural crops, are quite tolerant of such soils.[18] Where soil acidity is excessive, it can be relatively easily and cheaply mitigated with farm management practices such as lime application. Interest in investment into banana farms in the region has grown considerably in recent times. There appears to be realistic prospects for major expansion of banana production in the region in the near future.

All areas north of Hope Vale across to Pormpuraaw are considered to be too hot for production of most annual vegetables (such as leafy greens and tomatoes).

During the wet season (December–March), limited road access constrains transport of fresh produce into the region. Local production to supply this market gap could be an option throughout the region.

Production in northern areas of the Cape York region is constrained due to high transport costs to southern markets. Generally, the long distance to markets and lack of reliable all-weather transport to national markets limit the expansion of horticulture in most of the Cape York region. Limited air freight is available through Weipa Airport, which operates daily commercial flights to Brisbane, or through charter services operating for air freight.

Biosecurity restrictions under the far northern pest quarantine area need to be considered for any potential development. Movement of plant and fruit material out of this area is subject to quarantine conditions.

Cyclones and extreme weather patterns across the region limit the development of perennial crops throughout Cape York.

Access to skilled labour for farm management would need to be improved. Low-skilled harvesting staff would potentially be accessible through local communities and by extending the harvest trail network into the region.

18 Akehurst, A, Newley, P & Hickey, M 2008, *Soil & water best management practices for NSW banana growers*, Department of Primary Industries, New South Wales, viewed 17 September 2012, ‹http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/242359/soil-and-water-best-management-practices-for-nsw-banana-growers.pdf›.

Intensive livestock

Current

There is minimal intensive animal production currently in Cape York—one occasional feedlot, one egg producer and a scattering of aquaculture production enterprises in the south of the region (see Map 4.11). The feedlot is opportunistic, relying primarily on silage sourced from banana plantation waste to supplement feeding.

Potential

Intensive livestock has been identified as having biophysical potential across 8.6 per cent (approximately 1.1 million hectares) of the Cape York region (see Table 4.2 and Map 4.11). However, this is not considered viable due to a number of constraints including biosecurity risk, low access to feed grain, unsuitable climate and lack of infrastructure.

Biosecurity threats to the pig and poultry industries are a primary risk to intensive animal industries in the region. Localised, large populations of feral pigs have established in Cape York, with feral herds of up to 400 pigs recorded.[19] There is a high risk of spreading disease between feral and domestic populations, with the added risk of spreading disease from the Torres Strait and northern neighbouring countries. This will limit the development of the intensive livestock industry.

High feed costs, remoteness and lack of transport infrastructure would significantly limit any development of intensive livestock in the Cape York region. High transport costs and lack of all-weather access into a majority of the central and northern parts of the region would restrict any attempt to grow commercial quantities of livestock regardless of species. Without a local supply of grain and feed products there would be limited expansion opportunities.

High rainfall and temperature constrains the development of feedlots in the region. Predicted increased rainfall and higher temperatures for Cape York will further limit the potential for feedlot development in the region.

Limited access to processing facilities constrains the expansion of any intensive beef development. The York Downs processing facility recently established south of Weipa does not have the capacity to support an intensive livestock operation.

Southern areas of the region have better access to transport infrastructure and to grain supplies, so there is some capacity to expand in these areas. Any development of feedlots for the northern live export market would need access to stock feed and year-round transport. The Port of Weipa is not considered a viable option to support feedlots for live export—it cannot guarantee access to feed supplies year-round due to transport limitations.

Grazing

Current

Grazing industries account for 56.9 per cent of the region's land use with 7.2 million hectares currently identified under QLUMP as being primarily used for grazing activities (Table 4.2 and Map 4.12).

The herd size has grown relatively slowly—about 0.5 per cent per year. However, there has been growth in the value of production due to rising cattle prices. In 2010–11, the value of production was $46.2 million[20] compared to approximately $30 million in 2000–01.

19 Department of Employment, Economic Development and Innovation 2010, *Feral pigs in Queensland—distribution, ecology and impact*, declared class 2 pest animal factsheet series, State of Queensland, viewed 2 December 2012, ‹http://www.daff.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Feral-Pigs-Qld-PA6.pdf›.

20 Australian Bureau of Statistics 2012, Value of agricultural commodities produced, Australia, 2010–2011, cat. no. 7503.0, Australian Bureau of Statistics, viewed 18 January 2013, ‹http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/7503.0Main+Features12010-11?OpenDocument›.

The capacity for grazing land production is largely considered low. This is due to low soil fertility, poor nutrient value of pasture species, isolation and very limited infrastructure (such as fencing and watering points). Stocking rates are among the lowest in the state with an average of 1 head per 60 hectares.[21]

The low stocking results in minimal land degradation and changes in pasture composition compared to other areas of the state supporting higher stocking densities. Preferential grazing has caused some localised degradation. Properties tend to have very limited internal fencing and watering points and so controlling distribution of cattle is very difficult.

Current markets are primarily the saleyards at Mareeba (when road transport allows access) and live export through the Port of Weipa. Live export is limited by the ability of cattle producers to supply sufficient cattle of export size and grade to the quantity required. Improvements in consistency of cattle quality and quantity would need to be achieved if live export was to be considered a viable option for cattle producers throughout the region. The port facility is privately owned and stockyards exist for the export of live cattle through the port; however, access to the port is also limited with the port facilities being focused on bauxite shipping.

Large areas of the Cape York region are burnt each year, mostly by late dry season fires.

The most common production system in Cape York is the traditional system. In this system, all cattle are run on native pasture, so weight gains are low. While supplementary feeding in the wet season can improve animal productivity, this is difficult to achieve because the cattle tend to be distributed over large areas. The parameters of production are limited by ecological and financial factors.

Cattle mortality rates are high, as are the costs of mustering, while efficiency is low. Feral herds or 'bush cattle' are common because of the inefficiency of mustering and low branding rates. Infrastructure remains minimal and financial returns relatively low. This traditional system requires very large tracts of land to be viable. Studies have shown that no matter how large the area, the economic sustainability of such properties is questionable. Opportunities for intensification for those graziers running traditional systems are few.[21]

North of Mapoon was, in the past, considered a biosecurity monitoring zone for cattle. A livestock buffer zone was established in the northern part of Cape York to prevent the spread of cattle pests and diseases to the south, should they gain entry from the north. The zone stretched across Cape York from the east to the west coast, and about 160 km from north to south. Fencing was initially established across Cape York preventing cattle crossing into the buffer zone; however, this area is no longer maintained or monitored.[22]

Potential

Potential for grazing development has been identified for 69.3 per cent of the region (Table 4.2 and Map 4.13)

Further growth throughout the region, especially around Weipa and the south-eastern corner of the region, could be achieved by investment in finishing cattle (fattening the cattle to market size) and processing meat within the region. Broadening farming business to include mixed crop with livestock systems based on irrigated pasture, fodder and other crops could also be an option for growth. Growth of the industry will also depend upon improvements to water allocation, vegetation management and infrastructure. Development of forage production for the grazing industry within the region may help to maintain cattle condition throughout the dry season.

Significant investment would be required to improve transport infrastructure if development is to be undertaken on a large scale. However, despite investment, weather patterns such as wet season isolation may cause problems in rearing animals and may prevent animals getting to market.

21 Savanna explorer: North Australian information resource 2012, 'Sustainable grazing in Cape York', Tropical Savannas CRC, viewed 19 September 2012, ‹http://www.savanna.org.au/qld/cy/cygrazing.html›.

22 Department of Agriculture, Fisheries and Forestry 2001, *Quarantine protects Cape York*, Australian Government, ‹http://www.daff.gov.au/__data/assets/pdf_file/0014/120821/CapeYork.pdf›.

Compared to other pastoral regions, Cape York has a particularly long and reliable green season (period during which cattle running on native pasture can be expected to gain weight). This could put graziers running cattle on improved pastures at considerable advantage. However, for many graziers in the region, there is not available capital to intensify systems.[23]

Most graziers use the traditional system; the other (far more intensive) system is using sown pastures (Map 4.14). Sown pastures currently exist on 40 843 hectares (0.3 per cent of the region) and 625 537 hectares (5 per cent) has potential to be mechanically sown. A report for the *Cape York Peninsula land use strategy* in 1995 estimated that more than 50 per cent of land currently being grazed in Cape York was suitable for some form of pasture improvement.[23] Capital input here is far greater, as clearing, fertilising, regrowth control measures and greater infrastructure are all necessary. Carrying capacity in this system, however, can reach 1 head per 1.5 hectares. This would be considered achievable in optimal situations only and would be very difficult to achieve.[24]

Once pasture is established, this system offers easier herd management and very productive output. Yet the costs of establishing such systems can be prohibitive for the majority of producers in Cape York. This system is used by some smaller property owners in the Cooktown hinterland, although several larger owners are attempting to combine some elements with the traditional grazing system. Tree cover is too dense across most of the region to enable adequate sowing of pastures. It has never been viable for land owners to clear the land.

There are no areas considered to have high production potential and very limited areas of medium potential. The medium areas are sparsely scattered across the region (Map 4.13).

Opportunities exist to supply a very limited number of cattle to the recently established abattoir south of Weipa at York Downs. This was built in conjunction with Rio Tinto and operates on a small processing capacity of approximately 10 head per day. Processed product is sold into the local markets as regular transport of product is not cost-effective in Cape York. This processing plant is insufficient to support large numbers of stock.

Feral pigs and horses are common in Cape York and have major impacts. Pigs carry a range of parasites and are a vector risk for exotic diseases such as foot-and-mouth disease. Feral pigs, feral dogs and dingoes attack and kill calves. Feral horses compete with cattle for pasture and water, can destroy fences and disrupt mustering.

The construction of the Byerstown Range Road and further development of the Cooktown Developmental Road to bitumen standard is helping to provide year-round access. However, until the Peninsula Developmental Road standard is improved, movement of stock to the exporting Port of Weipa from the southern peninsula area will not be an option.

Live export of cattle requires sufficient numbers of cattle to fill a livestock transport ship. The current management of cattle in Cape York does not allow for the volume and uniformity of stock required to meet live export demands. For the industry to be viable, pastoralists need to work together to make the required number of cattle for a shipment. The major ports close to the region able to process live export of cattle are Mourilyan Harbour near Cairns, the Port of Karumba and the Port of Townsville; however, volumes required to be economical are unlikely to be achieved.

23 Savanna explorer: North Australia information resource 2012, 'Sustainable grazing in Cape York', Tropical Savannas CRC, viewed 2 December 2012, ‹http://www.savanna.org.au/qld/cy/cygrazing.html›.

24 Weston, EJ, Harbison, J, Leslie, JK, Rosenthal, KM & Mayer, RJ 1981, *Assessment of the agricultural and pastoral potential of Queensland*, DPI Agriculture Branch technical report no. 27, Department of Primary Industries, Queensland.

Forestry

Current

Cape York is currently a minor forestry production and timber processing region. It generates less than 5 per cent of Queensland's native hardwood forestry production and less than 5 per cent of plantation forestry production for the state's timber processing industry. Forestry production predominantly comes from timber resource areas (native and plantation) on state-owned lands administered under the *Forestry Act 1959*, including timber salvage on mining lease areas, plus native forest practice notification areas on private (freehold) land under the *Vegetation Management Act 1999*[25] and plantation forestry 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.

Native forestry currently occurs across the region on state-owned and private land, generally on land that is also used for grazing (Map 4.15). Native forestry in Cape York, predominantly hardwood, produces a number of forest products suitable for a number of uses including sawn construction and appearance timber, poles, bridging girders, fencing timbers and craftwood. In addition, native Queensland sandalwood is harvested for its aromatic timber properties. Hardwood fencing timbers are an important resource for grazing and other agricultural land uses. The key commercial native forestry hardwood tree species in Cape York include Darwin stringybark, various bloodwoods, Cooktown ironwood, Moreton Bay ash, forest red gum, Molloy red box and Queensland sandalwood, plus a broad range of other suitable tree species.

On state-owned land, the denotation of a management unit (MUID)[26] on the lot on plan indicates commercial native forestry or quarry material interest. However, the actual native forest production area is generally restricted to the forested area within the parcel. So although there are currently timber interests based on MUIDs on 6.7 million hectares or 53.5 per cent of the region (see Table 4.3 and Map 4.15), this figure is not the actual area of native forestry production on state land but includes land that potentially has areas of native Queensland sandalwood. The actual area of production 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.

Since the mid-1990s, commercial native forestry activities on state-owned lands in Cape York have been constrained by restrictions. The annual sales of non-salvage native forest log timber are restricted to 2000 m^3, from limited areas. Consequently, timber processing activity in the region has also been limited.

Native forestry on private (freehold) land forest practice notifications (managing, felling and removal of native trees for commercial purposes) covers 25 976 hectares (0.2 per cent of the region). The actual area of production is generally restricted to the forested areas within those areas (Table 4.3).

Plantation forestry in the region is relatively small (2794 hectares or 0.02 per cent of the region). Most of this was established in the late 1990s and 2000s and is predominantly located in the south-eastern section of Cape York near Hope Vale and Lakeland Downs. Plantation forestry, mostly hardwood, aims to produce a number of forest products including sawlogs, round timbers and pulpwood for a broad range of appearance and construction timber processing purposes, plus aromatic timber (sandalwood). The region's plantation estate includes approximately 2000 hectares of teak (including a fallow area near Lakeland Downs), approximately 500 hectares of African mahogany and approximately 250 hectares of 'irrigated' Indian sandalwood (Map 4.16). These plantations are presently immature and are expected to come onstream for harvest after 2020. Teak plantations have a denser tree canopy, and generally only combine with grazing for about the first 5 years of a crop rotation (until tree canopy closure). African mahogany plantations are generally managed as silvopastoral systems. Irrigated Indian sandalwood plantation forestry areas are generally not grazed.

25 Under the *Vegetation Management Act 1999*, 'forest practice' includes felling and removing trees for commercial gain. A landholder who conducts a native forest practice on remnant vegetation must do so according to the *Code applying to a native forest practice on freehold land* and must give formal notice of the location through a 'Notice of forest practice' form.

26 MUID—management unit inventory data.

In the Cape York region, there are a number of small facilities that process native hardwood timber. These are at Napranum, Lockhart, Mapoon and Aurukun (not mapped). They process some of the region's current forestry production and the rest is processed outside the region. There are, however, a number of portable sawmills and fencing timber processors servicing the region's forestry production that are not mapped. Commercial haul distances can be 400 km or more, and increase with product value.

Potential

There is significant potential for increased forestry production, in particular native hardwood, but also softwood and hardwood plantation resources. However, there is a high risk of severe cyclone damage, no medium to large processors and limited infrastructure in the region. These factors, plus the limited species trialling to date, need to be considered before development. Increased forestry production would provide further resources 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 Cape York are substantial—2.4 million hectares, 3.9 million hectares and 3.2 million hectares (18.7, 31.1 and 25.7 per cent respectively of the region's area; see Map 4.15 and Table 4.3). There are opportunities to increase native forestry production on the mapped potential areas on a long-term basis while having minimal impacts on the other pastoral land uses, creating silvopastoral systems. It is estimated that without restrictions on volumes of harvest, the existing native forestry resource on state-owned lands in Cape York can annually yield at least 16 000 m^3 of log timber, which is sufficient to support a viable timber industry and facilitate a long-term timber-related industry.

The region is considered reasonable for further plantation forestry development. It has with good rainfall (in the areas mapped as potential), productive growth rates for plantation species (in the areas mapped as potential) and relatively affordable land prices. However, there is a high risk of severe cyclone damage, no medium to large processor and limited infrastructure in the region. These factors, plus the limited species trialling to date, need to be considered before development.

The area identified for potential plantation forestry expansion in Cape York is substantial—softwood 8.9 million hectares and hardwood 2.0 million hectares (70.4 and 16.2 per cent of the region respectively; see Map 4.16). The current uses of land that has potential for hardwood are grazing (49 per cent) and other non-agricultural uses (50.6 per cent). Those for land that has potential for softwood are grazing (66 per cent) and other land uses (33 per cent).

Trials indicate that exotic pine, African mahogany, Indian sandalwood (irrigated), Australian sandalwoods (rain-fed) and teak (only on fertile soils) are the best options for plantation expansion in the region. However, there has been only limited species trialling in Cape York.

Expansion using African mahogany and rain-fed Australian sandalwood hardwood has the advantage of possible integration into the existing grazing landscape as silvopastoral systems.

Exotic pine varieties have performed well on a range of soils, particularly less-fertile soils that receive annual average rainfall of greater than 800 mm in 7 out of 10 years. African mahogany has performed well on a range of soils that receive an annual average rainfall greater than 700 mm in 7 out of 10 years. Teak performs well on fertile soils that receive an annual average rainfall of greater than 800 mm in 7 out of 10 years. Rain-fed Australian sandalwood has performed well on a range of soils that receive an annual average rainfall greater than 700 mm in 7 out of 10 years. Indian sandalwood requires irrigation to perform commercially.

Most of the existing timber processors have only limited capacity to expand production. Investment in new or upgrading of existing processing facilities is required and would likely occur if industry were assured of a long-term supply of a large quantity of suitable timber. Demand for native hardwood forest products is high and demand for exotic and native softwood forest products is medium to high. Demand for forest products is forecast to remain strong in the medium to long term.

Overall, the region currently has a relatively small timber production output, largely linked to the constraints already mentioned. However, there is opportunity for forestry production growth, particularly native hardwood, as well as softwood and hardwood plantation forestry, which in turn will support growth in the down-stream timber processing sector.

Table 4.3 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)					
Hardwood	1 071	0.01	2.56	2 046 739	16.24
Softwood	0	0.00	0.00	8 867 053	70.37
Mixed species (softwood and hardwood)	0	0.00	0.00	2 042 456	16.21
Fallow (where plantation not currently planted to trees)	1 723	0.01	9.85		
Total	**2 794**	**0.02**			
Native forestry					
State-owned land timber interests (area based on entire lot on plan; forestry restricted to forested area within that)	6 734 723[§]	53.45	6.82		
Private land (native forest practice notifications)	25 976	0.21	0.80		
High potential				2 355 107	18.69
Medium potential				3 917 329	31.09
Low potential				3 239 639	25.71
Total	**6 760 699**	**53.66**		**9 512 075**	**75.49**

[*] Potential areas include where the majority of current production occurs as well as where production could potentially occur. Refer to Section 4.3 ('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 category.

[§] 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.

4.3 Data confidence

The data confidence map (Map 4.17) indicates that the agricultural land-class dataset that was used as the basis for most of the maps developed for the Cape York region (excluding grazing and forestry) was predominantly 'medium' confidence. The dataset for the southern region was considered a 'low' confidence level.

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.

Most of the current land-use information used in the audit has been obtained through the Queensland Land Use Mapping Program (QLUMP), which is dated 1999 for this region. Land use is determined through available databases, satellite imagery and aerial photographs. As there are difficulties with differentiating land uses using imagery, local expert knowledge and some field surveys have been conducted to verify the data.[27]

The current locations of intensive animal production facilities are derived from data 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. The location of egg production is based on Safe Food Production Queensland's egg register as at 4 October 2012.

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).

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 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. 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 4.3.

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 1999 data), 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 4.2 overestimate the true potential area for each agricultural land-use category.

27 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›.

4.4 Sources of information

4.4.1 Bibliography

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4.4.2 Further 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).

***Australian Conservation Foundation 1977, *Cape York Peninsula: a national parks and land-use plan*, Australian Conservation Foundation.**

***Biggs, AJW & Philip, SR 1995a, 'Soil survey and agricultural suitability of Cape York Peninsula', in *Cape York Peninsula land use strategy*, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra, and Department of Primary Industries, Brisbane, 243 pp.**

Abstract: This report details the findings of Natural Resources Analysis Program (NRAP) NR02—Soil survey and agricultural land suitability assessment.

***Biggs, AJW & Philip, SR 1995b, *Soils of Cape York Peninsula*, land resources bulletin: QV95001, Department of Natural Resources and Mines, Queensland, 292 pp.**

Abstract: This report describes current land uses on the Peninsula including grazing, mining, conservation, tourism and traditional uses by Indigenous people. This project describes the soils of approximately 132 500 km^2 of mainland, from 16° S to Cape York, including aspects of climate, geology, physiography and vegetation on the Peninsula. Unique map areas (UMAs) were individually assessed for their suitability for various land uses. This project consists of reports, digital data and hard-copy maps. The electronic version contains links to soils maps and suitability maps for pasture, cropping and horticulture.

Bureau of Rural Sciences 2009, *Land use summary: Cape York NRM region—Qld*, produced as part of the Australian Collaborative Land Use and Management Program, Commonwealth of Australia, Canberra, ‹http://adl.brs.gov.au/landuse/docs/304_NRM_Cape_York.pdf›.

Abstract: This report contains maps and tables of land use in the Cape York NRM region as at 1999, using Australian Collaborative Land Use and Management Practices (ACLUMP).

***Cape York Regional Advisory Group 1996, 'Cape York Peninsula land use strategy: draft stage 2 report', Department of the Premier, Economic and Trade Development, Brisbane, and Department of the Environment, Sport and Territories, Canberra, 141 pp.**

Abstract: This report includes a strategy for sustainable land use and economic and social development.

Cape York Sustainable Futures 2010, *New horizons and opportunities: Cape York Peninsula investment prospectus*, ‹http://www.cypda.com.au/images/stories/documents/reports/new_horizons_and_opportunities.pdf›.

Abstract: This report provides an overview of the Cape York Peninsula and the current level of economic activity in the region. It includes strategic implications and competitive advantages of the Cape York Peninsula region; external trends and opportunities; existing commercial activity and investment; opportunities for new initiatives/expansion of existing activities; potential markets (local, regional, state, national, international); and physical, governmental, community development needs.

Chester, G & Driml, S 2012, *The potential economic benefits of protecting and presenting Cape York*, Department of Environment and Heritage Protection, Queensland, ‹http://www.thinktnq.com.au/research/23/24/doc-129›.

Abstract: This document reports on a study of the economic benefits of protecting Cape York Peninsula, and addresses the potential World Heritage listing.

***Connell Wagner Pty Ltd 1989, *Cape York Peninsula resource analysis*, prepared for Premier's Department, Queensland.**

***Cordell, J (ed.), 1995, 'Indigenous management of land and sea and traditional activities in Cape York Peninsula', in *Cape York Peninsula land use strategy*, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra, and The University of Queensland, 447 pp.**

Abstract: This project was designed to address land-use practices and concerns among the Peninsula's Indigenous land and sea owners. It is primarily concerned with cultural documentation of natural resource management practices, and environmental perspectives of Indigenous communities in the Cape York study area.

***Environment Science and Services (NQ) 1995, 'Stage 1 overview reports: overview of current resources, land uses and issues', in *Cape York Peninsula land use strategy*, Department of the Premier, Economic and Trade Development, Brisbane, and Department of the Environment, Sport and Territories, Canberra, 130 pp.**

Abstract: This report contains an overview of current resources, land uses and issues in three parts—Natural resources and ecology (Report 1); Land use and economy (Report 2); Society and culture (Report 3).

***Environment Science and Services (NQ) 1995, 'Stage 1 overview reports: thematic report 2 of 3—land use and economy', in *Cape York Peninsula land use strategy*, Department of the Premier, Economic and Trade Development, Brisbane, and Department of the Environment, Sport and Territories, Canberra.**

Abstract: Together with the overview report (Overview of current resources, land uses and issues), these reports effectively summarise and communicate the key findings of the stage 1 data collection exercise and provide a sound information base for the implementation of stage 2.

***Galloway, RW, Gunn, RH & Story, R 1970, *Lands of the Mitchell–Normanby area*, Queensland, land research series no. 26, CSIRO, 120 pp.**

Abstract: The Mitchell–Normanby area described in this report occupies the lower two-thirds of the Cape York Peninsula and lies between the fourteenth and eighteenth parallels of south latitude. It covers approximately 55 000 square miles (142 450 km^2) and has maximum length and width of about 290 miles (470 km).

***Grundy, MJ & Heiner, IJ 1991, *Soil associations of Batavia Downs*, Department of Primary Industries, Queensland, Land Resources Branch, QR91002, 42 pp.**

Abstract: This report describes the soils and landforms of Batavia Downs, a grazing holding of some 200 000 hectares in the northern part of Cape York Peninsula, and comments on the suitability of the land for more intensive management. The land resources of Batavia Downs were surveyed at 1:250 000 using free survey with aerial photograph interpretation and ground observations and then mapped into soil associations within soil landscapes that are recurring patterns of soils, landform and geology. The mapping code reflects each of the three components.

***Grundy, MJ & Heiner, IJ 1994, *Soils of Lakeland Downs*, Department of Primary Industries, Queensland, QO94027, 44 pp.**

Abstract: The soils of the basalt landforms of Lakeland Downs in Far North Queensland were described in terms of their morphology, their soil chemical and physical attributes and their location. Lakeland Downs is an increasingly important area of rain-fed and irrigated agriculture and this report is the first inventory of the soils of the area.

***Hanlon, David WG & Sloss, S 1995, 'Other primary industries (non-pastoral, non-forestry) of Cape York Peninsula—Part A Other primary industries' in *Cape York Peninsula land use strategy*, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra and RCS Hassall Pty Ltd, Spring Hill, 156 pp.**

Abstract: This report is in three parts—Part A Other primary industries; Part B Agricultural land suitability; and Part C General suitability of aquaculture and mariculture developments. The electronic version contains suitability maps for cropping and horticulture.

Kleinhardt Business Consultants 2007, *Cape York Peninsula regional economic and infrastructure framework report*, ECOS no. 126, pp. 21–3, ‹http://naedf.com/wp-content/uploads/2009/09/2008-Cape-York-Peninsula-Economic-Infrastructure-Report.pdf›.

Abstract: This report acknowledges Cape York Peninsula as a globally significant cultural landscape requiring innovative and sensitive solutions to its impending development challenges, and could be a blueprint for the future planning of Australia's northern regions.

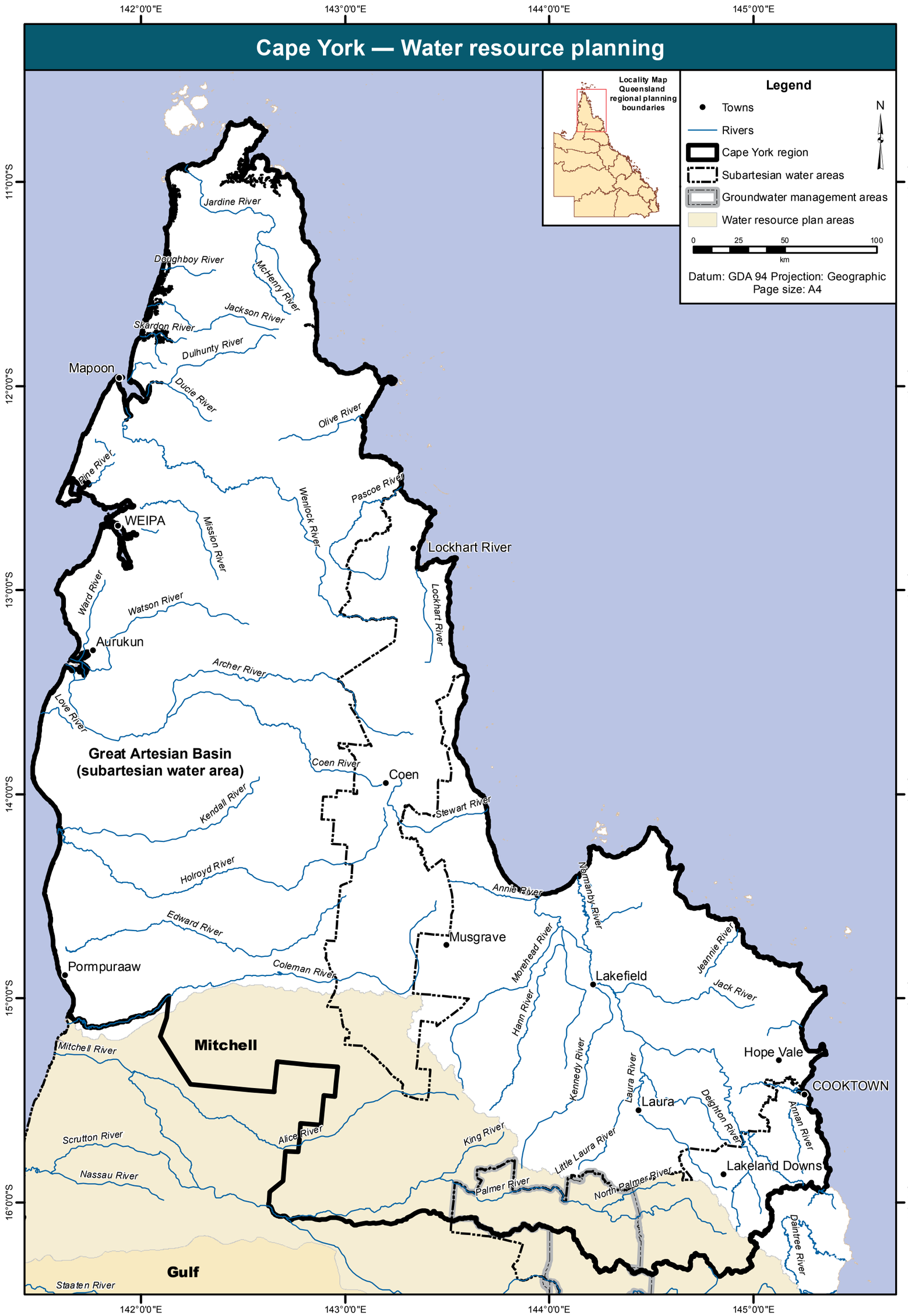
***Neldner, VJ & Clarkson, JR 1995, 'Vegetation survey and mapping of Cape York Peninsula', in *Cape York Peninsula land use strategy*, Office of the Coordinator General of Queensland, Brisbane, Department of the Environment, Sport and Territories, Canberra and Department of Environment and Heritage, Brisbane, 158 pp.**

Abstract: The vegetation of Cape York Peninsula is dominated by *Eucalyptus* spp. woodlands, open woodlands and open forests, which occupy 64 per cent of the study area. This dominance of eucalypt savannas is repeated in other tropical areas of northern Australia.

Map 4.2 Water resources

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

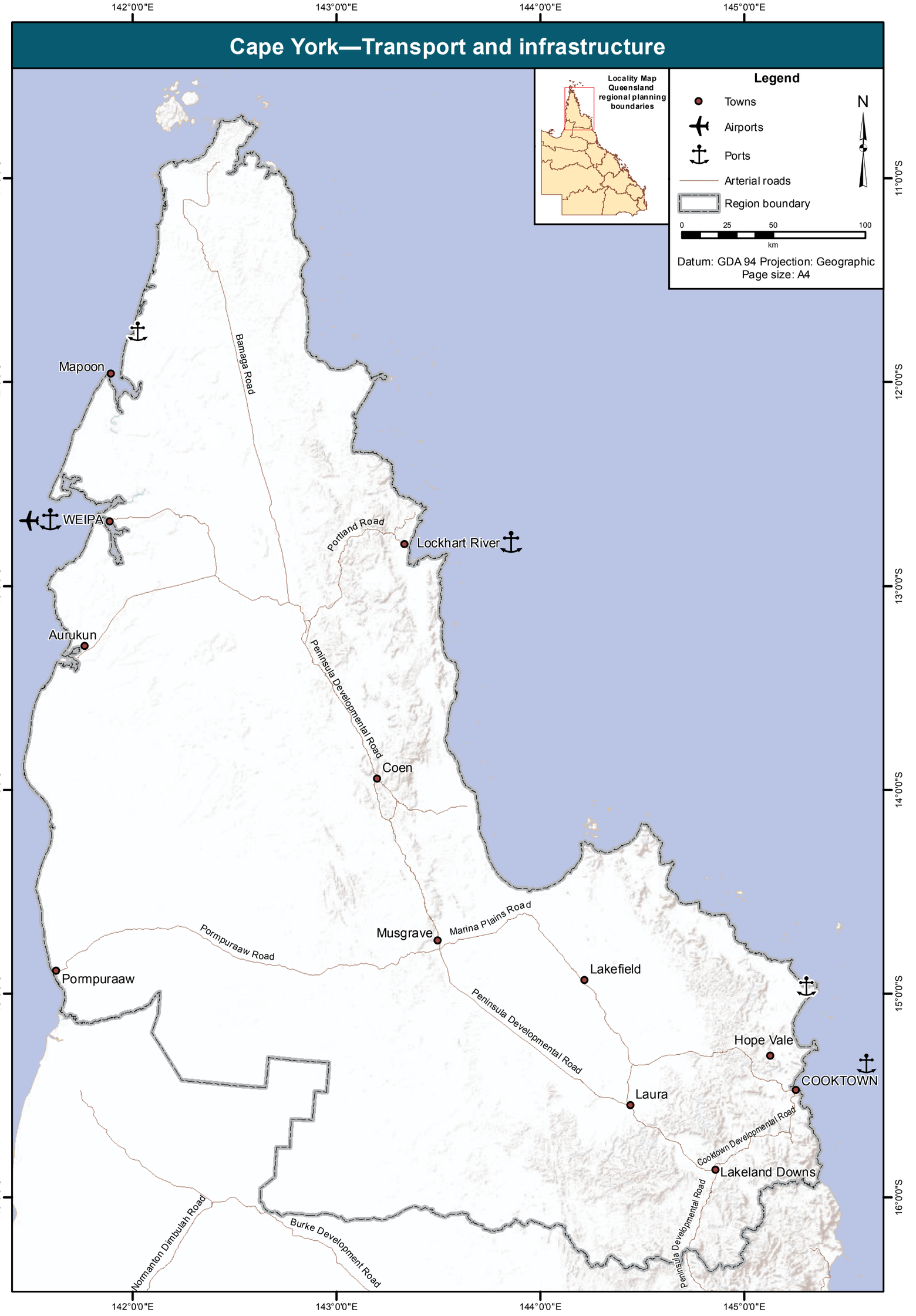
Cape York — Water resource planning



Map 4.3 Infrastructure

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

Cape York—Transport and infrastructure



Map 4.4 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 agricultural 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.

Cape York 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
- Clearing requires further verification - no regional ecosystem mapping
- National parks and state forests
- Region boundary
- Roads
- Rivers
- Towns

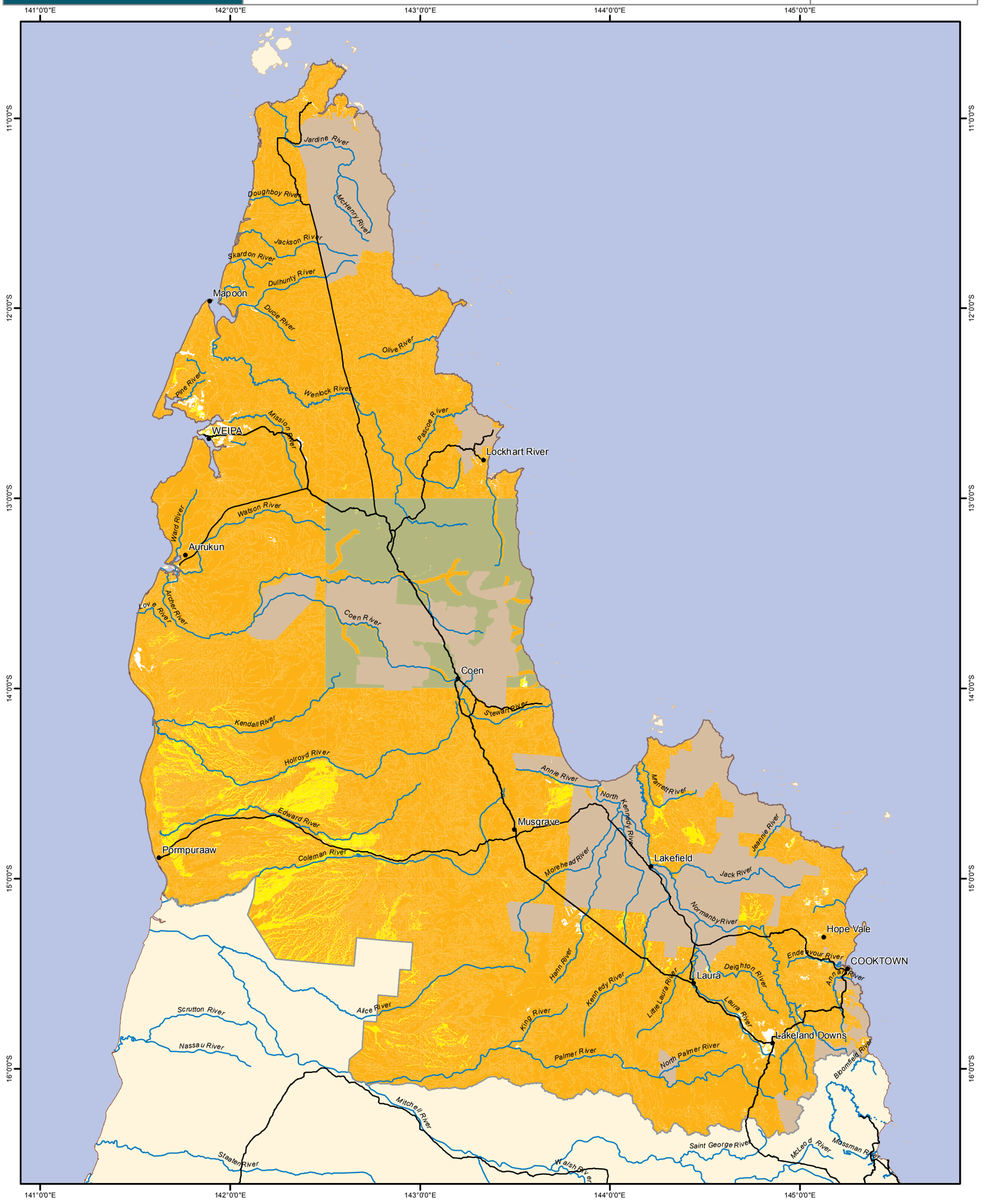
N

1:2,000,000

0 15 30 60 90 120
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.5 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. 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.

Cape York
Current land use based on QLUMP data (1999) and other data sources for forestry
(see explanatory notes)

Legend

- Current forestry plantations
- State forests
- Annual horticulture
- Perennial horticulture
- Cropping
- Irrigated cropping
- Grazing
- Intensive animal production
- Other land use
- Managed resource protection
- Defence
- Nature conservation
- Mining
- Water
- Region boundary
- Roads
- Rivers
- Towns

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Datum: GDA 94 Projection: Geographic
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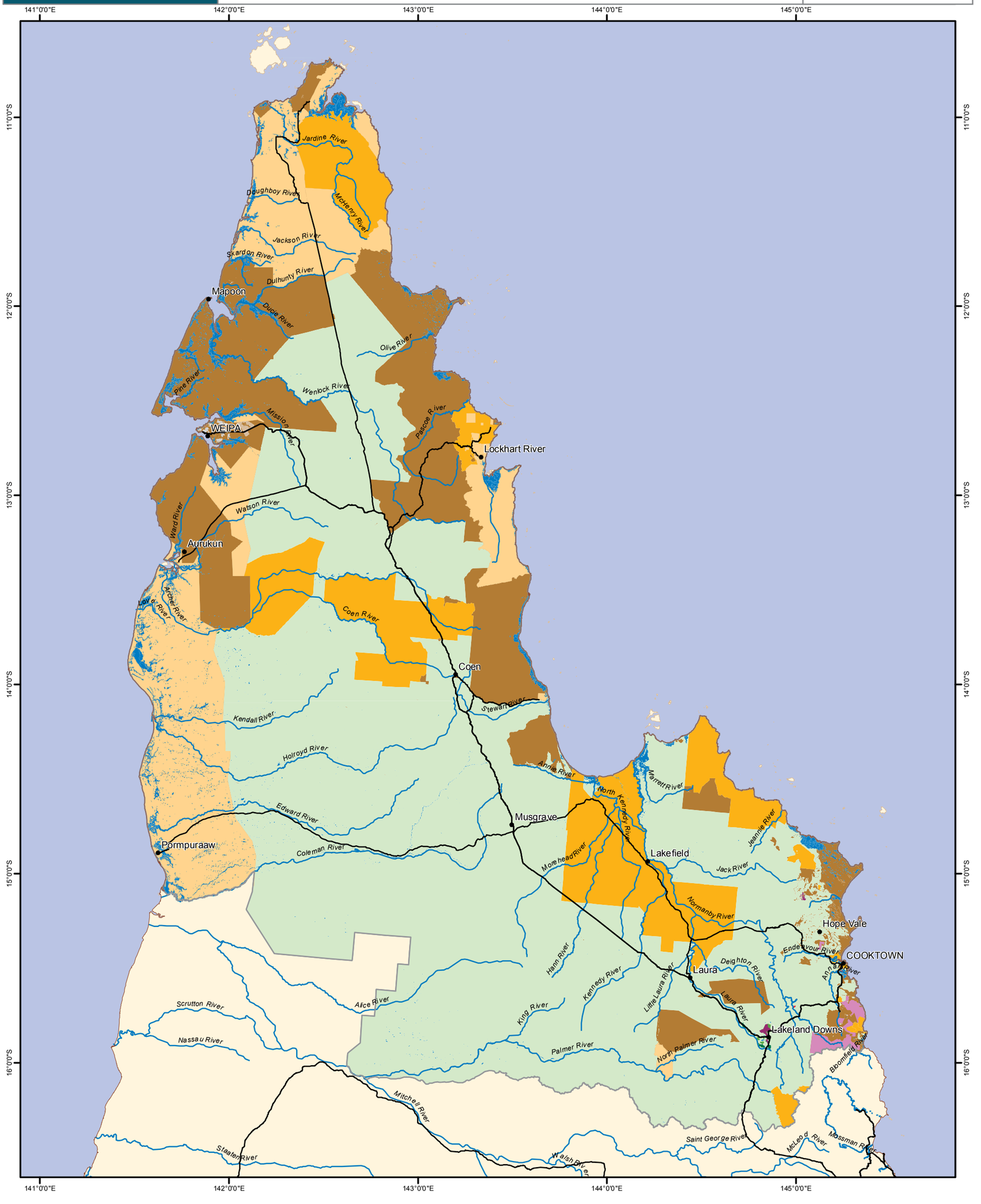
Locality Map
Queensland regional planning boundaries



Map 4.6 Important agricultural area

This map shows the important agricultural area 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 area shown on this map has 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.

Cape York
Important agricultural land areas

Legend

- Lakeland Downs
- Areas excluded from potential (see explanatory notes)
- Region boundary
- Roads
- Rivers
- Towns

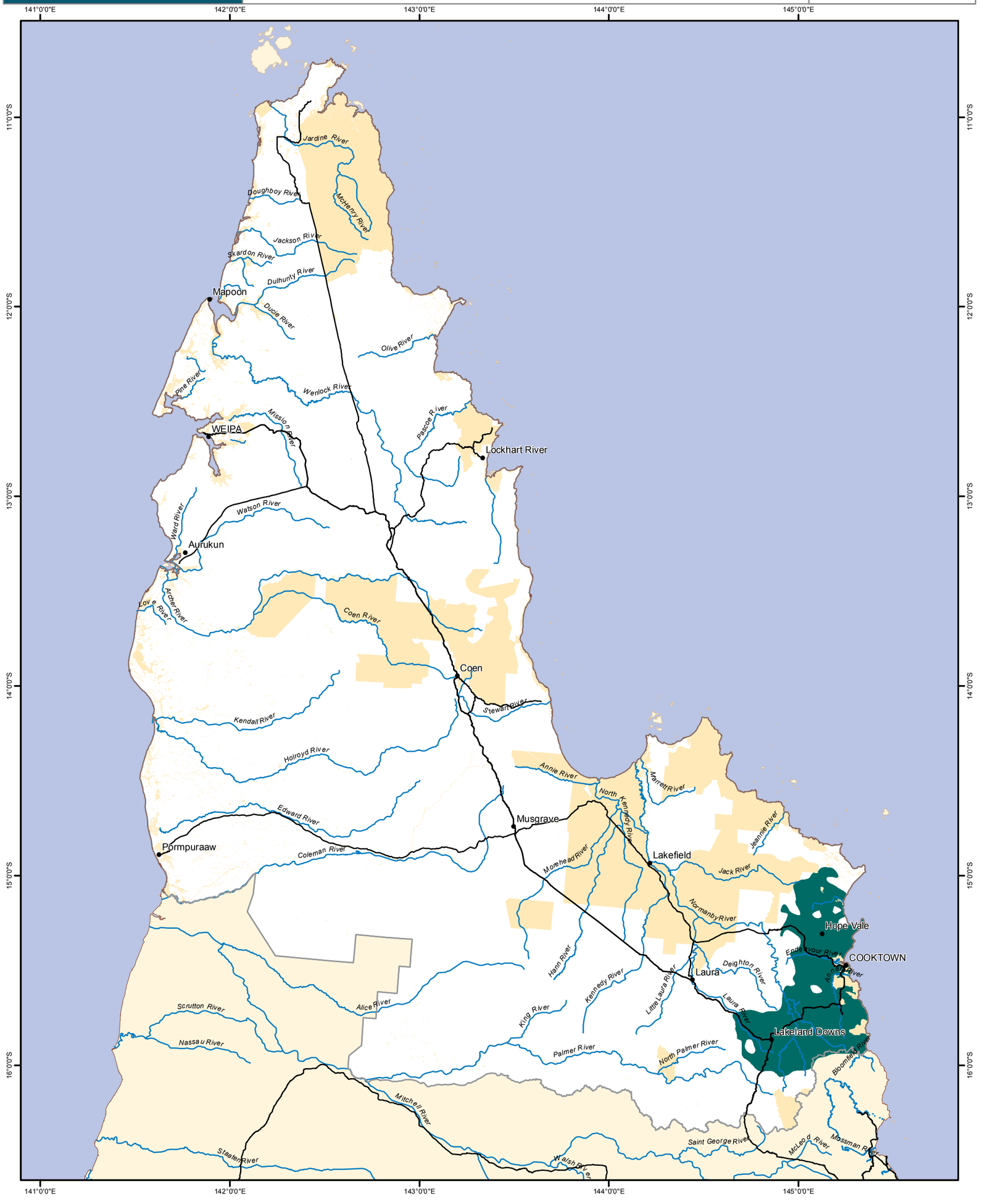
N

1:2,000,000

0 15 30 60 90 120
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.7 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 4.2). See Section 4.1 for further constraints.

Cape York Biophysical potential for broadacre cropping and current broadacre cropping

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

Legend

- Potential cropping
- Current cropping
- Current irrigated cropping
- Areas excluded from potential (see explanatory notes)
- Cape biosecurity quarantine zone
- Region boundary
- Cotton gins
- Roads
- Rivers
- Towns

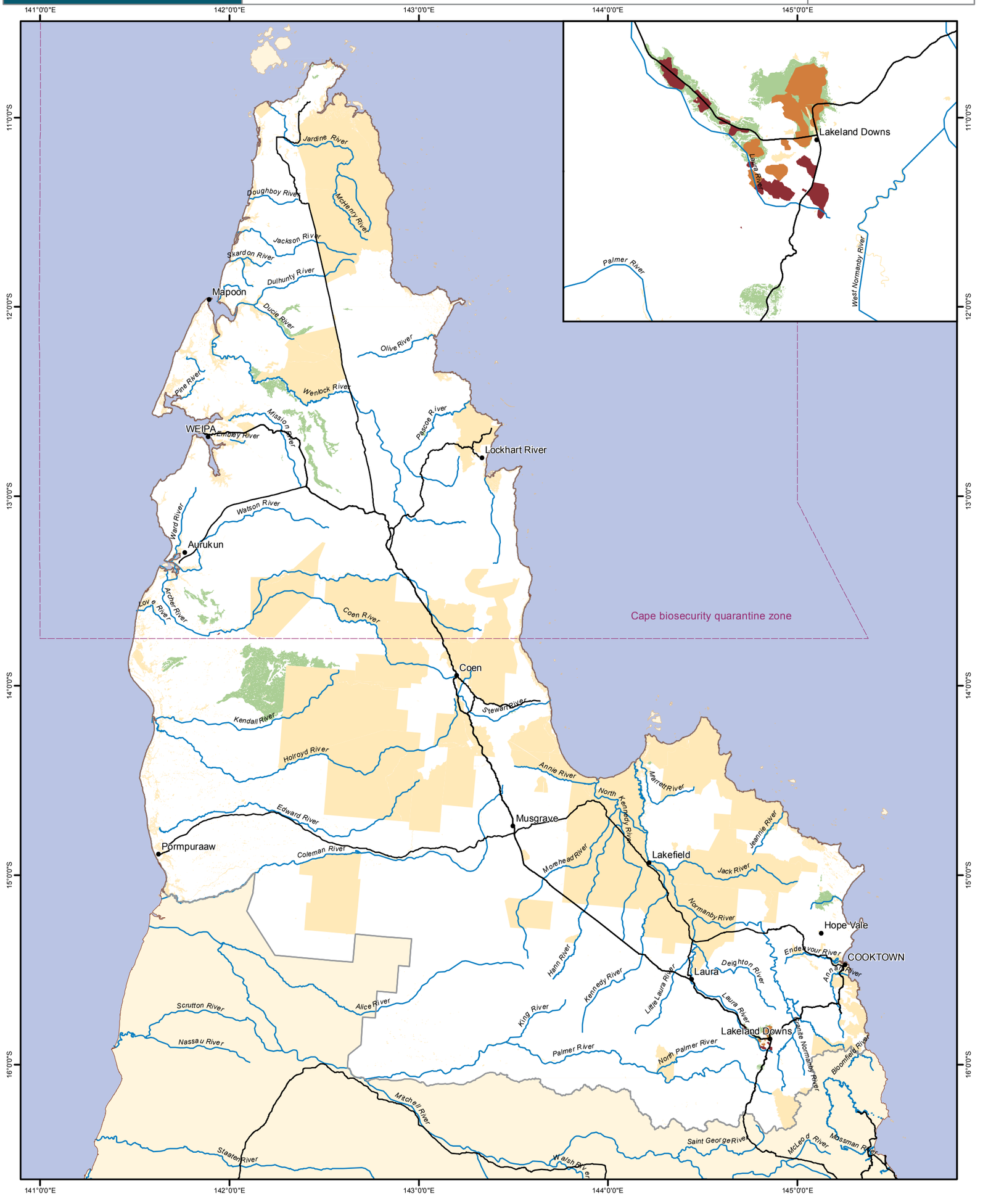
N

1:2,000,000

0 15 30 60 90 120 km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.8 Sugarcane

This map 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 4.2). See Section 4.1 for further constraints.

Cape York
Biophysical potential for sugarcane and current sugarcane

Potential based on ALC 'A' and 'B', slope <5%, <55 days per year where minimum temperature ≤9˚C

Legend

- Potential sugarcane
- Areas excluded from potential (see explanatory notes)
- Cape biosecurity quarantine zone
- Region boundary
- Sugar mills
- Roads
- Rivers
- Towns

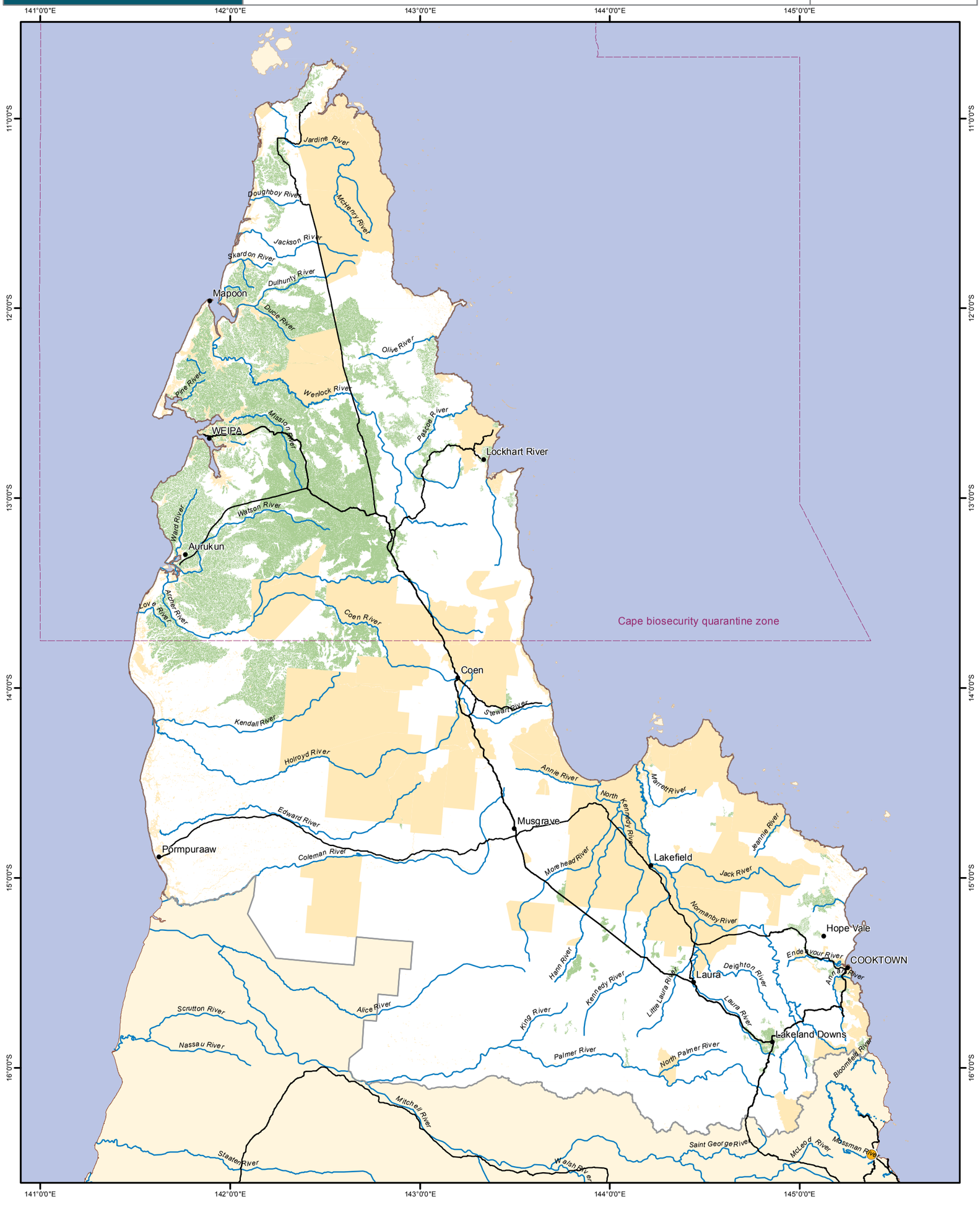
N

1:2,000,000

0 15 30 60 90 120
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.9 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 500 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 4.2). See Section 4.1 for further constraints.

Cape York
Biophysical potential for annual horticulture and current annual horticulture

Potential based on ALC 'A' and 'B', slope <8%, April - October rainfall <500mm

Legend

- Potential annual horticulture
- Current annual horticulture (not to scale)
- Areas excluded from potential (see explanatory notes)
- 50km from a population >2000
- Cape biosecurity quarantine zone
- Region boundary
- Roads
- Rivers
- Towns

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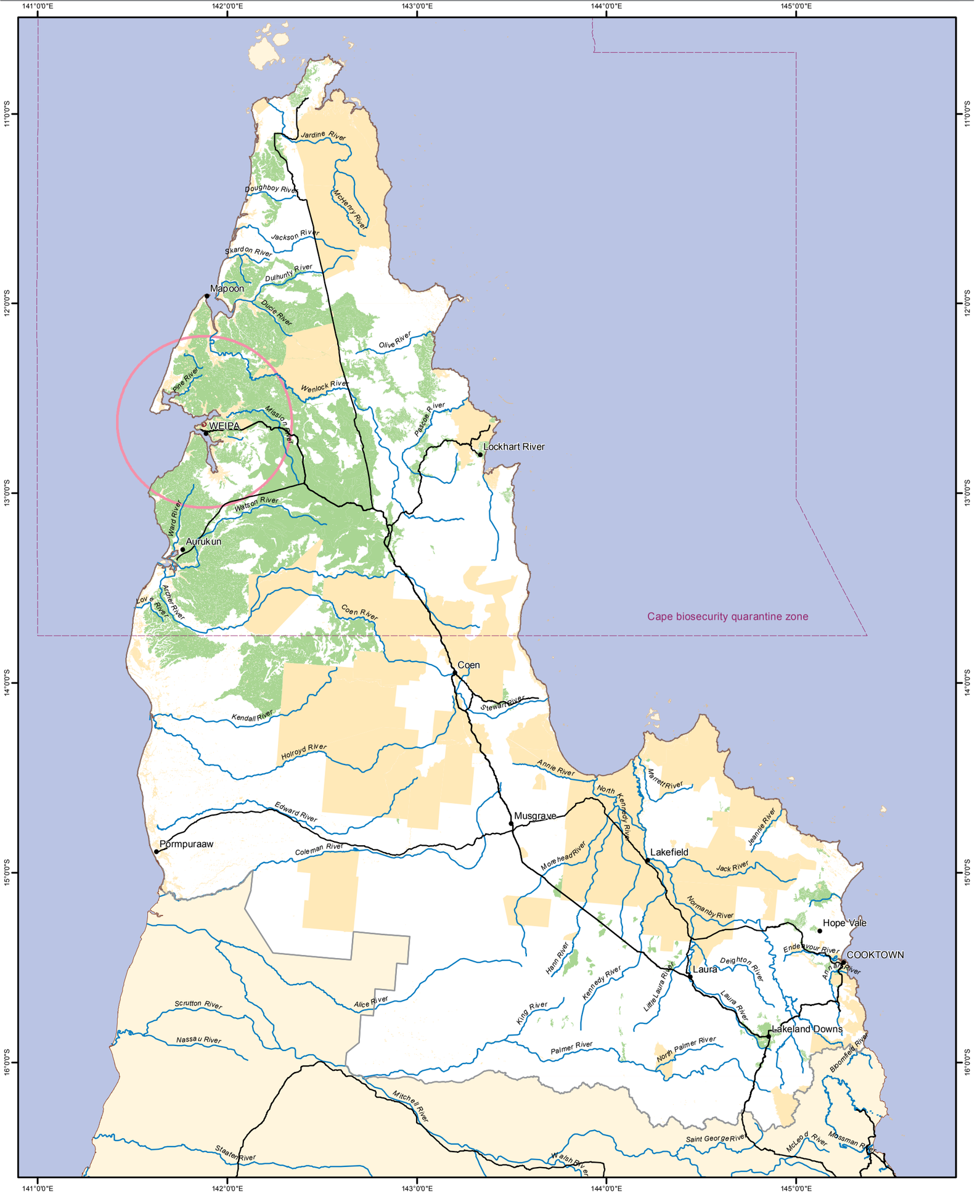
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.10 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 500 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 4.2). See Section 4.1 for further constraints.

Cape York Biophysical potential for perennial horticulture and current perennial horticulture

Potential based on ALC 'A' and 'B',
slope <15%,
April - October rainfall <500mm,
no cracking clays

Legend

- Potential perennial horticulture
- Current perennial horticulture (not to scale)
- Areas excluded from potential (see explanatory notes)
- 50km from a population >2000
- Cape biosecurity quarantine zone
- Region boundary
- Roads
- Rivers
- Towns

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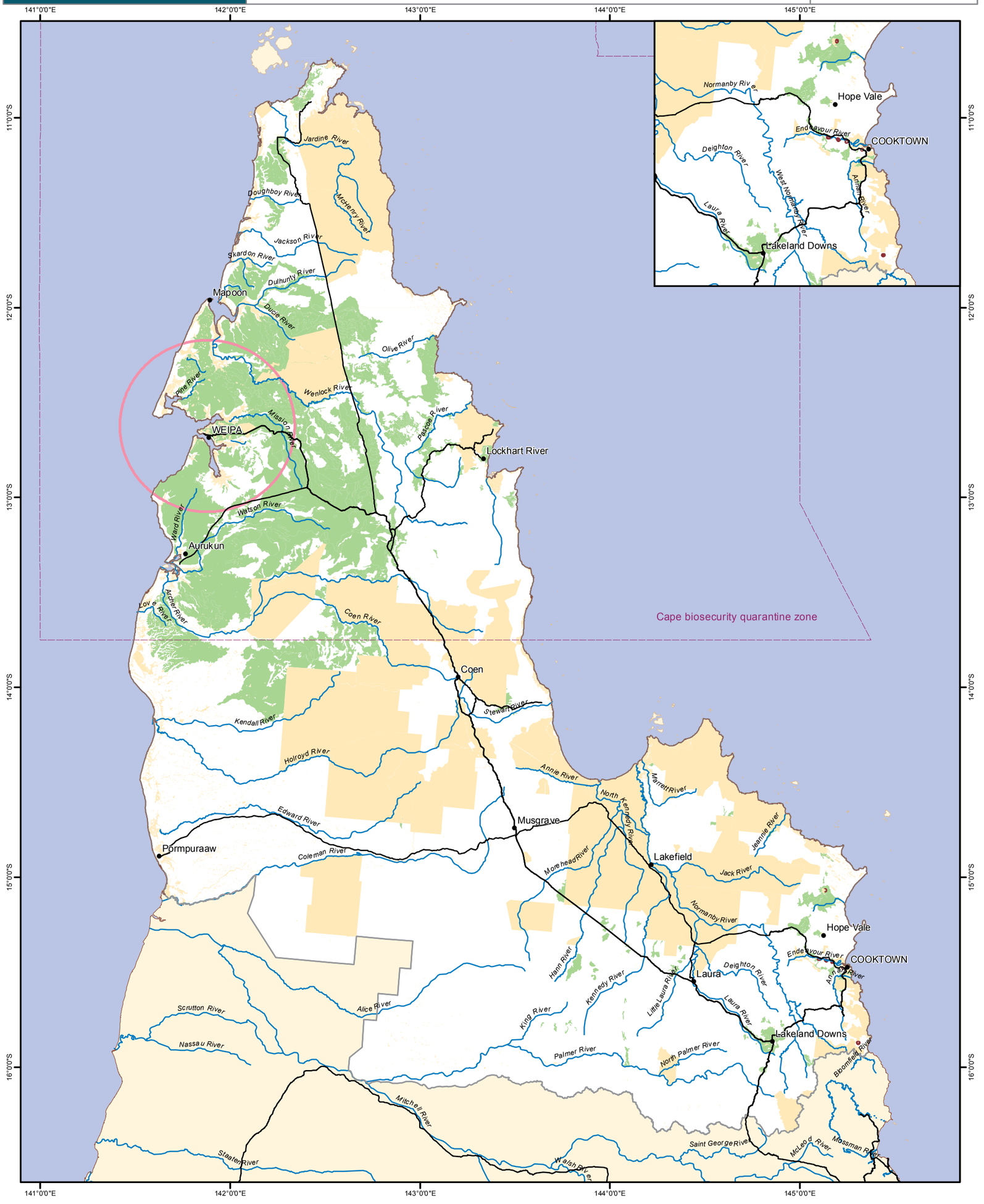
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.11 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.

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 4.2) 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 4.2). See Section 4.1 for further constraints.

Cape York
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

- Potential feedlot and piggeries area
- Current cattle feedlots (over 150 head)
- Current egg producers
- Potential marine aquaculture area
- Current aquaculture sites
- Areas excluded from potential (see explanatory notes)
- Region boundary
- Roads
- Rivers
- Towns

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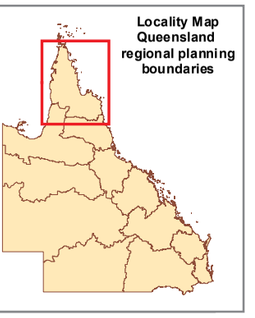
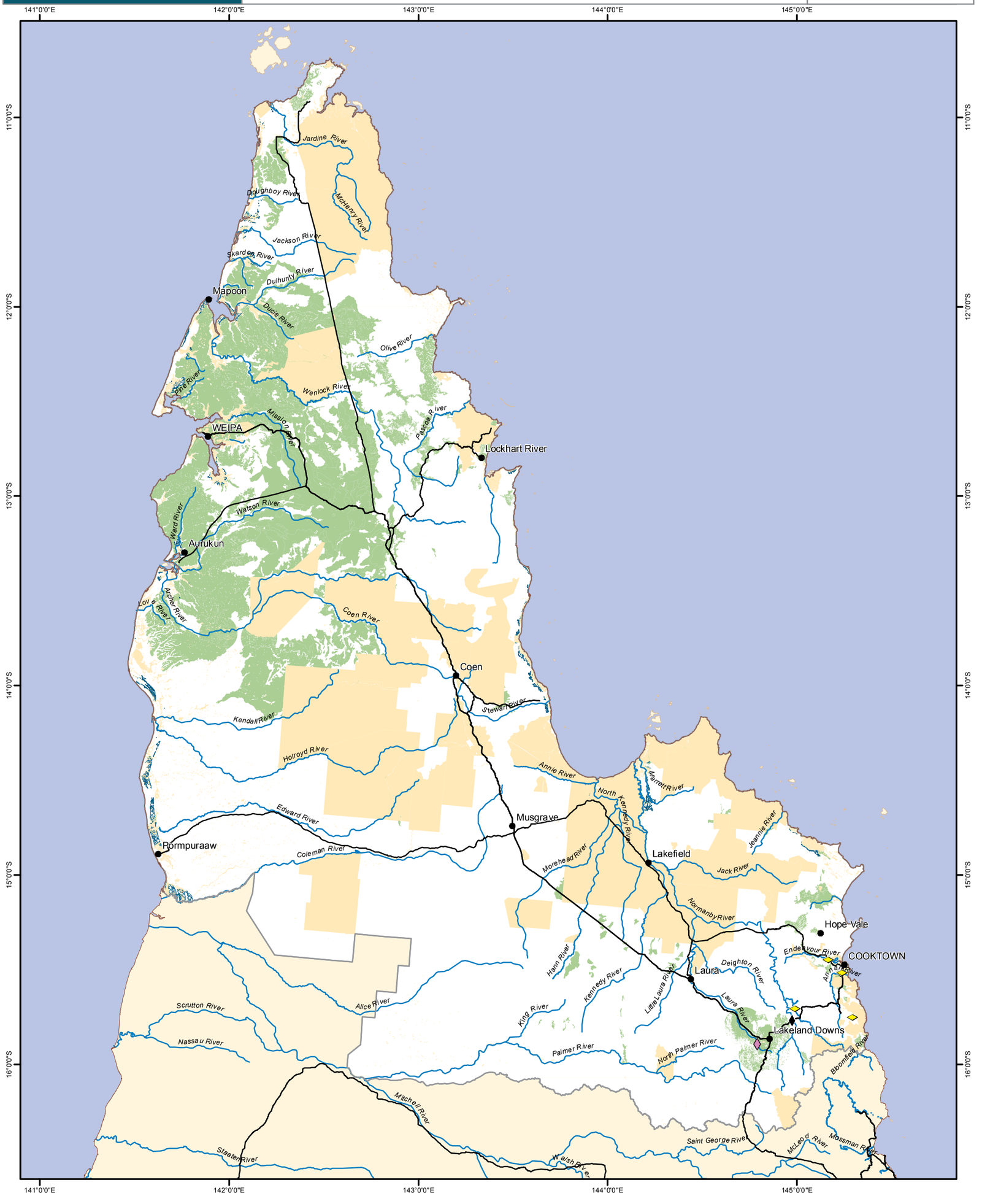
Locality Map
Queensland regional planning boundaries





Map 4.12 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.

Cape York
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)

- High >3500
- Medium 1500-3500
- Low <1500

Areas excluded from potential (see explanatory notes)
Region boundary
Roads
Rivers
Towns

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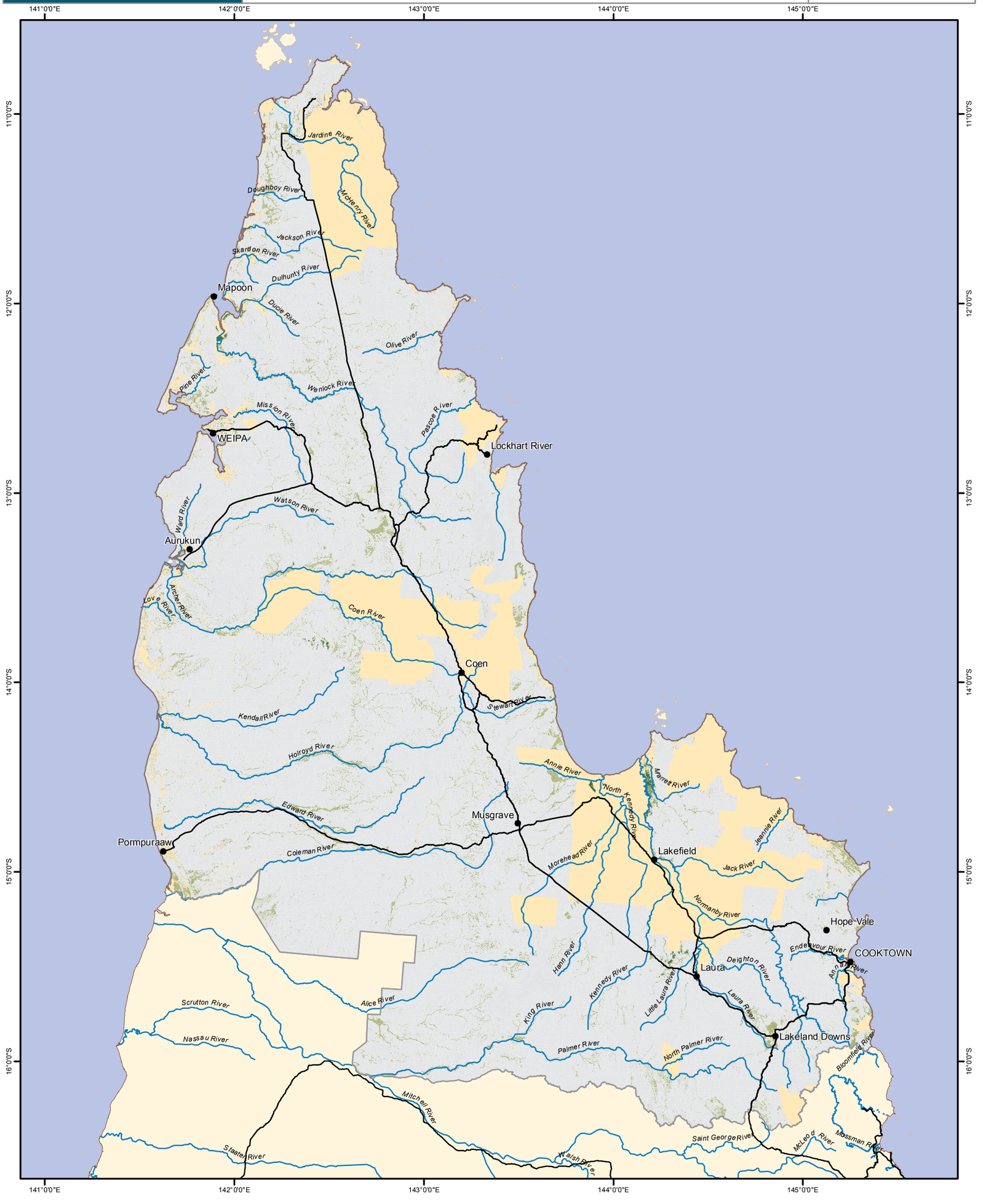
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.13 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') paramaterised 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.

Cape York
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)

- High >3500
- Medium 1500-3500
- Low <1500

- Areas excluded from potential (see explanatory notes)
- Region boundary
- Roads
- Rivers
- Towns

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Datum: GDA 94 Projection: Geographic
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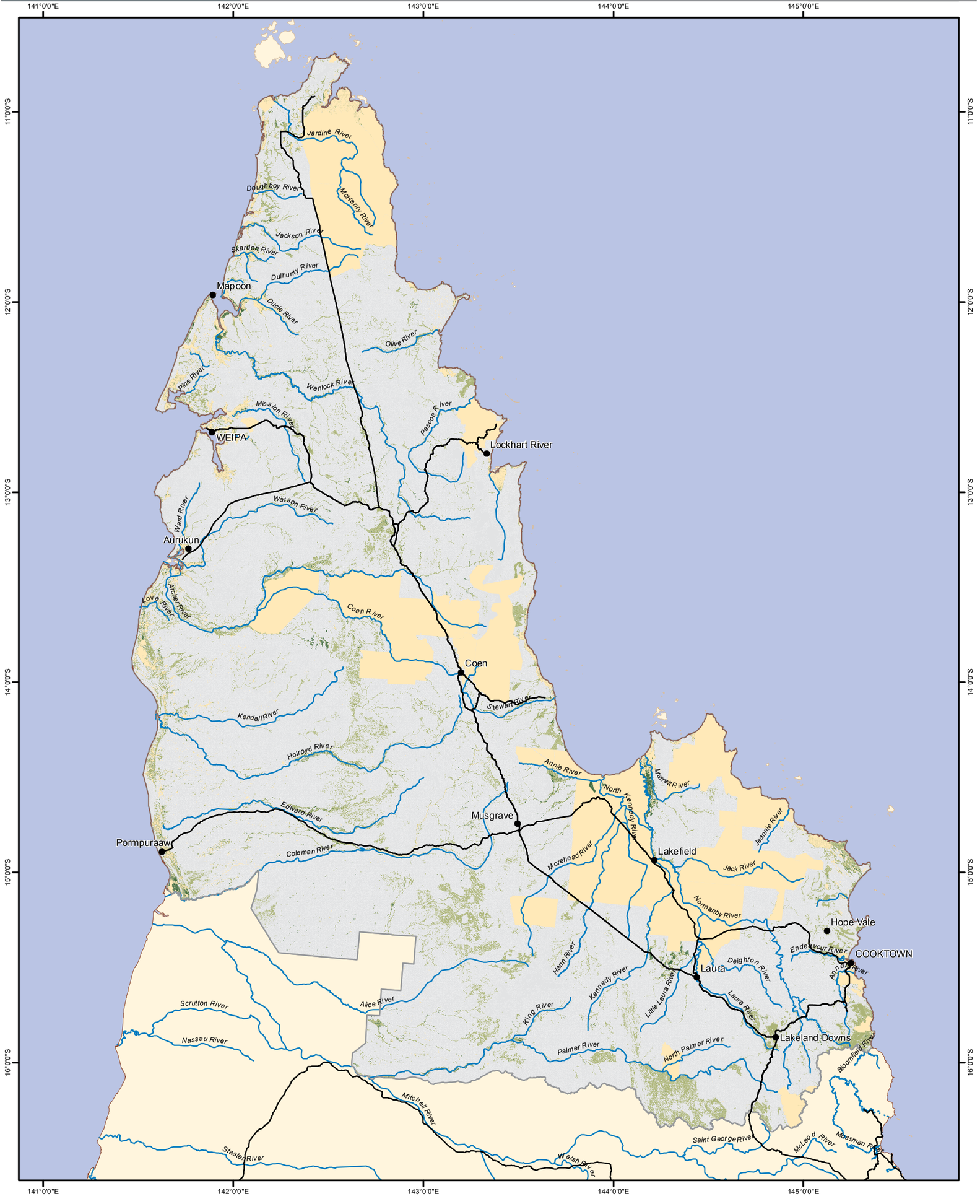
Locality Map
Queensland regional planning boundaries



Map 4.14 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.

Cape York
Areas suitable for sown 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

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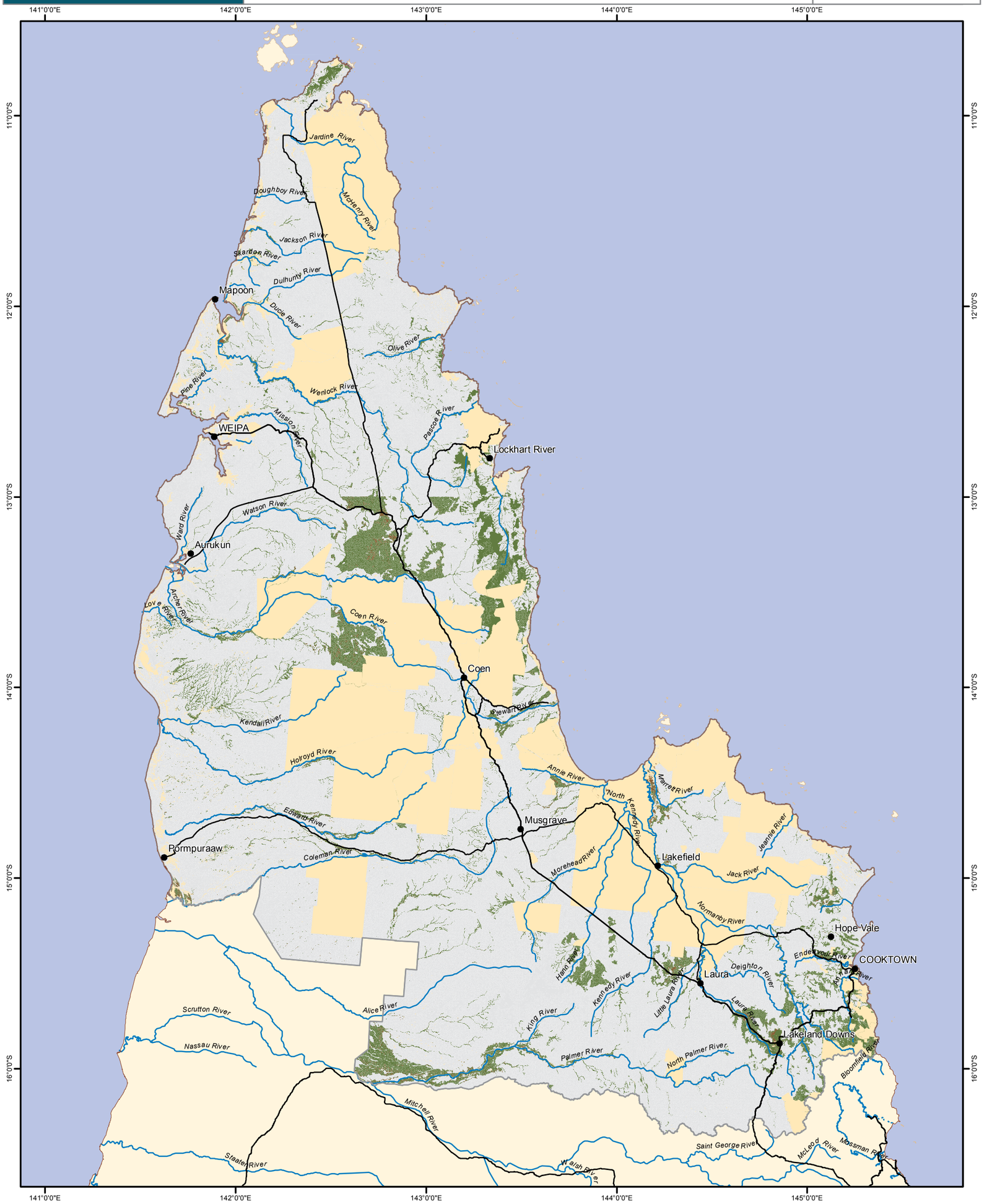
Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.15 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.

Cape York 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
- Roads
- Rivers
- Towns

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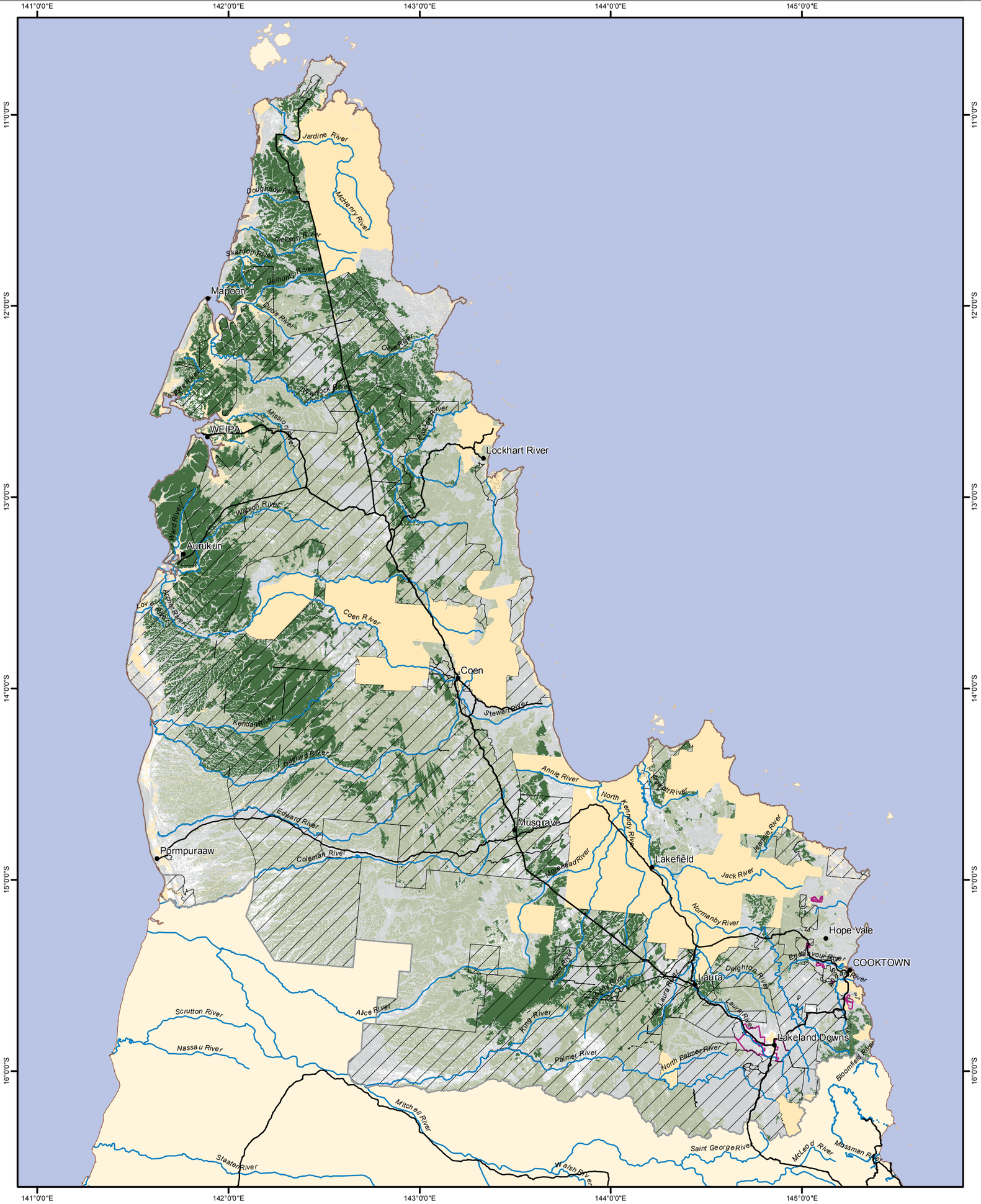
0 12.5 25 50 75 100 km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.16 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 4.2). See Section 4.1 for further constraints.

Cape York Biophysical potential for rainfed plantation forestry and current plantation forestry

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

Legend

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

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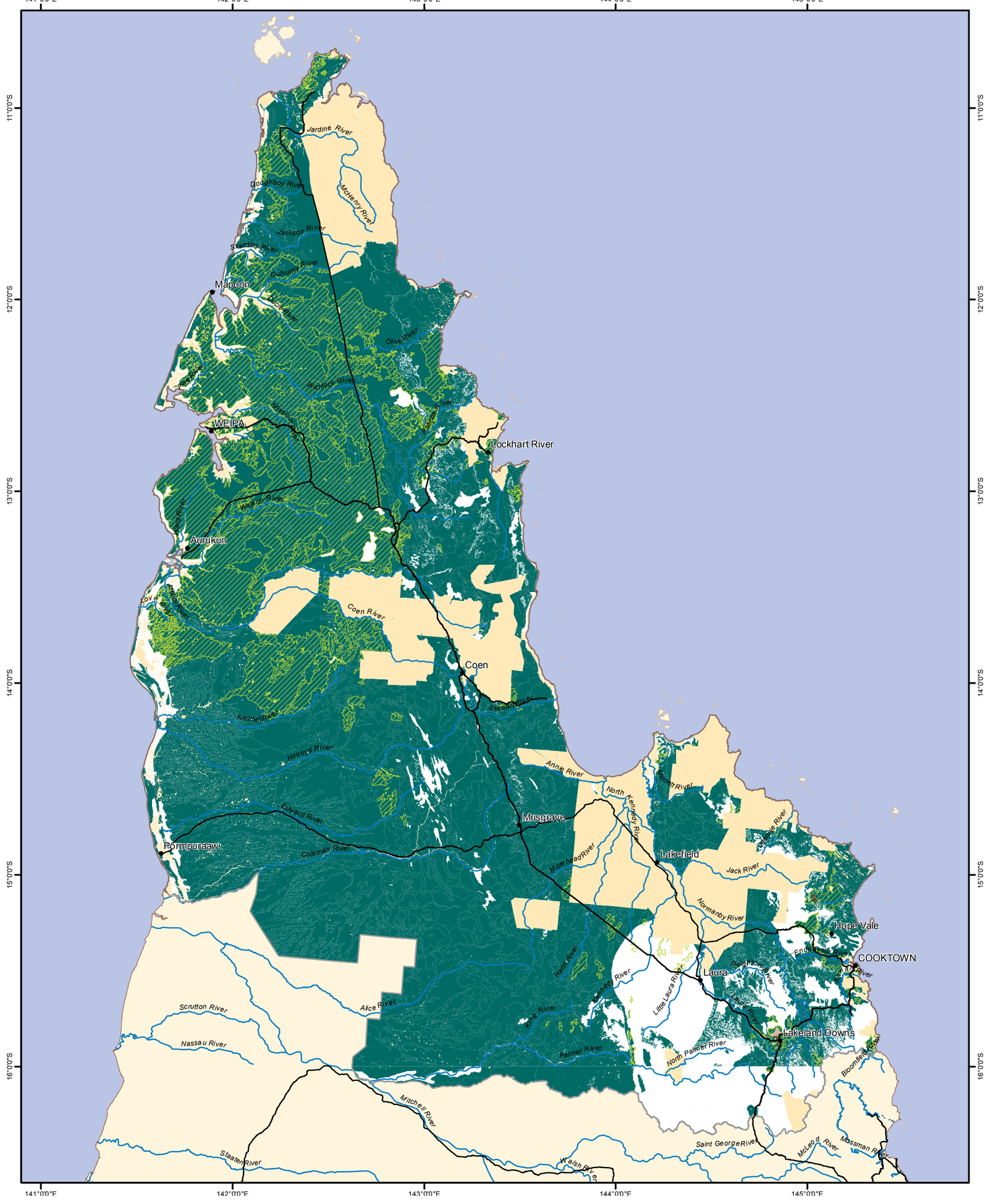
km

Datum: GDA 94 Projection: Geographic
Page size: A3

Locality Map
Queensland regional planning boundaries



Map 4.17 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.

Cape York–Confidence in ALC data