



2.0 Regional Profile



The following profile provides some details on critical assets of Central Queensland and seeks to provide a picture of the vast and beautiful region this plan intends to protect. For details on pressures on critical assets, and their condition in relation to indicators of pressure, see Appendix 3: Regional Overview. A summary of pressures is found at the end of this section, in Table 13. A list of species of conservation concern is listed in Appendix 4: ERIN.

2.1 Regional Assets

In natural resource management terms, assets are those things used or valued for the economic, social and environmental services they provide. Table 7 below identifies the regional assets, determined by the regional community, which must be protected or enhanced to achieve ecologically sustainable development in Central Queensland. Several components of each asset are also identified.

Table 7. Register of Regional Assets and their components

Asset	Component
Land	Productive agricultural land – diversity of land systems; grazing, dryland and irrigated cropping land; road reserves and stock routes; potential productive land; organic farming enterprises; farm-stay tourism
	Forestry – state forests; private forestry (native forests, woodlands, and plantations)
	Mining Land - mineral, energy, or extractive industry resources that include coal (Bowen and Surat basins); oil shale; limestone; gold and other mineral deposits; gem deposits; oil and gas fields; and sand, gravel, and other aggregate material deposits
	Conservation Land – national parks; conservation reserves and wetlands; vegetated riparian land; road reserves; stock routes; areas of state lands; endangered and of-concern regional ecosystems; weed free land; defence force land (Shoalwater Bay)
	Indigenous - access to land and sea country, transfer of knowledge, bush tucker and medicines, stories and uris; Indigenous pastoral properties
	Recreation Land – recreation; tourism; coastal landscapes; climate
	Urban, industrial and infrastructure land – cities and towns; population centres; industry and services; transport; Gladstone port and Port Alma; water storage and distribution; power generation; Gladstone State Development Area; intensive industries; meatworks/saleyards; well established rural services, facilities and local manufacturing
Ecosystem Health & Biodiversity	Bioregions, regional ecosystems and diverse landscapes – diverse bioregions; significant regional ecosystems and diverse landscape including flood plains, estuaries, ranges, islands, dunal systems and coastal landscapes
	Important habitat – wildlife refuges, species, communities and vegetation corridors in particular associated with hills and ranges, and rivers (e.g. along the Mackenzie River; Isaac and Connors Rivers); national parks (conservation land component); nationally and internationally recognised wetlands; near pristine estuaries; Shoalwater Bay Military Training Area
	Flora and Fauna – remnant vegetation, native fauna, threatened species; native timber
	Healthy waterways –significant species; important habitat –creeks, rivers and fresh water springs; significant off-stream-wetlands (including floodplain wetlands); connectivity and bioregional habitat integrity, including long reaches of uninterrupted or relatively natural river flow
	Estuaries, Coast, Reef and Seas – estuarine coastal and marine ecosystem integrity; important estuarine habitat; Great Barrier Reef; significant wetlands (Ramsar listed wetlands, coastal wetlands and freshwater wetlands); significant fauna species; coast-based industries; commercial, recreational and Indigenous Traditional Owner fisheries
	Cultural and spiritual value – native title rights; bush tucker and medicines; access



Water	Water use and management – water allocation and infrastructure; recreational use of inland waterways; access to water (for) agriculture, mining, industry and urban communities (including unallocated water); commercial and recreational fisheries; awareness of waste and reuse of water; environmental flows; healthy natural aquatic and riparian ecosystems
	Water Quality – Good water quality; health of aquatic ecosystems; water for primary industries; recreation, scenic and aesthetic values; drinking; industry and mining; good quality ground water
Great Barrier Reef	Biodiversity – diversity of species, communities
	Amenity – great scenic value
	Social / cultural – iconic stature for all Australians, particular significance for traditional owners
	Economic – tourism and recreation, commercial and recreational fisheries, publications
Air	Climate – diversity, amenity
	Air quality – good air quality supporting healthy ecosystems and economic and social assets
Cultural Heritage	Indigenous and Non-Indigenous – beliefs and values
	Cultural landscapes and places – places of cultural heritage significance (sites, artefacts, locations, landscape features, buildings); access to land and sea country, bush foods and medicines; essential and other oils; historical view of country; history
Economic	Primary production – beef; dairy; cereal and coarse grains; cotton; horticulture; fodder; fishing; forestry
	Mining – coal; oil shale; gold and other metal mines; oil and gas wells; gems; limestone; gem; quarry materials; shale oil; and other extractive industrial quarry sites
	Value adding – metals and non-metal manufacturing; food manufacturing; building and construction; energy generation; trade; cotton
	Transport – road and rail network; ports and harbours; airports
	Education – universities, TAFEs, schools, agricultural college
	Employment – including government and private sector
	Tourism – Great Barrier Reef; national parks; farm stay; cultural; built infrastructure
Social	Viable regional communities – population and employment; recreation; health and social services; education
	Social capital – people and networks; knowledge and experience; volunteers; widespread participation and sharing of knowledge; resource managers in local government, local (e.g. Landcare) catchment and regional community-based organizations and groups; resource managers; cooperation of major stakeholders; community services
	Management experience and knowledge – land managers; industry networks; labour; services; information and knowledge (local, technical, regional; individuals and institutions); Indigenous knowledge; traditional land management practices; urban people
	Physical, social and governmental integrity - integration of NRM plans and planning; robust planning and management; strong NRM institutions; healthy regional arrangements





2.2 Introduction to the Region

The Central Queensland region, home to approximately 200 000 people, covers ten percent of Queensland's land area along the Tropic of Capricorn. It covers a diverse and beautiful land and seascape, with distinctive rural and urban communities. In catchment area, the Fitzroy catchment is the largest river system running to the east coast of Australia. The Great Barrier Reef off our coast is the largest coral reef system in the world.

The land of the region covers 156 000 square kilometres, and encompasses the major systems of the Fitzroy, Boyne, and Calliope rivers as well as the catchments of the smaller coastal streams. The Fitzroy catchment is made up of the catchments of Nogoia, Comet, Mackenzie, Isaac, Dawson, and Fitzroy Rivers and forms the largest part of the region. The Boyne and Calliope Rivers drain the southern part of the region, entering the Pacific Ocean at Gladstone. Coastal streams drain to the coast along its length.

The Central Queensland region encompasses nineteen shires, wholly or in part. These shires and their estimated resident population in the region in the census years of 1991, 1996, and 2001, and the trend between 1996 and 2001 are listed below in Table 8.

Table 8: Estimated resident populations of Central Queensland shires, 1991-2001

Total: Central Queensland		1991 190,282	1996 197,784		2001 199,208
Local government area	Percent of population resident in CQ region			Trend	
Banana	100	14,997	13,881	↑	14,369
Bauhinia	100	2,363	2,238	↑	2,262
Belyando	92	10,393	9,898	↓	9,141
Broadsound	92	7,885	6,948	↓	6,001
Bungil	44	917	879	↓	858
Calliope (S) - Part A	88	7,448	9,480	↑	10,843
Calliope (S) - Part B	100	2,666	2,802	↓	2,793
Duarina	100	10,553	9,232	↓	7,659
Emerald	100	9,842	12,564	↑	13,009
Fitzroy (S) - Part A	100	3,531	4,661	↓	4,652
Fitzroy (S) - Part B	100	4,750	5,159	↑	5,299
Gladstone	100	24,983	26,574	↑	26,873
Livingstone	100	18,042	23,156	↑	26,369
Mount Morgan	100	3,278	2,964	↓	2,952
Nebo	45	1,139	1,016	↓	951
Peak Downs	100	3,722	3,127	↑	3,145
Rockhampton	100	60,067	59,857	↓	58,775
Taroom	100	3,216	2,787	↓	2,667

Central Queensland experiences a tropical to subtropical humid to semi arid climate. Annual median rainfall throughout the region is highly variable, ranging from about 600 mm annual at Emerald to more than 800 mm along the coast, and over 1000mm in the north where coastal ranges trap moist on shore airflow. Most rain falls in the summer, with many winters experiencing no rain at all. Because of the tropical influence on rainfall patterns, heavy storms can trigger flash flooding, and occasional cyclones wreak havoc. Although wind damage from cyclones is usually confined to coastal and near coastal areas, rain depressions in the aftermath of cyclones have caused major flooding in all parts of the catchment.



2.3 Land resources

Tenure

Seventy percent of the land area is owned by the State in a variety of tenures including National Parks, State Forests and Reserves, unallocated State land, road and railway reserves, and privately occupied leasehold land. The remaining thirty percent is under freehold tenure.

Land use

The following table describes land uses in the Boyne, Calliope, and Coastal Catchments in 1999 and the Fitzroy in 1997.

Table 9: Land use in Central Queensland: Fitzroy 1997, Boyne, Calliope, and coastal catchments 1999

Land use	Coastal Boyne Calliope 1999		Fitzroy 1997	
	Area (ha)	%age of total area	%age of total area	Area (ha)
Conservation & natural environment	378690	27%	4%	580070
Production from relatively natural environments (grazing and native forestry)	877006	62%	88%	12546606
Production from dryland agriculture & plantations	822	0.06%	6.80%	963769
Production from irrigated agriculture & plantations	2199	0.16%	0.50%	74976
Intensive uses	20257	1.40%	0.60%	88806
Water environments (streams, wetlands)	128171	9.10%	0.08%	12322
Total	1 407 148			14 266 549

Land resource areas

Land Resource Areas (LRAs) are defined by patterns of landscape and geology. Map 2 shows the dominant land resource areas of Central Queensland. Different land resource areas have different properties with respect to hydrological operation and how plants respond to those properties. LRAs such as Alluvial Plains and Brigalow Plains are generally more fertile and productive than Eucalypt Uplands, however, the characteristic properties of different areas are not solely related to productivity. LRAs have different properties with respect to erosion risk, and therefore streams draining different LRAs have naturally variable levels of sediment.

At the broad level the main driver of variation between different land types is rock type and landscape evolution. At more detailed levels, regolith becomes more important, playing a role in the amount and location of stored salt, and the pathways by which salt and water move in the landscape.



Land system diversity

As indicated in Table 9, Central Queensland land supports a wide diversity of uses, from conservation to production based industries such as agriculture, forestry, and mining, recreation, and urban and industrial uses, as well as supporting values of Indigenous communities. Different tenures and zoning, along with a wide variety of LRAs (see Map2) support these different uses.

Productive agricultural land

Agricultural production has the greatest footprint of any land use in Central Queensland, with nearly 90% of the land under agricultural production (see Table 9). Because of its sheer size in relation to the overall area, most LRAs are used for agriculture. The most fertile areas on land of minimal slope are used for cropping, and where these areas are close to water supplies, for irrigated cropping. Most highly sought after for cropping are the Alluvial Plains, Brigalow Plains, and Undulating Downs.

Other LRAs are used very successfully for grazing. Some of these areas have been cleared of native vegetation and sown to exotic species such as Buffel, Green Panic, and Rhodes grasses, greatly increasing the economic productivity of some of the previously forested areas, such as the Eucalypt Clay Uplands and Eucalypt Duplex Uplands. Stock routes, camping and watering reserves, and road reserves are therefore important areas of remnant vegetation. Where they are of sufficient width and area, they serve as important refugia and corridors for movement of native animals, particularly during dry seasons.

As the footprint is so large, and most of the land used for agricultural production is freehold or privately occupied leasehold land, access to country by traditional owners is very limited.

For details on agricultural production, see “Economic assets: Agricultural production”

Forestry land

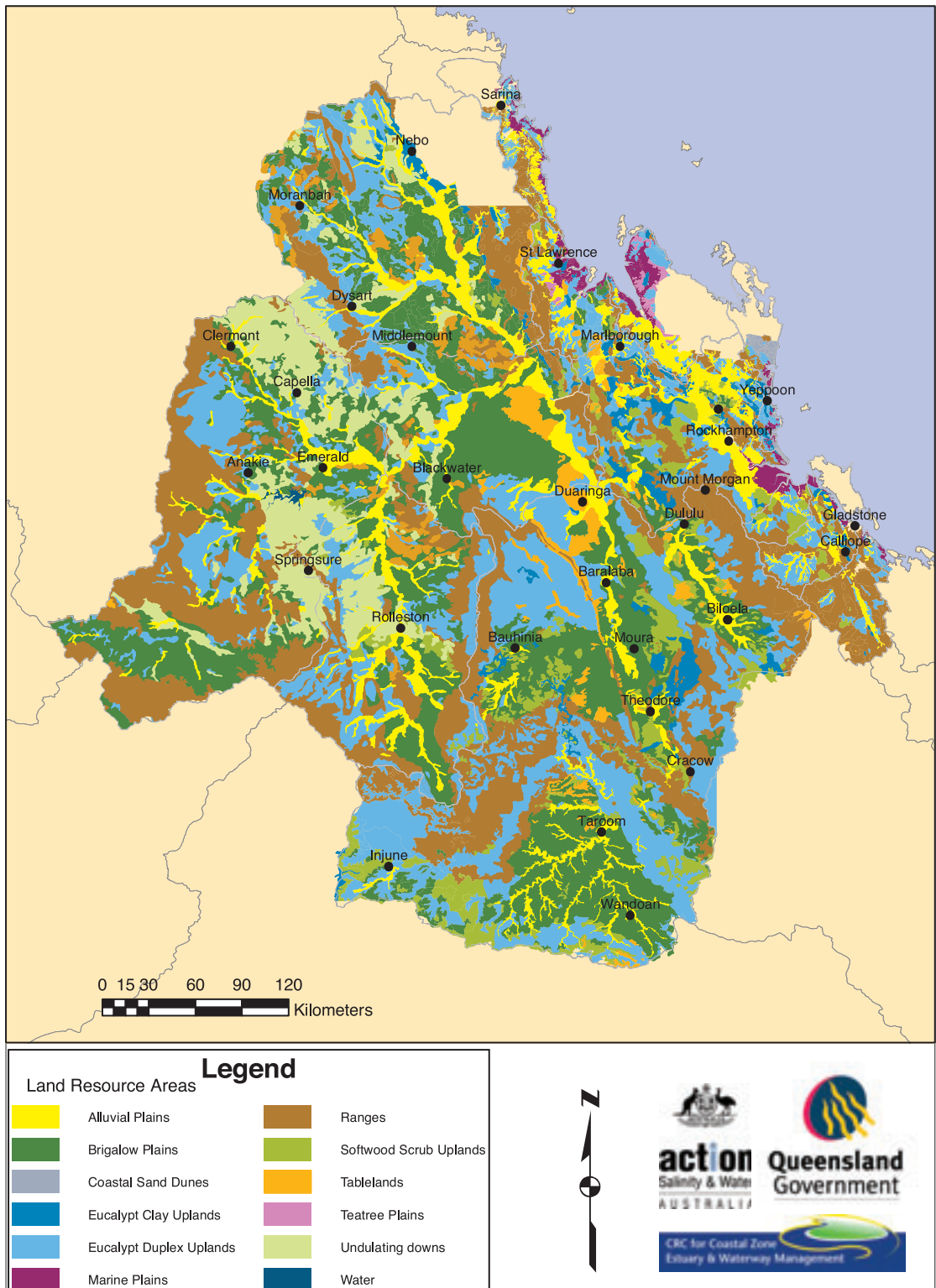
Approximately 900 000 hectares of land in Central Queensland is currently under State Forestry. Initial estimates of remnant vegetation on freehold land containing commercial timber species in the Fitzroy Basin alone (not inclusive of coastal catchments or the Boyne and Calliope catchments) are about 1.8 million hectares. Agroforestry is becoming an important diversification for those involved in grazing and cropping, and it can be assumed that the extent of private forestry is increasing.

Mining land

Mining and other extractive industries such as quarries use about 56 000 hectares in Central Queensland. Mining is a very important economic contributor to the region. For further details see “Mining” under “Economic Assets”.

Conservation land

Approximately 6% of the region’s land is under conservation management. See “Ecosystem health and biodiversity” for the significance of this land.



Map 2 – Land Resource Areas of Central Queensland



Indigenous land

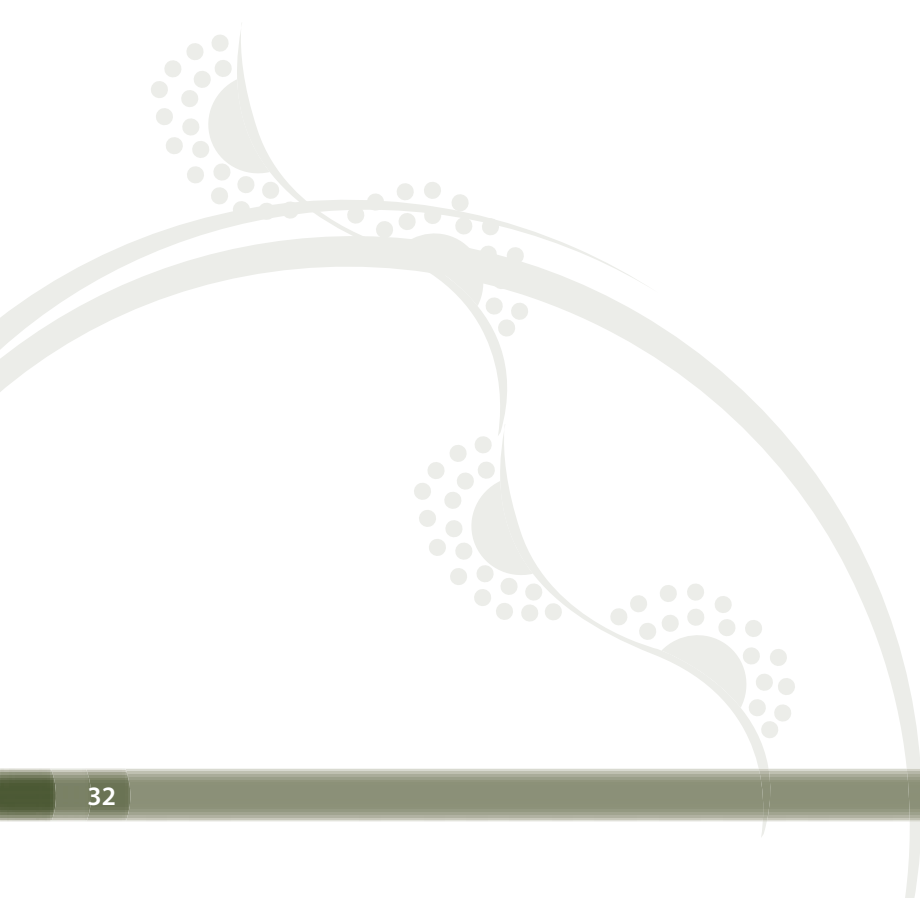
Most of the crown land in the region is under Native Title claim. In addition, Indigenous groups own pastoral properties and provide local government over the Woorabinda local government area. These lands are significant for the opportunity they provide to traditional owners for access to country and to self govern.

Recreation land

No estimate of the area of land under management for recreation is available, however, most regional shire councils manage land whose primary purpose is recreational. This includes racecourses, showgrounds, and other such areas. The clubs whose recreational pursuits are followed on the land privately owns some of these areas.

Urban, industrial, and infrastructure land

Between 0.5% and 1.0% of the region's land is under this use, which includes intensive animal industries such as piggeries and feedlots. It is also the land supporting utilities such as electricity generation and transmission, and gas storage, treatment, and transmission. Transport and communication (ports, aerodromes, roads, railways etc) are also included, as are waste disposal and treatment plants.





2.4 Water

Water resources of Central Queensland include rivers and streams; groundwater resources; and water storages such as barrages, dams, and weirs of various sizes and security of reserves.

Because of the variability of rainfall in Central Queensland, annual discharge from the principal streams varies considerably. From 1965 to 1998, median annual discharge from the Fitzroy River has been around 2.7 million megalitres. Most of this comes directly from run-off during rainfall, however, there are also important spring fed supplies in streams such as the upper Dawson and upper Nogoia Rivers, Carnarvon, and Mimosa Creeks in the upper catchments; and Raglan, Marlborough, and Waterpark Creeks on the coast.

Water and its use underpin the entire social, environmental, and economic fabric of Central Queensland, and are intrinsically linked to the culture of Indigenous and non-Indigenous people.

Streams and rivers flowing naturally are the lifeblood of Indigenous landscapes that see social health and vitality very much integrated with environmental health. As no groundwater apart from that flowing from natural springs was available to Indigenous people in their traditional lifestyles, water from streams and waterholes sustained the resident populations. In addition to the supply of water, animals living in and attracted to streams for water supplied an important source of food.

Waterholes and lakes created by dams and weirs are important recreational opportunities for people in Central Queensland. Many of these water bodies have been stocked with fish such as barramundi for recreational fishing and those wishing to fish in these lakes now pay a permit fee to assist the restocking process. Skiing and swimming are also important pursuits in the hot climate. Aesthetic elements of lakes and streams provide pleasant spots for picnicking and relaxation.

In an effort to strike a balance between environmental and productive requirements of the Fitzroy system, the Fitzroy Water Resource Plan was released in 1999. Implementation of the Plan ensures that environmental needs of the river system are catered for and that environmental flows will be part of the river's management. A series of objectives relating to environmental flows form part of the Plan's schedules, and a project to determine how best to measure the achievement of objectives is due for completion by 2006.

The Resource Operations Plan required under the *Water Act 2000* for parts of the Fitzroy catchment has been finalised. This plan allows for distribution of allocations of water for productive use.

A Resource Operations Plan is in place for the Boyne River. It defines how water will be managed for community and environmental needs. Meeting objectives relating to environmental flow form part of the river's management. The first environmental releases were discharged in the summer of 2004.

A Water Resource Plan is being prepared for the Calliope River and coastal creeks flowing into The Narrows.

The Central Queensland Regional Water Supply Study is underway to develop a long-term, whole of region strategy for the allocation of water to best meet the future urban, industrial, mining and agricultural needs of the Region. The study also aims to achieve optimum outcomes in environmental, social and economic terms. This will form the basis of the Central Queensland Regional Water Supply Strategy which is expected to be released towards the end of 2005.

2.4.1 Infrastructure

The provision of water for irrigation, industry, and urban use is vital to the economic sustainability of the region. Reliable supply of water is essential for the viability of the region's ecosystem, primary production, industrial development, and urban populations. High security supply is the key to many water users, such as coal mining and electricity generation, although these industries do not use vast quantities of water.



Major features of surface storage are four dams: Fairbairn on the Nogoia River, Awoonga on the Boyne River, Callide Dam on Callide Creek, and Kroombit Dam on Kroombit Creek. Together these dams store 3 717 000 megalitres when full. A further 185 000 megalitres is stored in barrages and weirs. Water for production is also harvested under certain conditions.

Groundwater reserves are of critical importance to the region. In addition to supplying the major irrigation industry of the Callide region, groundwater reserves in fractured rock aquifers supply stock and domestic supplies throughout the region. The Capricorn Coast area is supplied by water draining from sand dunes of the Shoalwater Bay area to Waterpark creek. The Great Artesian Basin supplies areas to the south and west of Bauhinia Downs and Taroom.

The lower Isaac River, Connors River, and the Calliope River are the only major streams in the region free from impoundments. Because of its drainage to the Coast, the Calliope's status is particularly valuable as it is able to provide for natural passage of fish and other aquatic species to freshwater from the sea, and to the sea from freshwater. Although the lower Isaac is free from impoundments itself, the Rockhampton Barrage and the Eden Bann and Tartrus Weirs interfere with free passage to and from the Fitzroy Estuary.

Indigenous people see damming of rivers and other interruptions to the flow of streams and the integrity of water bodies as interfering with their spirits and spiritual beliefs. Streams are seen as the lifeblood of country and in the same way that cutting blood supplies leads to death, so too, the cessation of flow of rivers leads to the death of these flowing systems. The Water Resource Plan and Resource Operations Plan are attempts to address these and other concerns by ensuring environmental flows and will go some way toward ensuring ecosystem function of the river system.

2.4.2 Regulated supply

SunWater, operator of the regional network of water supply infrastructure supplying irrigated agriculture, mining, power generation, industry, and urban development, supplies water through four schemes in Central Queensland:

- Callide Valley scheme of which 60% replenishes the aquifers from which irrigators draw their supplies and which supplies the Callide Power Station
- Dawson Valley scheme which supplies channel irrigators in the Theodore Irrigation Area and riparian irrigators along the Lower Dawson River
- Lower Fitzroy scheme pumping to the Stanwell Power Station
- Nogoia-Mackenzie scheme that supplies channel irrigators in the Emerald Irrigation Area and riparian irrigators from downstream of the Fairbairn Dam on the Nogoia River to below the Bingeingang Weir on the Mackenzie River.

In addition to the SunWater schemes, the Fitzroy Barrage, managed by Fitzroy River Water supplying water primarily to Rockhampton City urban users. The Gladstone Area Water Board manages the Awoonga Dam, which currently allocates approximately 80% of water used from the dam to industrial use. In 2002, the spillway of the Awoonga Dam was raised to 40m AHD.

2.4.3 Water quality

While water supplies are of critical importance to the human and environmental uses of the region, human uses place pressure on both the quantity of water and its quality.

Good quality water widens the potential for various uses of water, particularly those associated with ecosystem health and biodiversity. Most streams in the region support aquatic ecosystems and are suitable for wide ranging uses. Indigenous people view deteriorated water quality as a symptom of having interfered with the flow of water.

In 2003, regional stakeholders approved the *"Policy for Maintenance and Enhancement of Water Quality in Central Queensland"*, a policy to safeguard water quality in Central Queensland. A comprehensive community engagement process running over two years culminated in the adoption of the Policy.

Further discussions on the importance of water to Central Queensland can be found throughout this Plan. See Appendix 3 for details on quality of water with respect to a number of indicators.



2.5 Great Barrier Reef

The Great Barrier Reef extends along Queensland's east coast for more than 2 300 kilometres and covers an area of 348 700 square kilometres, the world's largest World Heritage Area and the biggest tropical marine reserve. As a World Heritage listed area, its protection is not the sole interest of those adjacent to it, but it is considered to be of global interest. It is the world's largest coral reef system, and enjoys lower pressure from people and development than other coral reefs around the world. It is one of the most complex ecosystems in nature, and its biodiversity values are enormous.

The Reef is home to 359 of the world's 400 species of coral, 5 000 to 8 000 different sponges, worms, crustaceans, and other small life. Echinoderm species (starfish and sea urchins) number around 800, along with 1 500 species of fish, and 6 marine turtles (of only seven in the world). More than 30 species of marine mammals inhabit the region. Humpback whales visit the region every year to give birth to their calves and play in the warm waters, and dugongs live among the seagrass beds. Bird species number around 215, of which 29 are seabirds.

Plant species on the Reef are also incredibly diverse. Fifty-seven percent of the world's mangrove species are represented by 37 species in the region. There are 400 to 500 species of marine algae, including the most extensive beds of *Halimeda* in the world. About 15 species of seagrass are present. Of the 900 islands of the Reef area, about 230 are vegetated by 2195 species of plants, 3 of which are endemic.

All water draining from streams in Central Queensland enters the Great Barrier Reef Lagoon. While streams further north deliver water to the lagoon every year, about once per decade the Fitzroy floods to an extent that affects the Reef. However, the smaller annual flows deliver sediments and nutrients affecting coastal fringing reefs. The Burdekin and Fitzroy catchments together deliver around one quarter of freshwater flow to the Reef, from approximately one third of the total Reef catchment.

While the biodiversity values of the Great Barrier Reef are enormous and obviously without question, it has a number of very important social and economic values to people living within its catchment, and to people from all over the world who use it for recreational and other purposes. This statement from the Productivity Commission Report into Industries, Land Use, and Water Quality in the Great Barrier Reef Catchment made by the North Queensland Land Council captures some of its value to Indigenous communities along the coast:

"... Aboriginal people continue to engage in significant subsistence hunting, fishing, and gathering activities in the rivers, seas, and on land. For these people, subsistence resources form an important part of the domestic economy. In addition, these activities are culturally important and life sustaining."

Further non-market values include existence value, arising from knowledge that the area is retained in its natural state, and option and bequest values, including those values that society may place on the Reef in the future. Scenic and amenity values are also very high and likely to increase in the future.

In economic terms, the Great Barrier Reef is a critical income earner. It is the basis of a large tourism industry, the largest employment sector within the Reef catchment providing jobs for nearly 48 000 people in 1999-2000. It accounts for around 10% of tourism related employment in Australia, and about 30% of tourism related employment in Queensland. Tourism and the recreational fishing industry on the Reef provided more than \$4.5 billion in gross value of production in the year 1999-2000. Commercial fishing and seafood processing accounted for a further \$152 million.

Recent estimates place the value of the Great Barrier Reef to the global community at \$57 billion.



2.6 Ecosystem health and biodiversity

2.6.1 Bioregions, regional ecosystems, and diverse landscapes

Central Queensland falls across thirteen bioregions: three terrestrial and ten marine.

Brigalow Belt North and Brigalow Belt South (52.5% and 43.5% of region respectively) covers 96% of the region and is characterised by the presence of Brigalow (*Acacia harpophylla*) and associated ecosystems of eucalypt forests, vine thickets, grasslands, cypress pine forests, dry rainforests, and riparian communities. The range of annual median rainfall is from about 500mm to 700mm. (See below and in the Appendix 84: Regional overview for more detail)

Southeast Queensland: (1.5% of region) runs along the coast adjacent to the Brigalow Belt with a diffuse boundary between the two bioregions. The rainfall is higher than that in the Brigalow Belt: from about 800mm to 1200mm annual median rainfall. The vegetation ranges from that of the Brigalow Belt to wetter ecosystems closer to the coast.

Central Queensland Coast: (2.5% of region) also adjoins the Brigalow Belt and runs along the coast in the northern part of Central Queensland. Like the Southeast Queensland bioregion, it is characterised by higher rainfall (1300mm to 2000mm annual median) and takes in the Shoalwater Bay – Byfield area of Central Queensland.

Reef bioregion RE8 (Coastal Southern Fringing Reefs): dominated by episodic Fitzroy River flood plumes. This bioregion has a southern influence in its algal species. Fringing reefs around high continental islands have a high cover of hard coral and soft coral with low diversity.

Reef bioregion RE6 (Incipient Reefs): Area has lots of algae and only incipient reefs. Very high turbidity and tidal movements, strong southern influences on coral and algal species

Reef bioregion RE5 (High Tidal Fringing Reefs): Very high turbidity, thus habitat for light-avoiding benthos at the base of the reef. Strong coastal influence and unusually strong currents for inshore area, strong tidal movements, and high tidal range. Well-developed fringing reefs, with poor hard and soft coral communities, but rich gorgonian and algal communities

Reef bioregion RE7 (Mid Tidal Mud Flat Reefs): Greatest tidal range and tidal movements on the GBR. Higher turbidity than RE5 and RE6, with very few reefs or corals, but distinct algal communities

Reef bioregion BCB2 (Capricorn Bunker Mid Shelf Reefs): Oceanographically isolated from RCB2 and may be biologically distinct from rest of rest of GBR. Set back from edge of shelf but exposed due to local currents. Distinct differences in coral trout populations compared with Swains Reef and elsewhere on GBR

Reef bioregion RCB1 (Capricorn Bunker Outer Reefs): Oceanographically isolated from RCB1 and may be biologically distinct from rest of rest of GBR. More turbid and sheltered than RCB1 with more algae, characteristic of mid shelf area, good turtle feeding area

Non-reef bioregion NA3 (High nutrients coastal strip): mud and nutrients sourced from adjacent land. This provides good seagrass beds in sheltered areas, and provides ideal turtle and dugong feeding habitat.

Non-reef bioregion NB8 (Capricorn Bunker Lagoon): Up to 50% cover of *Halimeda* and seagrass, with a mixing of southern inshore and tropical inshore sponge species, 28% of which are endemic.

Non-reef bioregion NB6 (Inner shelf Lagoon Continental Islands): Strong currents with some gravel and hydroids around Pine Peak Island. There are some gorgonians and low reef sites in very turbid water, along with seagrass meadows in some bays.

Non-reef bioregion NA4 (Inshore terrigenous sands): Under the strong tidal influence of Broadsound, with very mobile sands and little algae or seagrass.

There are 239 regional ecosystems represented in Central Queensland, 132 in the Brigalow Belt, and a further 107 in the Central Queensland areas of the Central Queensland Coast and South-East Queensland bioregions. For more details about the Great Barrier Reef, see Section 2.5.



The region is home to significant landscape features. These include the rugged and beautiful Carnarvon sandstone range system that forms the south-western boundary of the region; the Blackdown Tableland the community of which is home to a great variety of species endemic to the tableland; Kroombit Tops with rainforest on its ranges; the bogomosses along the Upper Dawson River; the Marlborough serpentinite area with its unique vegetation communities and plants; bluegrass downs communities of the Central highlands; coastal heathlands; and the Brigalow country and its associated softwood scrubs and bonewood and semi-evergreen vine thickets to name a few. Many of these areas are sacred sites to their traditional owners, and contain burial sites, art, and traditional dwelling places.

The Fitzroy system is noted for its extensive floodplains, important habitat and nesting sites for many animals. The floodplain contains a particularly complex wetland system, and is possibly the best example of this type of system on Australia's east coast. Numerous levees, or scrolls, on the floodplain have created a distinctive wetland landscape with "nested" wetland systems, both seasonal and semi permanent. One of the functions of the scrolls is to ensure that these wetlands can fill from local rainfall runoff from Lion Creek and other local streams: they are not only filled by flood out from the Fitzroy River.

With their associated waterholes and wetlands, the floodplains support a very diverse, unique, and dynamic ecosystem. Floods that spread over the plains are an important feature of the episodic nature of the river, and perform a number of important functions with respect to lifecycles of species such as tarpon and barramundi, and nutrient cycling. Pre-European settlement, these areas provided important food sources for Indigenous people, and through the holistic associations between their lives and the natural resources around them, have deep spiritual significance for them. The Fitzroy estuary is most southerly known nesting site of the estuarine crocodile.

2.6.2 Important habitat

The Great Barrier Reef is discussed in more detail in Section 2.5.

The **Shoalwater and Corio Bays** area north of Yeppoon is listed as an internationally significant Ramsar wetland, site number 792. The area covers 239 100 hectares and encompasses State Marine Park, National Estate, and Fish Habitat Area along a coastline of 300 kilometres adjacent to the Great Barrier Reef. The area's terrestrial, estuarine, and marine environments represent the largest area in east Queensland containing representative ecosystems in relatively undisturbed habitats for significant floral and faunal assemblages and include populations of rare and threatened species. More than 1000 plant species can be found in the area.

A wide diversity of wetland types can be found here:

- Fringing coral reefs
- Shallow open water with seagrass beds
- Rocky marine shores, beaches, and sandbars
- Intertidal mudflats and sand flats
- Mangrove forests and melaleuca woodland
- Freshwater lagoons, swamps, and stream on elevated sand plains

Tidal flats and mangrove forests are extensive because the region is subject to a tidal range of more than 5 metres.

The area falls in a climatic overlap zone with an unusual mix of tropical, sub-tropical, and temperate species. Rainfall is variable, but is up to 1800 mm per year. Because of the dominance of this rain in the summer months, many of the wetlands are ephemeral.

Marine turtles and dugong feed on the extensive seagrass beds, comprised of ten different seagrass species. The mangrove flats are an important nursery for fish and provide sheltered roosts for birds.

It is an important feeding area with high-tide roost sites for a large number and diversity of local and migratory shore birds, amounting to one-third of the species recorded in Australia. Waterbird populations number upwards of 16 000 from March to June and exceed 20 000 during the warmer months. Twenty-six bird species



protected by the Japan Australia Migratory Bird Agreement (JAMBA) and twenty-seven listed under the China Australia Migratory Bird Agreement (CAMBA) visit the area. Some of the species known in the area include:

- Eastern curlew*
- Whimbrel*
- Great knot*
- Mongolian plover
- Pied oystercatcher
- Grey-tailed tattler*
- Terek sandpiper
- Beach thick-knee

*These species occur in the Shoalwater and Corio Bays area in numbers exceeding 1% of the total population size in the flyway.

The area contains an unusually high number of fish species, with 428 marine and estuarine fish and 17 freshwater species known to live there. Two threatened fish species have been found: the honey blue-eye and the Oxleyan pygmy perch. It is the only catchment on the east coast of Australia where there are no exotic fish species in estuarine and freshwater wetlands. See Appendix 4: ERIN for a more detailed list of significant species.

Human impacts are minimal. Entry to the Shoalwater Bay Military Training Area is very restricted, and there is little other development in the area. It is remote from larger centres, and access is not easy. Activities are restricted to military training activities, use by Aboriginal people, tourism, and commercial and recreational fishing.

The **wetland and lagoon system of the Fitzroy River** is used extensively by internationally important numbers of diverse species of waterbirds. As well as providing nesting sites, the wetland systems are critical refugia during prolonged dry spells. The Cotton Pygmy Goose, listed as Rare in Queensland, makes use of the wetlands of this system around the Rockhampton district, this area being among its most important habitat area.

Other wetlands of national importance in Central Queensland which are listed in the Directory of Important Wetlands in Australia include: Fitzroy River Delta, Hedlow Wetlands, Yeppoon-Keppel Sands, Dismal Swamp-Water Park Creek, Curtis Island Marine Plain and The Narrows. Broadsound is especially significant for its vast Fish Habitat Area, the distinctive channel wetlands on Torilla Plain, and its importance for waterbird feeding and breeding.

All **regional wetlands** are important for their provision of habitat and food sources of various species and communities. Migratory water birds use wetlands, whether ephemeral or permanent, natural or artificial, during visits to the region. Other birds, including ducks, waders, and water-edge birds find habitat and food there, in addition to aquatic species including plants, and vertebrate and invertebrate animals. Some of these wetlands are particularly important in the life cycle of iconic fish species such as barramundi. Where the Corio and Shoalwater Bays area provides for huge numbers and diversity, even small wetlands are important for the flora and fauna that depend on them.

Longer lasting wetlands and waterholes are particularly important for their ability to offer refuge during dry periods. Important examples of these are the various artificial wetlands created by dams, both publicly owned and private, for industrial, domestic, and agricultural supply purposes.

Six percent of the region's land is **managed primarily for conservation**. This includes national parks, the Military Training Area at Shoalwater Bay, managed resource protection areas, wilderness areas, and nature reserves among others. In addition to this area, quite large areas of various catchments, in particular the Isaac-Connors, are under low impact management. These areas provide excellent habitat and corridors. Many areas of agricultural properties are also managed for conservation. In addition to land managed for conservation, significant areas offshore within the Great Barrier Reef World Heritage Area are also managed for conservation. These areas include Fish Habitat Areas, Marine Park Zones and Marine Conservation Zones.



The **Brigalow Belt bioregion** contains important habitat for rare and threatened species including the Bullock, the Jewel Butterfly, Brigalow Scaly-foot, Glossy Black-Cockatoo, Greater Long-eared Bat, Large Pied Bat, Eastern Long-eared Bat, and the threatened community of semi evergreen vine thickets. The bioregion provides important habitat for star finches and golden tailed geckos, and is home to the Critically Endangered eastern population of the Yellow Chat. As well as the more densely vegetated regional ecosystems associated with this bioregion, **open woodlands and grasslands** are important habitat.

Serpentinite communities are found in the northeast of the region along the discontinuous serpentinite geological belt from Marlborough to near the mouth of the Fitzroy River. With area of about 520 square kilometres it is the largest serpentinite formation in Australia, the Marlborough serpentinite region is characterised by soils high in heavy metal content, particularly nickel and chromium. Because of the hostility of these soils to plant growth, many of the plants found there are endemic. *Stackhousia tryonii*, one of only two nickel-accumulating plants found in Australia, thrives on these soils. Many of the plants found in these communities are classified as Vulnerable under the *EPBC Act 1999*, and because of the commercial value of metals contained in soils underlying these communities, their existence is threatened by mining.

Stackhousia tryonii, *Pimelea leptospermoides*, and the Giant Callistemon (*Callistemon sp.*) are endemic species and aquatic vertebrates such as the Fitzroy River turtle (*Rheodytes leucops*), freshwater long tom (*Strongylura krefftii*) and sleepy cod (*Oxyeleotris lineolatus*) have adapted to the mineral rich waters found in streams in serpentinite areas.

Semi evergreen vine thicket communities are valued for their diversity of plant species. These communities inhabit rich, often volcanic, soils very productive when cleared for cropping and improved pastures, thus their extent and distribution is limited when compared to that of pre-European settlement. They contain a number of rare and threatened plants such as *Atalaya collina* (a whitewood), *Denhamia parvifolia* (small-leaved denhamia), and *Cossinia Australiana*, a small tree of the Sapindaceae family. In the drier parts of the region, Brigalow (*Acacia harpophylla*) ooline (*Cadellia pentastylis*) and bottle trees (*Brachychiton rupestre*) are associated with these diverse communities. These thickets often have closed canopies and offer good protection for small animals and thus are favoured habitat for a number of birds, mammals, and lizards.

Within Central Queensland there are some large areas where the impact of human use is very low: these areas are particularly valuable and many are protected with National and Marine Parks. Others are not protected in this manner, but are offered protection by their lack of value for mining or agriculture, or are remote and difficult to access. In addition, many of these areas are on private land. Many of these areas are not protected by covenants.

2.6.3 Waterways: creeks and rivers

Waterways of Central Queensland are generally suitable for a wide range of uses including the support of aquatic ecosystems. As discussed in other sections, these streams support a number of important and/or endemic species, many of which are of conservation concern. Healthy waterways are fundamental to Indigenous health and well being through the association with flowing life-blood. Although traditional owners are concerned with the number of barriers and impoundments on major tributaries, there are still significant reaches of uninterrupted streams. Diversity of flow regime along the length of streams is also important to the provision of differing in stream habitat requirements of aquatic species.

Central Queensland is subject to high intensity rainfall from time to time, and streams drain soils with varying erodibility. Because of this, regional waterways have carried higher loads of sediment than southern streams subject to a different range of conditions. Although European settlement of the region has increased loads of sediment delivered to streams, certain streams have always carried high sediment loads, and most streams away from the coast would have carried loads significantly higher than streams in other parts of Australia.

2.6.4 Estuaries, coast, reef, and seas

The importance of the Great Barrier Reef, coastal areas, and marine bioregions is discussed separately. Estuaries are particularly important in Central Queensland for their function in processing sediments and nutrients from upper catchment areas – they are not pipes. Estuaries play an important role in processing nutrients and sediments and many marine species require access to estuaries at various stages of their life cycle.

Of the 31 documented estuaries spanning the coast from Clairview Creek to the Boyne River most have been



classified as in “near-pristine” or “largely unmodified” condition. The Fitzroy, Causeway, Boyne and Calliope estuaries are classified as in “modified” condition. Auckland Creek has been “extensively modified”. “Largely unmodified” estuaries include those of bigger streams such as the Styx River, Herbert Creek and St Lawrence Creek.

All estuaries in the region are tide dominated with the exception of Causeway Lake which is a wave dominated estuary. Tide dominated estuaries are naturally highly turbid. Significant areas of salt marsh and mangrove habitat are typical of many of these estuaries. Corio Bay, Gladstone Harbour and Shoalwater Bay support seagrass beds on intertidal flats.

The Fitzroy estuary is, at 64 kilometres long, one of the longest estuaries and provides habitat and food sources for its resident ecosystems and species. During low flow situations it processes nutrients and sediments, thus protecting the Great Barrier Reef from much of the sediment and nutrient washed down from upper catchment areas (see discussion above “Healthy Waterways”). The difference in velocity between ebb tides and flow tides acts as a pump to return nutrients and sediments from Keppel Bay to the estuary for processing after they have been deposited during floods.

Estuaries, saline flats, and supra-tidal wetlands are important in the life cycle of many commercially and recreationally important fish and crustaceans. Many species that live in Keppel Bay require access to the estuary at various stages of their life cycles. Although the estuary is not considered a mangrove dominated system, the many mangrove species flourishing along its banks are very important to the cycling of nutrients and sediment and to the animals and other plants inhabiting this richly diverse ecosystem.

There are approximately 125 islands located in State waters (i.e. within approximately the three nautical mile limit). Many have high environmental values and are important for migratory bird species, turtle nesting and as habitat for threatened and rare species and ecosystems.

The estuary and coastal region is an important step between the terrestrial environment and that surrounding the Great Barrier Reef, providing a system to accumulate and buffer sediment and nutrient loads from the catchment. Because of the desire of so many Australians to live in these areas, they are also vulnerable to the effects of increasing population pressures.

2.6.5 Flora and fauna

Within Central Queensland terrestrial bioregions and ecosystems, 623 fauna species and 3241 flora species have been identified. Between 30% and 40% of the State’s flowering plant and animal species are represented here. Species are listed below, some of which are endemic, are of conservation concern:

Animals

- *Epthianura crocea macgregori* - Yellow chat, eastern population
- *Rheodytes leucops* - Fitzroy River Turtle
- *Denisonia maculata* - Ornamental snake
- *Taudactylus plieone* - Kroombit tinkerfrog
- *Onychogalea fraenata* - Bridled nailtail wallaby

Plants

- *Aristida annua* - annual wiregrass species
- *Atalaya collina* - whitewood
- *Cycas ophiolitica* – a cycad
- *Decaspermum species*
- *Macrozamia species* – a Zamia palm (cycad)
- *Stackhousia tryonii* – one of only 2 nickel accumulating plants in Australia
- *Tectaria devexa devexa* – Capricorn Caves fern
- *Triocinia retroflexa*

In addition to these species belonging to terrestrial and freshwater aquatic ecosystems, many more species abound in the marine environment, particularly in and around the Great Barrier Reef. Marine and coastal species of conservation concern include: rare dolphin species such as the Irrawaddy dolphin; turtles species such as *Natator depressus* (flatback turtle, Australia’s only endemic marine turtle) and *Caretta caretta* (loggerhead turtle); and migratory birds such as the Little tern (*Sterna albifrons*) and Eastern Curlew (*Numenius madagascariensis*). A comprehensive list of species and communities of significance is listed in Appendix 4.

Complex relationships between elements of these ecosystems, the climate, and interactions with humans and their impact make up the very integrated and interdependent system of Central Queensland.



2.7 Cultural Assets

Central Queensland holds a wealth of cultural heritage, of both Indigenous and European origin. Human use and occupation of Central Queensland have created items and places that make up the cultural record. These may be part of the natural or cultural environment, and have social, aesthetic, historic, or scientific significance or some other special value for the present community and future generations. They are “the things and places we want to keep” and they play an integral part in defining the unique character of our region.

2.7.1 Brief early history

Aboriginal people have occupied the region for up to about 60 000 years. At the time of European arrival many distinctive Aboriginal groups were present across Central Queensland with around 14 different Aboriginal tribes living in the Central Highlands alone. Strong social, political and economic links existed between various groups and each group had a well- defined territory, generally associated with one or a number of adjacent river catchments of the region and other physical boundaries.

Historical sources from between 1840- 1850 suggest the number of Aboriginal people living in the Central Highlands area at the time of European settlement to be around 2000. However, others propose a population of 4000, based on national population densities developed in 1974. When the potential effects of the 1830s smallpox epidemic are considered (reducing the population to some 25% of the 1820s levels) these estimates appear quite conservative and would place the Aboriginal population of the Central Highlands region in the early 1800s at 16, 000 people.

Pastoral settlement of Central Queensland quickly followed the initial exploration of the area by people such as Leichhardt, who travelled through the region in 1844- 45. Over the following 10 years, properties were established along the Dawson River, from present-day Taroom to Moura.

In 1854 the Archer brothers followed Leichhardt’s advice and traced the Dawson along to its junction with the Fitzroy and down onto the coastal plain, where they took up Gracemere Station in 1855. Others followed their lead and by 1860 a series of large stations covered the region providing the pastoral basis of the present regional social and economic setting.

Early European settlement in the Boyne Calliope region followed Matthew Flinders’ navigation of the Curtis Coast, noting the existence of a safe harbour near Facing Island. Lack of fresh water noted by John Oxley in his 1823 exploration led him to deem the area unsuitable for pastoral development. The first government residency was established in Gladstone in 1853, when additional blocks were marked for homes and businesses, and a road was marked out.

The potential of the port for exporting commodities led to the establishment of large leasehold runs, firstly for wool production, and later for beef production, in the hinterland. One of the earliest of these pastoral pioneers was William Henry Walsh, who established “Milton” in 1856. During the 1920s many of these larger leases were resumed and split up for smaller grazing and more intensive agriculture and “soldier settlement” blocks

For the first few years, interactions between Aborigines and Europeans may have been relatively free of conflict. By the early 1850s, increasing European presence in the district put pressure on Aboriginal life ways, particularly as many stations refused to allow Aboriginal people on their land. These increased pressures, interactions, and cultural misunderstandings resulted in violence from both groups, many deaths and the forced relocation of Aboriginal people from their traditional land.

2.7.2 Indigenous heritage

While some of the best-known examples of Indigenous heritage are the art works at places like the Carnarvon Gorge, Ka Ka Mundi, and Salvator Rosa, other sites include occupation shelters, stone quarries, scarred trees, burial sites, shell middens, and spiritual and ceremonial places. Other sites have become significant since European settlement and these include initial contact sites, massacre sites, travel routes, missions, reserves, station camps, and town camps. Across the region, artefacts such as stone knives, axes, and grinding dishes and stones can be found.

Perhaps the most important facet of Indigenous cultural heritage is that of country. The whole land and seascape, and all the elements of their composition are sacred to Indigenous people. Their links with place arise out of this association and forms the basis of their natural resource management.





Traditionally, Indigenous people cared for their country in a manner consistent with its needs as they saw this as the best way of ensuring the country remained healthy and continued to fulfil their requirements. Restricted access to, and limited rights over country now constrains their ability manage in traditional ways. See Appendix 3 for further discussion on pressures on Indigenous participation in natural resource management.

2.7.3 Other heritage

In the years since European settlement, many buildings of significance have been built. These include churches, private residences, public buildings, memorials, and commercial buildings, as well as some recreational facilities. These document our recent past and in some places such as Quay Street in Rockhampton whole precincts have been maintained to provide an ongoing reminder of days gone by. Early mining in the region has left a built legacy of buildings and other infrastructure related to those activities. Many of these durable structures still exist and add much to the sense of history in places like Mount Morgan and Copperfield, outside Clermont. Cultural heritage also benefits the community through helping us to understand and can provide avenues for reconciliation between the region's people.

In addition to buildings, other non-tangible cultural aspects are important. The socio-cultural aspects of agriculture provide a certain lifestyle and social arrangement. The importance of agriculture to the regional community means that much of our culture has been borrowed from that source.





2.8 Social assets

The people of Central Queensland come from a wide range of backgrounds. Many of the present population were born overseas as indicated in Table 10, and have come to the region for a variety of reasons including employment opportunities and lifestyle. This diversity of origin provides colour and texture to our cultural background and is celebrated annually in the Multicultural Fair held at the Rockhampton campus of Central Queensland University.

Table 10: Country of birth of Central Queensland residents.

Country of birth	
Australia*	156,605
Canada	189
China (excludes SARs and Taiwan Province)(a)	129
Croatia	50
Egypt	21
Fiji	200
France	71
Germany	579
Greece	68
Hong Kong (SAR of China)(a)	56
India	137
Indonesia	67
Ireland (Eire)	199
Italy	145
Korea, Republic of (South)	18
Lebanon	10
Macedonia, FYROM(b)	3
Malaysia	133
Malta	48
Netherlands	550
New Zealand	3,258
Philippines	536
Poland	86
Singapore	63
South Africa	362
Sri Lanka	68
Turkey	12
United Kingdom(c)	5,265
United States of America	335
Viet Nam	55
Yugoslavia, Federal Republic of	95
Born elsewhere overseas(d)	1,918
Not stated	9,168
Overseas visitors	1,669
Total	182,168

(a) SAR is an abbreviation of 'Special Administrative Region'. SARs comprise 'Hong Kong (SAR of China)' and 'Macau (SAR of China)'.

(b) FYROM is an abbreviation of 'Former Yugoslav Republic of Macedonia'.

(c) Includes 'England', 'Scotland', 'Wales', 'Northern Ireland', 'Channel Islands', 'Isle of Man', and 'United Kingdom, nfd'.

(d) Includes 'Inadequately described', 'At sea' and 'Not elsewhere classified'. * 8140 Indigenous people live in CQ



2.8.1 Social capital: People and their knowledge, experience, and networks

Through people using their networks and experience to build knowledge, our region is well placed to benefit from opportunities and to manage within the capacity of our natural resources. Most land managers have interactions with industry groups, landcare groups, and other informal methods of information sharing and building. Participants in other industries rely on similar structures and processes to build and share knowledge. Natural resource management groups such as landcare and catchment groups facilitate networking through their group activities and also build knowledge through provision of relevant information to their audience.

Volunteers provide much of the workforce in community natural resource management. Catchment and landcare group committees are usually volunteers, and volunteers supported by project officers, landcare coordinators, and facilitators provide much of the on-ground work. In addition, that portion of work provided by resource managers, which can be considered for the public good, is volunteerism. Through voluntary contributions, people build up networks of information sharing and increase their knowledge of natural resource management. In addition, knowledge is increased through participation in courses conducted for specific purposes.

Many regional people have taken advantage of the significant formal education opportunities available at Technical and Further Education institutions (TAFEs) and the Central Queensland University (CQU). Other courses run by various training providers add to knowledge building. Many of the region's businesses, particularly agricultural businesses, have been in the same family for more than one generation, building a history of the business and applying this to current situations. Indigenous people have been in the region for many, many generations, and also have a wealth of knowledge of country and its management.

Information management and technology are assisting businesses in decision support. Use of electronic media is increasing and providing community and business with greater access to information for business and non-business purposes.

Research facilities in Central Queensland add to the building of knowledge. People of institutions such as CSIRO, state agencies, and the CQU have powerful research capability and much of the knowledge we draw on from day to day comes from work these people have undertaken.

Many different knowledge systems exist and in collaboration make up a rich warehouse on which to draw for wise decision making and planning. A continuing challenge is to bring together these different systems to provide sensible, wise strategies.

People and their knowledge, networks, and experience are the social capital on which the viability and vitality of our community relies. It is an essential asset, on which the successful implementation of this plan relies.



2.8.2 Health and other social support

Health services are located in most centres with Rockhampton Hospital and a number of private hospitals also providing a range of specialist services to the region. The Royal Flying Doctor Service and Capricorn Rescue helicopter service provide retrieval services from remote areas and transport for critical cases to Brisbane. In addition to local hospitals and health centres in rural areas, Home and Community Care programs assist in providing health and other care services to people in their own homes.

Other social and community services provided in the region include Farm Financial Counselling, Rural Support workers, Family Support workers and a number of general and issue-focused counselling services. There are also many community care centres and neighbourhood centres meeting the needs of people in Central Queensland communities. Self-help groups are also available in larger centres, many of which offer outreach services to those in more remote centres.

Education

The region has significant educational resources covering primary, secondary, and tertiary in public and private institutions. CQU has campuses at Rockhampton, Gladstone, and Emerald as well as a number of campuses outside the region. Education of overseas students is a major source of income for the CQU and some of the private secondary schools. Primary and secondary students with no reasonable access to schools study through Schools of Distance Education, centres of which are located at Emerald and Rockhampton. Distance learning for tertiary students is available through CQU and other universities outside the region.

Central Queensland TAFE operates a number of campuses around Central Queensland supplying valuable education by way of Certificate and Diploma level courses. This education is particularly valuable in the service and mining industries, which are important employers in the region (see Table 12: Employment, Central Queensland). TAFE also supplies education and training services to agriculture through the Emerald Agricultural College.

As well as these formal educational institutions, a number of other training providers offer courses in a wide range of subjects and skills. Private consultants also facilitate knowledge building through interactions with clients.

Recreation

Tourism is a major income earner for the region. Recreational pursuits such as fishing, water sports such as scuba diving, snorkelling, sailing, skiing, swimming, and the use of the region's natural wonders for bushwalking and camping add to the laidback lifestyle enjoyed by Central Queenslanders. Most National Parks are available for camping. The Central Queensland coast is the southern gateway to the Great Barrier Reef, and has a number of beautiful and unspoilt islands such as Heron and Great Keppel on its doorstep, available to holiday makers.

Throughout the relatively warm winters, tourists from southern Australia and overseas flock to the region to enjoy the warmer weather and to experience what Central Queensland has to offer. Many come with caravans, and caravan parks are becoming increasingly geared to the annual migration. Farmstay tourism has become an important source of income for many families involved in agriculture, and provides an enriched experience for visitors to the region.

The thriving agricultural industry gives rise to a number of associated recreational pursuits such as rodeo, camp drafting, cutting competitions, and other horse sports. In addition, agricultural shows in most regional centres provide competition for stud animals and performance pursuits such as showjumping, dressage, and pony club events. On the cultural side, art, photography, cooking, and needlecraft are showcased. These are important events in the social calendar of districts fortunate enough to have sufficient volunteer workforce to conduct their annual Show.



Agricultural production

The region supports a range of agricultural production including a range of horticultural crops, cotton, a number of cereal grains, sheep, and beef cattle. The estimated value of agricultural production in the region in 2001 was \$1,325m.

Beef production contributes the largest portion of income earned by agricultural industries, providing 7.3% of the region's gross output and employing 2.8% of the workforce. Central Queensland is widely regarded as Australia's premier beef production region. Rockhampton is acclaimed as the Beef Capital of Australia. Beef production is also the biggest land use in the region, covering 86% of the region's land. Most of the cattle of the region are pure or infused Bos Indicus breeds, as these breeds are ideally suited to the tropical climate and are well adapted to grazing on the rangelands of the region. The higher quality grazing country, particularly that situated on the vast floodplains is used for finishing prime cattle for high quality beef consumed on the domestic and export markets.

Other animal industries are represented by dairying and pork production, however the contribution of these industries to the Central Queensland economy, while an important diversification, is much more modest.

Cereal and pulse grains are the main commodities produced by the dryland cropping sector, providing employment for 1.9% of the workforce, and contributing 2.0% of the region's gross output. Cropping is mainly confined to the fertile Brigalow Plains, Alluvial Plains, and Undulating Downs LRAs and uses about 6.6% of the region's land.

Irrigated cropping is primarily cotton production, worth over \$92m in direct output to the economy in 2001. The cotton industry in Australia is estimated to produce 2.5 times higher yields than the average world yield, and Central Queensland cotton yields are around 10% higher than the national average. Lucerne and other stock fodder crops are also grown using irrigation. Horticultural commodities, such as grapes and citrus fruit are grown in the Central Highlands. Tropical fruits and vegetables are important earners along the Capricorn and Curtis Coasts.

For details on gross output of different commodities, see Table 11, Gross outputs, Central Queensland.

State forests

The Rockhampton Forest Management Area is estimated to have produced over \$4.5m of products in 2001-2002 from approximately 900,000ha of State forest. The plantation area is currently 7,800ha primarily comprised of exotic softwood species. The industry employs about 0.1% of the regional workforce.

No estimate of on-farm forestry is available.





Commercial Fishing and Fisheries Production

Commercial fishing on the Capricorn Coast, valued as landed catch and excluding processing and marketing, contributed approximately \$39m in 2000 to the economy of the region. In 2003, the total near-shore commercial catch (Broad Sound to Port Curtis) was 2100 tonnes valued at \$17.6m.

The main species caught in the Capricorn coast area include: spanner crabs, scallops, King prawns, mud crabs, banana prawns and coral trout. In the Fitzroy estuarine area, the main species caught by commercial fisheries includes barramundi, mud crabs, banana prawns, and king salmon. Further out on the Swains reef, spanner crabs, King prawns, coral trout and red throat emperor dominate the catch.

There are 152 aquaculture licences/permits in the region. The majority of these licences/permits are for Oysters (75), Redclaw crayfish (23), Barramundi (7) and Silver perch (5). Freshwater fish, prawns and clams are also cultured.

The value of production of this industry to the region varies in response to seasonal conditions that drive production of the main species.

Recreational fishing

The value of recreational fishing to the region has not been quantified, however, Murphy (2003) has estimated that expenditure by recreational fishers in the region, including visitors to the region, is \$135m per annum. Expenditure includes fuel, vehicle purchase and hire (including boats), charter of fishing vessels, bait and tackle, accommodation, and meals.

Mining production

Mineral production is also diverse including a number of base metals, precious metals, semi-precious stones and most importantly substantial deposits of both coking and thermal coal. Mineral production from the Central Queensland region was estimated to have been worth \$5,719m in 2001. The industry employs approximately 6.1% of the regional workforce.

Coal mining is a huge contributor to the regional economy. The towns of Moura, Moranbah, Middlemount, Dysart, Glenden, and Tieri owe their existence to coal mining as they were especially built to accommodate the workforce of Bowen Basin mines. Other towns such as Blackwater and Capella were centres of less than 1000 residents until the early 1970s when open cut coalmines began operating in the area. A large part of the economy and population of larger centres such as Emerald and Clermont is due to coalmining activity. Services provided to adjacent communities have also improved since mining started: reticulated power and water services have become available to once remote cattle stations, and roads throughout the region have improved to handle increased number and weight of traffic.





As well as the workforce directly employed by the mining companies, service industries have increased their capacity to provide for the needs of the mining companies and the domestic needs of increased population, such as social support (education, health, and related services), retailing, tourism, and many other services.

In addition to coal, sapphires and other precious gems are mined on the Gemfields west of Emerald on the western boundary of the region. These gems are world class and as well as contributing to the regional economy through gem sales, the Gemfields supports a healthy tourist industry with people coming from all parts of Australia and the world to stake a claim and dig for sapphires in one of the few gem areas not totally under the claims of large companies. Chrysoprase, a jade-green semi-precious gem is mined near Marlborough.

The world's largest and purest source of magnesite is currently being mined near Kunwarara, north of Rockhampton. The ore is transported to Parkhurst on Rockhampton's northern outskirts and processed into calcined magnesia, deadburned magnesia, and electrofused magnesia for use in high temperature applications, particularly in the steel industry.

Gold is mined at the Cracow mine, which has operated on and off for many decades, dependent on the price of gold for its viability. A new mine with significantly greater reserves is currently under development.

Other minerals extracted include limestone and nickel. Quarries providing sand, gravel, road building materials, and railway ballast are important sources of income for the local economy.

Deposits of other minerals occur throughout Central Queensland.

Manufacturing

Manufacturing in the region is strong, taking advantage of the close proximity of raw materials and a plentiful supply of electricity and gas. It is dominated by the manufacture of metals, primarily alumina and aluminium. Although currently in maintenance mode, a project to produce magnesium metal and an attendant light metals manufacturing industry in the region has the potential to increase diversity to this sector.

Although food manufacturing is shown to be relatively unimportant in terms of contribution to gross output in the regional economy, processing of livestock is a valuable industry to the region as it value-adds substantially to the grazing industry in the region (See table 11 and 12). Closure of abattoirs in Central Queensland in recent years had affected employment and value-added production.

Processing of cotton at three gins through the region is also important, particularly in adding value to cotton production. These gins produce cotton fibre and cottonseed for oil and stockfeed production.

The relocation of Cement Australia from Brisbane to Gladstone in recent years to take advantage of the proximity of limestone deposits and economies of scale has increased the importance of non-metals manufacturing in the region meeting the demand for cement in the construction industry in North Queensland.

As a requisite of the mining industry, a substantial amount of ammonium nitrate is produced in the region, near Yarwun and Moura. Sodium cyanide, an input into gold processing is produced at two plants near Yarwun.



Energy

The region encompasses a large part of the Bowen Basin, containing Queensland's most valuable coal deposits. A substantial amount of the coal extracted in this area is thermal coal used for power generation. There are 4 major power stations (Stanwell, Callide A and C and Gladstone power station) located in the region capable of producing 112,000 megawatts of electricity. The availability of large quantities of power has been instrumental in attracting large and heavy industry into the Gladstone area. The stations also sell to the national electricity grid.

A number of regional coalfields are currently producing methane gas, a valuable resource for power and chemicals manufacture. In addition, a gas pipeline from the Denison natural gas fields provides natural gas to Gladstone for domestic, commercial and industry supply.

Transport

As the region is heavily reliant on export of its product, one of the vital assets in the region is the efficient Gladstone Port. This is located on a natural and deep harbour requiring relatively minimal modification over the years to expand its capacity. The port is the 5th largest port in Australia. The port's major function is to facilitate the export of production from the Central Queensland region, including coal, cereal grains, beef, alumina, aluminium, and cement. Bulk handling facilities are available for the movement of coal and grain. The port also handles imports of raw material for manufacturing in the region including bauxite, LP Gas, petroleum products, and cement gypsum.

The region is particularly well serviced by an extensive rail network linking the coalmines to bulk terminals located at Gladstone and the Mackay region as well as moving other products around the region.

In addition to these facilities for handling transport of commodities, Central Queensland is well serviced by air, rail, and road transport for people. The centres of Rockhampton, Gladstone, Emerald, and Biloela/Thangool have regular air services. Passenger rail services are available to the north, south, and west. In addition, the road network servicing the area provides a means of travel around the region and beyond.

Tourism

Tourism is a very important industry economically particularly to catchments of the Great Barrier Reef. Approximately ten percent of tourism production in the Great Barrier Reef catchments comes from Central Queensland. As well as the enormous attraction of the Reef itself, many other features of Central Queensland attract visitors from other parts of Queensland and Australia and overseas. See "Recreation" for more details. Tourism related sectors employ about five percent of the regional workforce.

Of great importance to the tourism sector is the presence of Protected Areas, such as National Parks and other areas managed for conservation and for their scenic, amenity, and biodiversity values. These areas are described elsewhere in more detail, but underpin the tourism industry in Central Queensland.





2.10 Pressures and Risk to Assets

Pressures and threats to the condition of assets were identified through the technical assessment and consultative process (see 1.5 Developing the Plan). The pressures, and the range of assets they affect are presented below in Table 13. Pressures are ranked by risk to asset (see section 3.3). Pressures are an important element of the assets based planning approach. Targets in this plan are based on addressing the following pressures.

Table 13: Pressures on assets ranked by risk

Pressures Ranked by Risk to assets	Assets Affected							
	Land	Eco. Health	Water	GBR	Air	Cultural H.	Economic	Social
Very High								
Low cover (High run off, Erosion, Low infiltration, Low plant growth, timber thickening)	x	x	x	x	x	x	x	x
High deep drainage / salinity	x	x	x	x	x	x	x	x
Episodic events	x	x	x	x			x	
Reliance on seasonal conditions	x	x	x	x		x	x	x
Invasive introduced species	x	x	x	x			x	x
Riparian and floodplain modification	x	x	x	x	x	x	x	x
Modifications to wetlands		x	x	x		x	x	x
Coastal development (shoreline and wetland reclamation)	x	x	x	x	x	x	x	x
Barriers, and waterway development (weir pools, dams, sea walls, ponded pastures)	x	x	x	x		x	x	x
Water contaminants (TSS, Pesticides, N&P)	x	x	x	x	x	x	x	x
Climate change	x	x		x	x		x	x
Lack of understanding of Indigenous values	x	x	x	x		x	x	x
Government policy and increasing regulation	x	x	x				x	x
Community expectations (environmental responsibility, property rights)	x	x	x				x	x
High dependence on world commodity prices	x						x	x
Cost-price squeeze	x						x	x
Water availability		x	x	x			x	x
Capacity to pay for improved NRM	x	x	x	x		x	x	



Pressures Ranked by Risk to assets	Assets Affected							
	Land	Eco. Health	Water	GBR	Air	Cultural H.	Economic	Social
Water extraction (ground and surface)	x	x	x	x		x	x	x
Stream bank erosion (cattle access)	x	x	x	x		x		x
Altered fire regimes	x	x		x	x	x		
Overfishing / Non-target by-catch		x	x	x		x		
Aging and declining population (dependence on two industries)	x						x	x
Removal of rural services	x	x				x	x	x
Net outflow of youth							x	x
Medium								
Land clearing and fragmentation	x	x	x	x	x	x	x	x
Mining impacts	x	x	x		x	x		x
Urban and industrial pollution (incl. stormwater, sewage, landfill and other point source)		x	x	x		x	x	x
Invasive native species	x	x	x	x			x	x
Managed water flows	x	x	x	x		x	x	x
Loss of Indigenous Intellectual Property						x	x	x
Lack of coordination and integration	x	x	x	x	x	x	x	x
Lack of good information / monitoring	x	x	x	x	x	x	x	x
Lack of producer / community involvement in research	x	x	x	x			x	x
Low								
Tourism and recreation impacts	x	x	x	x			x	x
Rural / urban divide				x			x	x
Theft and vandalism of heritage						x	x	x
Lack of Indigenous access to land and sea country						x	x	x

