IPSWICH ENVIROPLAN
A PLAN FOR OUR FUTURE

IPSWICH NATURE CONSERVATION STRATEGY 2015

Background Report





City of Ipswich

www.ipswich.qld.gov.au

EXECUTIVE SUMMARY

Ipswich is centrally located within the western growth corridor of Australia's third most highly population urban region, South-East Queensland (SEQ). Over the next couple of decades the City is predicted to triple in population, providing Ipswich with the challenge of balancing the needs of its expanding population with the needs of the natural environment.

Key threatening processes and local drivers for nature conservation in Ipswich include:

- Loss of native vegetation
- Climate change
- Inappropriate fire regimes
- Introduced pest plants and animals
- Dryland salinity
- Lack of community awareness and engagement

Ipswich is committed to the management of nature conservation, as reflected in Theme 2: Natural Environment of the Ipswich Long-term Community Plan i2031 and Corporate Plan. The role of Council sits within enacting policies and programs aimed at promoting, protecting and enhancing the local environment, as well as creating community awareness and engagement. This report describes the makeup and distribution of the natural environment within the Ipswich City local government area (LGA).

Ipswich LGA has a unique and diverse natural environment and Council has had strategies aimed at conservation outcomes in place for over 15 years, with the local environmental levy being initiated in 1996 and the initial Nature Conservation Strategy adopted in 2000. Council has since established a large Natural Area Estate and working partnerships with local land owners, providing protection and management actions towards the majority of the City core habitat areas.

Nature conservation in the area has traditionally focused on the protection of these core habitat areas and areas containing high conservation values such as threatened plant and animal species. Moving forward, nature conservation in Ipswich will shift towards finding a balanced approach to achieve economic and environmental outcomes. This balance strengthens the environmental values of Ipswich and promotes a strong social connection, all of which strives towards a sustainable and productive community. Nature conservation in Ipswich will continue the management and rehabilitation of these core habitats as well as building upon the City's habitat network. An effective habitat network comprises of a system of core habitat areas connected through the landscape by corridors. Native habitats in Ipswich are currently in a fairly fragmented stage, mainly as a result of human impact such as clearing of vegetation to allow for alternative land uses. Strengthening the habitat network is a way to combat the impacts of this fragmentation by connecting several habitat areas together.

Ipswich's Natural Environment

Ipswich City enjoys a humid subtropical climate, with warm humid summers and mild winters. There are 38 regional ecosystems (REs) which have been mapped to having existed within Ipswich, with two of these cleared to such extent that they can no longer be found within the Ipswich LGA. Today there are three REs which make up almost 80% of the City's remnant vegetation cover. One RE, containing semi-evergreen vine thicket has 100% of its SEQ extent located within the Ipswich LGA, and the endangered *Melaleuca irbyana* ecological community has just over 70% of its SEQ distribution within Ipswich.

Ipswich supports a high variety of species, with 1,651 native species across the plant, fungi and animal kingdoms recorded within the local government area. The native vertebrate fauna in Ipswich is dominated by birds (55%), with mammals only making up approximately 13%. A number of these species are considered to be matters of environmental significance under Queensland and/or Federal legislation. There are currently 31 species listed under Queensland's *Nature Conservation Act 1992* as threatened. An additional seven species are considered to be near threatened, whilst another 28 species, considered as common or near threatened wildlife under legislation, have been identified to be of particular local significance due to elevated levels of threat leading to local decline or are of a particular iconic value within Ipswich. The Australian government's main environmental legislation*, the Environment Protection and Biodiversity Conservation Act 1999*, lists 65 threatened species to potentially be present within the Ipswich LGA. Other matters considered to be of local environmental significance include areas containing high levels of climate change refugia and ecosystem functions.

Ipswich's Habitat Network

To assist Ipswich's natural environment and biodiversity to gain a level of resilience to the impacts generated by a changing climate, Council is working towards catering for areas that provide local refuge to biodiversity from the extremes of climate change and integrating these refugia into the City's habitat network.

The identification and mapping of the City's habitat network was conducted through a three stage process:

1. Identifying matters of environmental significance hot spots
2. Identifying current connectivity across the landscape
3. Establishing a number of set criteria around network components
4. Eliminate areas within the urban footprint except where consistent with set criteria

Components of the Ipswich habitat network are:

- Core habitat areas
- Urban nodes
- Strategic remnants
- Corridors

This habitat network also supports a number of regionally significant corridors, which allow wildlife to move cross-border into surrounding habitat:

- Flinders Karawatha Corridor
- Little Liverpool Range
- D'Aguilar Range

To facilitate focusing of conservation activities and promote a targeted approach, priority areas for conservation and rehabilitation has been identified. Activities within these areas will be promoted through local designation by:

- Coordinating conservation efforts within priority areas
- Building upon existing natural area estate and conservation partnerships
- Providing opportunities for new partnerships and
- Leverage offset investments.

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PART A – BACKGROUND AND CONTEXT

1. INTRODUCTION

Purpose

This report describes the makeup and distribution of the natural environment within the Ipswich local government area (LGA). Ipswich is centrally located in the booming South-east Queensland (SEQ) region of Australia and covers an area of 1,090 square kilometres. To the east of the City are the highly urbanised cities of Brisbane and Logan and to the north, south and west are the rural and agricultural areas of the Scenic Rim, Lockyer Valley and Somerset Regions. Ipswich lies within the western growth corridor where the SEQ Regional Plan 2009 predicts a trebling of population by 2031. The needs of an expanding population will be given continued consideration in the planning and management of the natural environment and its inhabitants.

The intent of this report is to provide current technical background information on present environmental values which will inform the review of the Nature Conservation Strategy 2008 and assist in developing the strategic framework for achieving the nature conservation goals and objectives. The report is set out in three main parts:

- Part A – Background and Context
- Part B – Ipswich's Natural Assets
- Part C – Enhancing Landscape Connectivity

A number of policies and strategies have been produced by Council that link to the Strategy and will assist in achieving these goals and objectives (refer Appendix I). A desired outcome from the review of the Strategy is to strengthen these linkages, ensuring the reflection of nature conservation goals in Council's decision-making processes.

What is nature and nature conservation?

Nature incorporates all elements within the natural landscape (abiotic and biotic), including plants, animals, the landscape, and other features and products of the earth which are not man made[1] (Figure 1). The benefits nature provides set the basis for human well-being. These benefits are known as ecosystem services and a continuous deterioration of ecosystems results in a reduction of the services, products and goods available. Some of these are vital to our survival, including: clean freshwater for drinking, animal and plant products for food, life sustaining air quality, building materials, fuel and many more.

Figure 1 – The abiotic environment includes factors such as temperature, soil, sunlight, air and water whilst the biotic environment comprises of the living elements fauna, flora and microbes.

One key element of a well-functioning ecosystem is the presence of a variety of species to ensure a stable supply of goods and services, though the effect of species loss may differ depending on the ecosystem[2]. The SEQ region, together with north eastern New South Wales, is one of the richest parts of Australia for birds, amphibians and eucalypt[3]. However, over 56% of the region's vegetation cover has been cleared for urbanisation and agriculture[3], which previously supported a large number of species now considered to be threatened[4]. Reduction of habitat areas also has the potential to have an impact on the well-being of the region's growing populations. This reinforces the importance of supporting nature conservation.

Nature conservation traditionally focus on the protection of areas containing high conservation values, such as threatened plant and animal species. Moving forward, nature conservation in Ipswich will shift towards finding a balanced approach to achieve economic and environmental outcomes. This balance strengthens the environmental values of Ipswich and promotes a strong social connection, all of which strives towards a sustainable and productive community.

2. QUEENSLAND'S ENVIRONMENTAL LEGISLATIVE AND PLANNING FRAMEWORK

The Australian environmental legal system is structured in four levels: International law, Commonwealth law, Queensland law and local law, and refers to those laws specific to the protection of soil, air, water, the oceans, biodiversity and the environment as a whole. Environmental law places legal obligation on Council and provides direction for the protection and management of the environment (Table 1). Other planning documents that provide guidance for nature conservation include the SEQ Regional Plan, Australia's Biodiversity Conservation Strategy and Queensland Biodiversity Conservation Strategy, as shown in Figure 2.

Figure 2 – Environmental Legislative and Planning Framework

Table 1 – Main legislations relating to the natural environment in Ipswich

Legislation	What does it protect?	How?
The Environmental Protection and Biodiversity Conservation Act 1999 (EPBC)	Matters of National Environmental Significance (MNES): • World Heritage Areas • Commonwealth listed migratory species • Commonwealth marine environment • Commonwealth listed threatened species and ecological communities • RAMSAR wetlands • Nuclear actions • National Heritage places	Activities which may have a significant impact on MNES are to be referred to the Commonwealth Environment Minister for assessment.
The Sustainable Planning Act 2009 (SPA)	SPA manages the processes by which development occurs and the purpose of SPA is to achieve ecological sustainability, which integrates the aspects of: • Protection of ecological processes and natural systems; • Economic development; and • Maintenance of the cultural, economic, physical and social wellbeing of people and communities.	SPA information relating to: • State planning instruments such as: the Regional Plan, State Planning Policies and State Planning Regulatory Provisions • The preparation of a local Planning Scheme • Development approval processes and requirements It has a number of mechanisms

		in place aimed at the protection of particular state interests, such as koala habitat.
Nature Conservation Act 1992 (NCA)	The NCA has three main goals: • Creates and manages protected areas; • Manages and protects native wildlife; and • Manages the spread of non-native wildlife.	NCA divides native wildlife into categories of status (extinct in the wild, endangered, vulnerable, near threatened and least concern). The Act may require permits to be issued when dealing with an activity which may have an impact on listed native wildlife.
Vegetation Management Act 1999 (VMA)	It classifies vegetation into Regional Ecosystems (REs) and assigns conservation status under the *Vegetation Management Regulations 2000* based on their current extent in the bioregion.	The VMA provides for the preparation of maps to identify areas of high conservation value, areas vulnerable to land degradation and remnant vegetation. It also provides for policies around which applications for clearing vegetation are assessed in conjunction with SPA.
Environmental Offsets Act 2014 (EOA)	Matters of State Environmental Significance (MSES).	This act regulates environmental offsets within Queensland to replace values lost due to development.
Environmental Protection Act 1994 (EPA)	Provides four Environmental Protection Policies: • Water • Air • Noise • Waste management	• Provides a general environmental duty and duty to notify of environmental harm. • A system for development approvals integrated into SPA for Environmentally Relevant Activities.

Queensland's Planning Framework

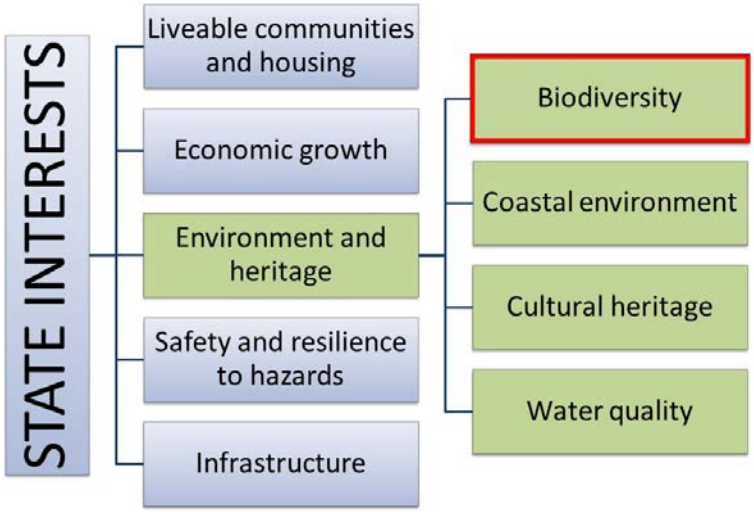
The Queensland Government is in the process of reforming the planning and development system currently in place in Queensland. *The Sustainable Planning Act 2009* (SPA) and associated regulation manages the processes by which development occurs in Queensland. SPA is designed to: manage the process by which development occurs, the effects of development on the environment and coordinate and integrate planning at local, regional and state levels. As part of Queensland's planning reform, SPA will be replaced by the *Planning and Development Bill 2014*. The purpose of this Act will be to facilitate Queensland's prosperity, by balancing economic growth, environmental protection and community wellbeing, mainly by providing for an efficient, effective, transparent, integrated and accountable system for planning and development assessment (Figure 3).

Figure 3 – Components of the *Planning and Development Bill 2014*

Queensland State Planning Policy

The Queensland State Planning Policy (SPP) applies when preparing or amending a regional plan or planning scheme. The SPP defines State policies about matters of state interest in land use planning and development (Figure 4).

Figure 4 – Queensland State interests under the State Planning Policy.



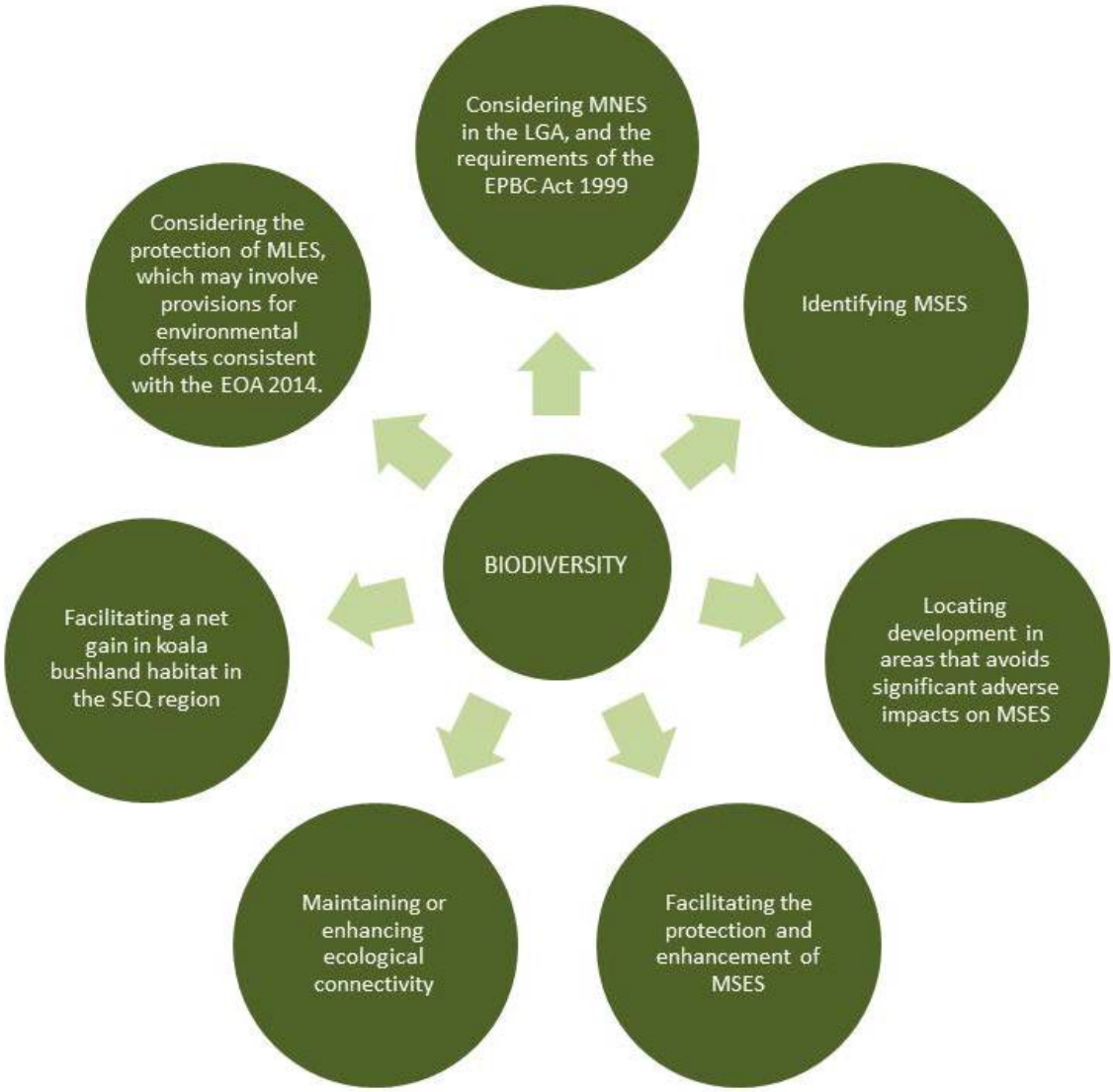
The SPP states that biodiversity is of interest to the state due to the uniqueness of Queensland's biodiversity and the services it provides in the form of food, recreation, materials and energy.

Matters of environmental significance are valued and protected and the health and resilience of biodiversity is maintained or enhanced to support ecological integrity.

Biodiversity is of state environmental importance in Queensland, and the focus of this state interest, is considered to be a Matter of State Environmental Significance (MSES). The SPP also takes Matters of National Environmental Significance (MNES) and Matters of Local Environmental Significance (MLES) into consideration.

Local planning schemes need to appropriately integrate this state interest by adopting the state interest policies as depicted in Figure 5.

Figure 5 – Policies for the integration of the biodiversity state interest into local planning schemes



3. DRIVERS BEHIND NATURE CONSERVATION

SEQ is the third most highly populated urban region of Australia and the most urbanised area of Queensland[5]. In the 2010/11 financial year SEQ attracted 71.1% of Queensland's population growth[6]. Predictions are that the region will continue to cater for most of the population growth, with Ipswich experiencing the fastest growth rate in Queensland and is predicted to establish itself as the third largest growing local government area in Queensland by 2021[7]. With this growth arises the challenge of achieving a balance between managing the need for development with the needs of the environment.

Drivers identified in Table 2 are derived from a range of strategies and plans from a global to local level, supporting the need for nature conservation.

Table 2 – Drivers which support the needs for nature conservation[8] [9] [10].

Global	▪ Mass industrialisation and urbanisation ▪ Climate change ▪ Deforestation ▪ Resource needs – the global demand for resources exceeds the biological capacity of Earth by 20% ▪ 'Green Economy` ▪ Ageing populations, rising health costs and shifting values forge large new 'wellness' markets ▪ Human population health ▪ Species extinction
Federal	▪ Greenhouse gas emission reduction ▪ Reduction in environmental regulation ▪ Water security ▪ Habitat loss, fragmentation and degradation ▪ Invasive species ▪ Unsustainable use and management of natural resources ▪ Changing fire regimes ▪ Climate change ▪ Economic development ▪ Demographic change ▪ Socio-political factors ▪ Scientific and technological change
State (Queensland)	▪ Economic development ▪ Reduction in environmental regulation ▪ Water security ▪ Habitat loss, fragmentation and degradation ▪ Invasive species ▪ Unsustainable use and management of natural resources ▪ Climate change

	▪ Population growth and distribution ▪ Changing fire regimes
Local (Ipswich)	▪ Population growth ▪ Loss of habitat for native species ▪ Climate change ▪ Loss of ecosystem services ▪ Invasive species ▪ Flooding ▪ Local economic development ▪ Dryland salinity

The role of Council in relation to nature conservation sits within enacting policies and programs aimed at promoting, protecting and enhancing the local environment, as well as creating community awareness and engagement.

Ipswich is committed to the management of nature conservation, as reflected in Theme 2: Natural Environment of the Ipswich Long-term Community Plan i2031 and Corporate Plan.

Table 3 – Vision, goals and strategies relating to Theme 2: Natural Environment within the Ipswich Long-term Community Plan (i2031)

i2031 vision for the natural environment: *The City's natural systems provide clean air and water and support biological diversity whilst serving human needs. Liveability will be enhanced through integration of the built and natural environment*	
Goal	**Strategies**
Planning for healthy and sustainable environments – Ipswich has a rich, biologically diverse and attractive natural environment sustaining a broad range of fauna, flora and ecological systems across its many, varied landscapes.	• Protection of biodiversity • Environmental planning • Appreciation of ecosystem services • Integrated management
Managing for healthy and sustainable environments – The City of Ipswich has an integrated network of conservation estates, bushland reserves and green corridors that contribute to the attractiveness of the City, protect core habitat and environmental assets and caters for the recreational needs of the community.	• Managing recreation in natural areas • Clean and healthy environments • Restoration and rehabilitation of environmental assets
Environmental partnerships – The residents of Ipswich understand and appreciate the area's environmental assets and the importance of managing and enhancing environmental systems and processes.	• Integrated partnerships • Local knowledge of environmental assets • Community awareness and appreciation

4. KEY THREATENING PROCESSES

Many species of plants and animals in Australia are today threatened as a result of human activity, such as landscape change and habitat loss[11]. In Ipswich, land and natural resource use practices have left a legacy of degraded areas and processes which impact on the natural environment. The key threatening processes in Ipswich City were identified via the use of: external and internal surveys, alignment with key threatening processes under the EPBC Act, the Australian Biodiversity Conservation Strategy 2010-2030, and the Biodiversity Strategy for Queensland. These are:

- Loss of native vegetation
- Climate change
- Inappropriate fire regimes
- Introduced pest plants and animals
- Dryland salinity
- Lack of community awareness and engagement

There are many challenges involved with managing the natural environment to reduce the impacts caused by these threats, particularly in relation to catering for the needs of an increasing population. However, there are also many opportunities that may arise as a result of sustainable development for the natural environment and for the community.

Loss of Native Vegetation

Land clearing can be attributed as the greatest direct cause of habitat loss and fragmentation in Australia, which is the biggest threat faced by the natural environment today. Vegetation is vital for the health of the environment in Ipswich, not only from an environmental perspective but also for the support of the Ipswich economy and productivity. The 2011-2012 year experienced the highest clearing rate of wooded vegetation in Queensland since 2006-2007, with an increase of 68% from 2010-2011, 0.12% of this clearing occurring within the Ipswich LGA[12].

According to the area analysis for regional ecosystem statistics and remnant extent provided by the Queensland Herbarium 1997-2011, nearly 80% of remnant vegetation within the Ipswich local government area has been cleared[11]. At the citywide scale there are several ecosystem types which have been depleted to less than 5% of their pre-European settlement (pre-clearing) extent, although remaining more common at a regional scale and considered Not of Concern or Of Concern under the VMA. Within the Ipswich LGA, 9.1% of the remnant vegetation cover available in 1997 has been cleared at an average annual rate of 1.2%.

Why is loss of native vegetation a leading threat to Ipswich's natural environment?

Loss of vegetation and the subsequent deterioration of ecosystems results in a reduction of the services, products and goods available to human kind (ecosystem services). Some of these are vital to our survival, including:

- Water filtration, cycling and flow rates
- Flood control
- Fuel, fibre and other material products
- Climate regulation

- Soil erosion control
- Habitat for a number of native species

Loss of vegetation often leads to fragmentation, which in turn may result in isolated patches of habitats and loss of connectivity. A number of consequences are likely for Ipswich's natural environment, including:

- Area effects where the available habitat does not meet the requirement of the species and the species cannot survive
- Isolation of wildlife populations as a result of barriers to movement, e.g. distance is too long between nearby habitats
- Reduced genetic variability, which may lead to inbreeding amongst the species
- Edge effects, where organisms inhabiting the border of a habitat are exposed to changes in the biotic and abiotic environment due to fragmentation, for example, increased sunlight, wind, predators and competitors
- Linear infrastructure including roads, railways, and electricity and pipeline easements, as well as issues leading to an increased number of animals involved in traffic accidents or, in some species, roads may act as a barrier causing isolation of the species
- Crowding, for example, over-crowding of koala populations as a result of habitat loss may have led to an increasing occurrence of *Chlamydophila* disease as populations are subject to a higher rate of stress, leading to a lower immune response, due to increased competition for food and shelter[14].

Challenges – There are several challenges associated with the management of native vegetation loss, especially taking into consideration the high projected population growth for the Ipswich local government area. Fragmentation and habitat loss is often a direct result of urbanisation and the full implementation of the SEQ Regional Plan and Regional Infrastructure Plans will see substantial development across Ipswich. Some of this impact may be mitigated through the implementation of a compact urban form within the designated urban footprint. However, the provision of infrastructure corridors may still transect the rural parts of the city; in some areas this will result in extensive changes in the area of vegetation cover at the landscape scale, with many connected landscapes transformed to fragmented landscapes over time.

The competition for land use will continue to put pressure on Ipswich's native vegetation. Other challenges in regards to the regulation of land clearing, particularly on privately owned land, include:

- Clearing of least concern plants is exempt from requiring a clearing permit under the NCA within mapped low-risk areas
- The VMA allows for clearing to be done in preparation for a likely natural disaster to minimise or avoid impacts on infrastructure and human life; this is now self-assessable, and
- Clearing of high-value regrowth is exempt.

Opportunities – Often with challenges comes opportunities. Ipswich still contains large areas of natural bushland located outside of the current urban footprint, providing for opportunities such as delivering direct offsets in the form of environmental and carbon offsets for the region. Environmental offsets may be required under a number of laws when proposing to undertake an activity that may have a significant impact on a matter of environmental significance, such as: SPA, NCA, EPA and the EPBC Act. Carbon offsets relates to credits generated for reductions in greenhouse gases, such as the planting of forests acting as carbon sinks. These offsetting scenarios have the potential to not only offset some of the clearing occurring within the local government area, but also to increase current native vegetation cover by delivering offsets resulting from clearing occurring outside of Ipswich.

Another opportunity for managing native vegetation clearing would be to utilise an ecosystem services approach. This would assist in identifying areas vitally important to the local government area based on the services they provide and not only on the biodiversity they shelter. The preservation and restoration of ecosystem services has the potential to assist in cost reduction and disaster risk reduction for the City as in most instances hard structures are more expensive to construct and maintain (Note Box 1). Management of ecosystem services also has the potential to create a framework which involves community-based land stewardship, reducing the pressure on Council to conduct management and maintenance activities.

Note Box 1 - Cost Reduction and Disaster Risk Reduction through the preservation and restoration of ecosystem services – Case Studies

New York City's Watershed Program[15]: In the US, New York City Council was faced with an increasing threat to the city's water supply as a result of up-state land use. During investigations, it was shown that the construction of a massive filtration plant would result in an investment of $6-8 billion with an annual maintenance cost of $300-500 million. In contrast, promoting land use change within the catchment to rehabilitate the 'natural' filtration system only required a $1.5 billion investment. The city decided to go with the second option and has over the past decade purchased land and provided subsidies for best management practices within the catchment. This program has proven successful and has become a catalyst for ecosystem services programs worldwide.

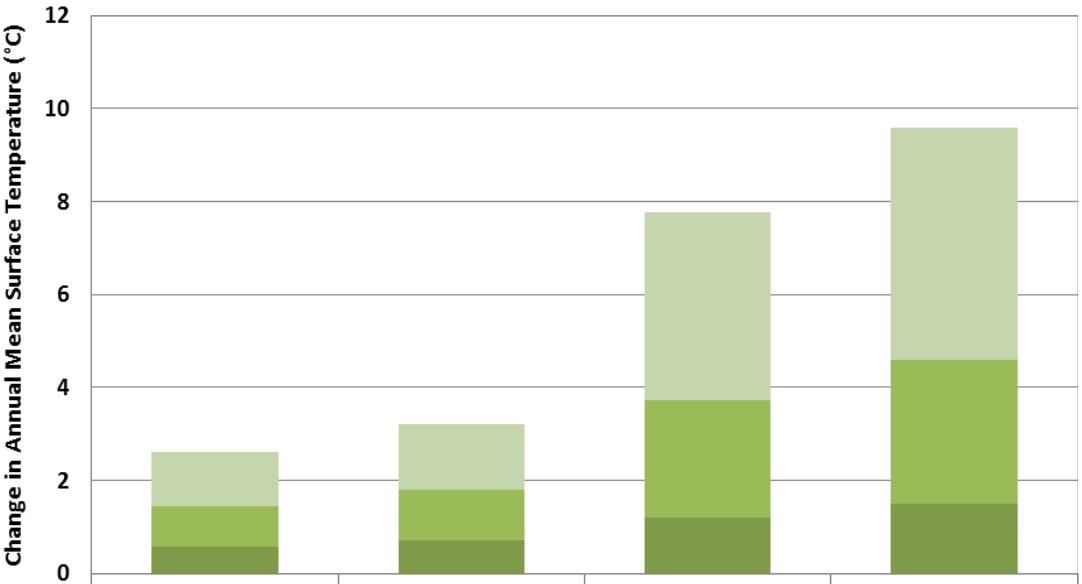
From an economic point of view the value of a healthy ecosystem for disaster risk reduction is considerable. For example, in Malaysia the role offered by the mangrove ecosystems for storm protection and flood control has been valued at US$300,000/km, based on the cost of hard engineering work that would be required to do the same job[16].

Climate Change

Climate change refers to the changes in climate over time, whether they are a natural occurrence or a result of human activity[17], which alters the abiotic environment in which a species live. The trend in climate change over the last few decades has been a steady rise in temperatures, with an increase of 0.9°C in Australia's temperature since 1950[18]. There is a reversible connection between climate change and vegetation loss as the loss of vegetation leads to increased amounts of carbon dioxide in the atmosphere, mainly due to reduced carbon sequestration capacity[19], and changes in temperature and climate patterns may alter a species' distribution pattern or survival rate.

Ipswich is projected to face a potential 0.58°C average temperature rise by 2030, under a low emission scenario, to a 4.05°C rise by 2070 under a high emission scenario (Figure 6).

Figure 6 – Change in Annual Mean Surface Temperature (°C) in Ipswich and Queensland average. Data has been extracted from CSIRO OzClim webpage http://www.csiro.au/ozclim/home.do using a moderate annual warming response.



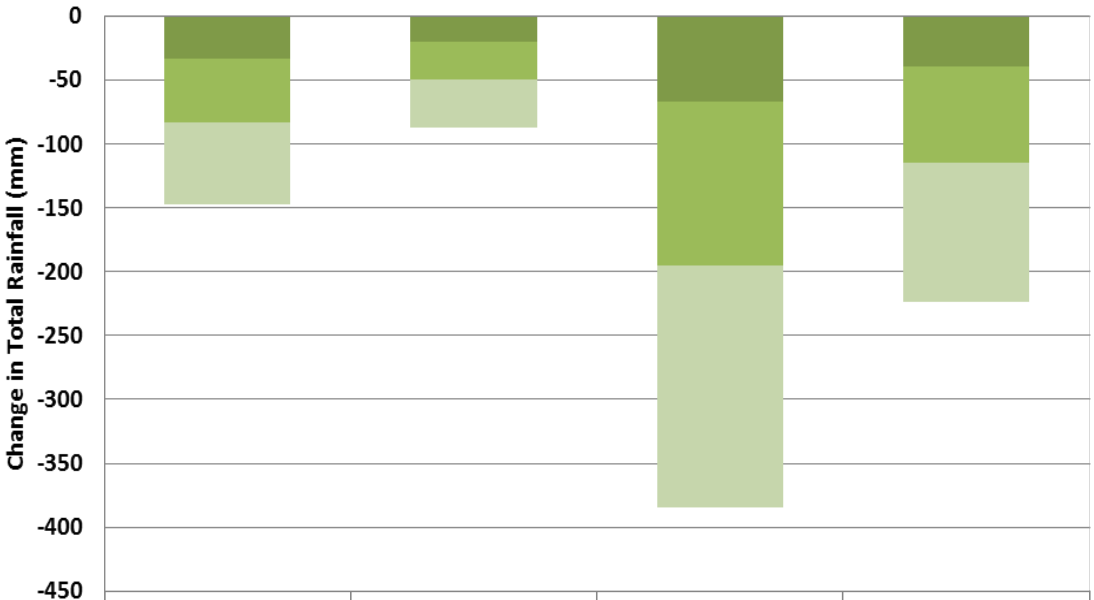
	Low Emission Scenario		High Emission Scenario	
	Ipswich	Qld	Ipswich	Qld
2070	1.15	1.43	4.04	4.99
2050	0.88	1.08	2.51	3.1
2030	0.58	0.71	1.21	1.49

Climate Change is not only about the greenhouse gas effect and global warming. Science predicts changes in other aspects of our climate as well, such as[17]:

- Rainfall patterns
- Ocean currents
- Rising sea level
- Ocean acidification
- Intensity and frequency of extreme events such as storms, droughts and floods.

The total average rainfall in Ipswich is expected to face a higher decrease than the Queensland average, which, even under a low emission scenario, will decrease by 33.3 mm by 2030 (Figure 7).

Figure 7 – Change in Total Rainfall (mm) in Ipswich and Queensland average. Data has been extracted from CSIRO OzClim webpage http://www.csiro.au/ozclim/home.do using a moderate annual response.



	Low Emission Scenario		High Emission Scenario	
	Ipswich	Qld	Ipswich	Qld
2070	-64.2	-38.2	-188.9	-109.1
2050	-49.6	-29.6	-128.4	-75.3
2030	-33.3	-19.9	-66.9	-39.8

Why is climate change a threat to Ipswich City's natural environment?

Due to the current rate of the change, the natural environment is highly vulnerable to climate change as it is limiting a high number of species' ability to adapt. This may lead to biodiversity in Ipswich experiencing changes such as: shifts in genetic composition, changes in migration patterns of some birds, altered life cycles, changes in vegetation compositions, increased extinction risks and changes in fire regimes[20], leading to severe losses of ecosystem services.

Challenges – The biggest challenge emerging as a result of climate change is the need for adaptation. There is a need for the community, as a whole, to learn how to adapt with not only the direct impacts caused by climate change, such as loss of ecosystem services, but also the indirect impacts such as increasing living costs. Council, as well as other local organisations and businesses, are faced with the challenge of reducing current carbon emission rates and accept the importance of mitigation.

Opportunities – Though there are many challenges and risks resulting from climate change, there are also a number of emerging opportunities. Adaptation for climate change has the potential to provide for local economic growth through the development of: new job markets surrounding renewable energy and green construction; delivery of carbon offsets within Ipswich to be traded on the global market and therefore creating a potential revenue stream for local landowners; and implementation of cost-effective measures such as energy efficient technology leading to reduced costs for Council and increased benefits for the community.

For increased resilience to climate change impacts across the habitat network, the City should strive to protect climate change refugia containing a variety of habitats and areas to support species genetic diversity across the City.

Inappropriate Fire Regimes

The fire regimes in Australia have large impacts on environmental values. The pattern, extent, seasonality, frequency, intensity and patchiness of fire regimes affect the ecology of the landscape; many native plant species, including eucalyptus and acacias, are dependent on fire events to maintain their ecological cycles[21]. In general it is the composition of the landscape, as well as the intensity of the fire, that will determine the effects of the fire event. Some ecosystems are more or less dependent on fire to germinate while the event may inflict serious detrimental effects on others. Appropriate fire management is also vital to ensure the safety of surrounding communities and decrease occurrences of high-intensity fire.

Why are inappropriate fire regimes a threat to Ipswich City's natural environment?

Poorly managed fire regimes are a serious threat to our biodiversity, as it may lead to[10]:

- Destruction of native plant communities and animal populations
- Increased soil erosion
- Expansion of weed and feral animal populations
- Reduced water quality and
- Increased soil salinity

Ipswich City Council has a fire management policy in place for Council's Natural Area Estate. This document states that: *To protect and promote biodiversity and ecological values within Council's reserves, planned burns will be applied as a management tool to achieve objectives established by the fire management plan. This may require the application of a range of fire regimes to stimulate vegetation regeneration, control weeds or protect and fire sensitive species and habitats*[21].

Challenge – In light of climate change, in combination with inappropriate fire regimes, more frequent and intense bush fire seasons are predicted, placing species and ecosystems at their ecological limits. Achieving appropriate levels of resourcing and coordination required to mitigate these effects, as well as the engagement and education of private land owners in appropriate fire management, already provides a major challenge for Council.

Opportunities – This is an opportunity to use Council's Natural Area Estate as a model for integrated, best practise, fire management. Council's conservation partnerships provide a tool for engaging with private land owners in the execution of ecological burns and prevention of high frequency fire from a city-wide perspective, as well as promoting collaboration across the board, thus providing environmental and safety outcomes for the local community.

Introduced Pest Plants and Animals

An introduced plant or animal is a species that grows or lives outside of its original range and has established to become a pest. These animals and plants have become an entrenched part of the landscape in SEQ as some species have "naturalised". The

Queensland Biodiversity Strategy[22] states that the invasion of pest plants is one of the highest threats to terrestrial ecosystems in Queensland, alongside native vegetation clearing. Nationally pest plants are identified and categorised based on the severity of their environmental and socio-economic impacts and invasiveness[23].

There are approximately 73 pest animals that have established in Australia[23]. Of these, 27 have been recorded to occur within Ipswich (Table 4). The Ipswich City Council Pest Management Plan 2010-2014 identifies four of these species as posing a significant threat to Ipswich's natural environment[24]. In contrast, 347 pest plants (including fungi and protists) are scattered throughout the City and are widespread in various locations, having a major impact on riparian corridor condition. Pest plant and animal control in Ipswich is primarily focused on protection of natural assets, such as parks and reserves, as well as community education and empowerment[24].

Table 4 – Pest animals which have been recorded to occur within the Ipswich LGA

Amphibians	**Reptiles**
Rhinella marina, Cane toad	*Hemidactylus frenatus*, House gecko
Birds	
Anas platyrhynchos, Northern mallard	*Cacatua tenuirostris*, Long-billed corella
Streptopelia chinensis, Spotted dove	*Columba livia*, Rock dove
Lonchura punctulata, Nutmeg manikin	*Carduelis carduelis*, European goldfinch
Passer domesticus, House sparrow	*Sturnus vulgaris*, Common starling
Sturnus tristis, Common myna	
Mammals	
Capra hircus, Goat	*Bos Taurus*, European cattle
Canis lupus familiaris, Dog	*Vulpes vulpes*, Red fox
Equus caballus, Horse	*Felis catus*, Cat
Lepus europaeus, European brown hare	*Oryctolagus cuniculus*, Rabbit
Rattus rattus, Black rat	*Mus musculus*, House mouse
Rattus norvegicus, Brown rat	*Sus scrofa*, Pig
Fish	
Oreochromis mossambicus, Mozambique mouthbrooder	*Gambusia holbrooki*, Mosquitofish
Poecilia reticulate, Guppy	

Why are pest plants and animals a threat to the natural environment in Ipswich?

Pest species causes loss of biodiversity in several ways, including[10]:

- Competition with native species for food and habitat
- Predation
- Diseases
- Alteration of the physical environment
- Toxicity

They can also have economic and social impacts in the form of[10]:

- Increased fire risk
- Increased costs to infrastructure maintenance

- Reduction of the amenity of recreation areas
- Adverse effects on human health

Challenges – Many introduced species have already become so entrenched in the environment in Ipswich that the complete eradication of these is near impossible. Making the determination of when controlling a species is value for money will always provide a major challenge. It is also vital to note the importance of best management practices, especially in relation to weed control, as certain weed species may also have some positive impacts, such as Lantana providing habitat for small bird species, and therefore the provision of native habitats is required when clearing weeds such as these.

Another particular challenge faced by Council is that the majority of land within Ipswich is privately owned, where control for pest plants and animals is the responsibility of the land owners. Engaging with land owners can, at times, prove very challenging for a number of reasons, some of these being:

- Entrenched ideas and behaviour already existing in the community
- A general lack of interest
- Existing stigma and fear around government and
- High expectations of assistance from local government.

Opportunities – Control of pest plants and animals provides an opportunity for community members to work together for a united approach on a key threat to Ipswich's natural environment. It provides a platform for engagement of new stakeholders and awareness building.

Weeds of National Significance (WONS) of importance in Ipswich City[23]

Asparagus fern, *Asparagus aethiopicus*, a perennial herb that originated as a garden species and has since spread to become a serious environmental weed as it subdues native ground vegetation.

Cat's claw creeper, *Dolichandra unguis-cati*, a climber known to choke the native vegetation on which it grows. This plant is considered one of Australia's worst environmental weeds due to its invasiveness and severe impacts.

Fireweed, *Senecio madagascariensis*, can easily out-compete pasture species and pose a threat to livestock as they are toxic. Fireweed is scattered throughout Ipswich and are commonly found around roadsides, pastures, and adjacent open forest.

Lantana, *Lantana camara*, smothers native vegetation by forming dense thickets and causes the areas to be impenetrable to animals. The plant can also be poisonous to livestock.

Madeira vine*, Anredera cordifolia,*- is a competitive vine that smothers trees and is generally difficult to control.

Parthenium weed*, Parthenium hysterophorus,* invades: pastures, disturbed bare areas along roadsides, heavily stocked areas around yards and watering points. This may result in reduced beef and crop production. The pollen from the pest plant contains potent allergens that may cause dermatitis and hay fever.

Parkinsonia, *Parkinsonia aculeate,* poses a threat to the City's wetlands as they form dense shrubs which become impenetrable to many animals.

Salvinia, *Salvinia molesta,* an aquatic weed which has the potential to cause thick mats of vegetation over Ipswich's waterways, reducing available oxygen and making the environment unsuitable for native aquatic biodiversity.

Water hyacinth, *Eichhornia crassipes,* similar to Salvinia, this aquatic plant destroys local waterways and degrades water quality.

Pest animals of significant interest in Ipswich City[23] [24]

The red fox, *Vulpes vulpes,* is a major threat to both native biodiversity and agriculture, via predation on native species and livestock, plus potential for disease spread (rabies).

Similar to the red fox, wild dogs, *Canis familiaris,* are a threat to native biodiversity and agriculture via predation and disease spread.

Rabbits, *Oryctolagus cuniculus,* are one of Australia's major agricultural and environmental animal pests, as they compete with native animals for food and shelter, destroy the landscape and cause soil erosion by preventing plant regeneration.

The feral pig, *Sus scrofa,* inhabits about 40% of Australia. The feral pig has a huge economic impact on the agricultural industry by causing: losses in agricultural production; and, cost of control.

To a lesser extent feral pigs do predate on native species but they mainly cause disturbance of the soil and native vegetation, leading to poor water quality and reduced available habitats for native species.

Other introduced pest animals of emerging interest due to their detrimental impacts on local biodiversity are cane toads and fire ants.

Dryland Salinity

Salinity is a natural process in Australia as this is, in general, as salty continent with limited capacity to drain salt and water. This issue has been further increased as a result of land use changes since European settlement, as native deep-rooted vegetation was cleared to make room for crops and pastures with shallow roots and different growth patterns[25]. This results in ground water table rises, bringing dissolved salts to the surface and as water evaporates, crystallised salt is left behind on the surface.

Why is dryland salinity a threat to the natural environment in Ipswich?

Dryland salinity is most common in agricultural areas as a result of extensive land use changes. Impacts caused by the issue are plenty and include:

- Loss of agricultural production as it reduces yields and stunts growth of many crops and pastures. Most crop and pasture species have low tolerance to salt.
- Water quality – run-off into rivers and streams result in increased water salinity levels.
- Biodiversity – a range of flora and fauna species can be affected by dryland salinity as sensitive plants die off and habitats are destroyed, both terrestrial and aquatic.

Challenges – Agriculture is closely tied to land clearing and land use change, resulting in a shift in available vegetation. This can be further exacerbated in areas under irrigation as increased amounts of water are added to the area.

Opportunities – There are strategies for managing salt-prone areas to reduce the risk of dryland salinity. Council has the opportunity through mechanisms such as the Conservation Partnerships program and catchment planning to communicate the benefits of implementing these methods into whole property planning.

Lack of Community Awareness and Engagement

Unsustainable behaviour and a lack of community awareness is also a primary cause of declining health of the City's natural environment. Disconnection with nature often results in a lack of empathy with the natural environment, leading to biodiversity not being recognised as underpinning ecologically sustainable development. This has resulted in short-term socio-economic benefits outweighing long term environmental considerations. The growing demand of an expanding human population is placing additional pressures on our natural environment with long-lasting consequences.

Investment into building community awareness and understanding of anthropogenic impacts and the resulting environmental impacts plays a key role in protecting the natural environment in Ipswich.

Challenges – Encouraging peoples' involvement in any specific issue is always challenging as people are generally more focused on matters which may have an immediate direct effect rather than worry about the long-term effects that may result from climate change and loss of ecosystem services. A major challenge faced by Council when attempting to engage with its community members is reaching the desirable target audience whilst not excluding other important community members. As stated within the Introduce Pest Plants and Animals section, engaging people can, at times, prove very challenging for a number of reasons. Similar to the previous section, this includes:

- Entrenched ideas and behaviour already existing in the community
- A general lack of interest as well as a low understanding of what environmental values exist in the City
- Limited availability of information, alternatively the information is in existence but difficult to access
- Competing/conflicting priorities and
- Lack of funding to generate awareness and engagement within the community.

Opportunities – Council is in a position where working closely with the community through increased awareness and engagement would bring many benefits. Community member engagement has the potential to lead to increased support for local nature conservation and man-power to deliver on nature conservation outcomes. Ways that this could be generated include:

- Increase mechanisms for engagement currently on offer

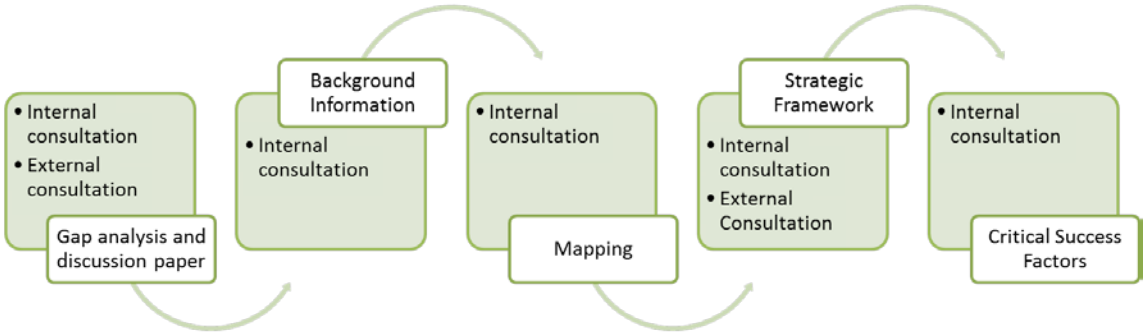
- Tailor key messages to focus on issues Council specifically wants to provide during different time periods
- Utilise other bodies/organisations to deliver key messages and
- Promote more of what Council does and what resources are available through alternative avenues.

5. REVIEW OF THE NATURE CONSERVATION STRATEGY 2008

Project Methodology

The development of the Background Report was initiated in early 2012 with an aim to support the review of the Nature Conservation Strategy 2008. The consultation and review process can be viewed in Figure 8.

Figure 8 – Consultation and review process of the Ipswich Nature Conservation Strategy 2008



Evolution of a Strategy

The initial Ipswich City Nature Conservation Strategy (NCS) was adopted in 2000 and then superseded by the NCS 2008. Each document reflected a continual progression and change in nature conservation objectives and management approaches. Through the development of a gap analysis of the NCS 2008 and consultation with the stakeholder, the intent of the next iterative of the Nature Conservation Strategy was identified, as outlined in Table 5.

Table 5 – Progression of Nature Conservation Strategy objectives and intent

	NCS 2000	NCS 2008	NCS 2014
OBJECTIVES	Identification and preservation of core habitats and strategic linkages	Enhancement and protection of areas and tracts of vegetation	Promoting resilience in the natural environment
APPROACH	• Taking stock • Baseline • Technical information	• Corporate influence • Relevance and advocacy • Road map for users	• Creating a framework • Partnerships • Innovation
AUDIENCE	• Environmental groups and staff • 'niche' audience	• Whole of Council • Mainstream	• Whole of Ipswich
FOCUS	• Technical	• Core business of	• Achieving nature

	information • Nature conservation for its own sake	Council • Social and economic benefits	conservation outcomes through economic and social interactions/ mechanisms
LINKS	• Planning Scheme	• Multiple corporate and Council strategies and plans	• On a federal, state, regional and local level

"Needs" Analysis and "User" Interviews

Workshops, involving internal and external stakeholders, were conducted to capture the current "needs" of the Ipswich environment. Discussions surrounded current threats to the environment, prioritisation of these threats, management of these threats and desired outcomes. The results of these workshops set the basis for the information surrounding key threatening processes to the Ipswich natural environment.

Written interviews were also conducted with the advisory groups via the distribution of a questionnaire prior to the review workshops. These questionnaires covered topics concerning the effectiveness of the current Strategy, possible improvements to take into consideration during the review process, internal linkages and current threats to the environment. Recommendations resulting from these interviews and workshops included:

- Investigate further possibilities to incorporate Ecosystem Services into the Strategy;
- Ipswich City Council needs to further investigate actions to maximise the resilience of Ipswich's nature to the effects of climate change.
- Council needs to set measurable outcomes and key performance indicators plus collect baseline data.
- A monitoring and reporting strategy needs to be developed.
- An approach on internal and external engagement and uptake of the Strategy should be developed.
- Mapping should be revised and updated.
- Linkages between internal Council documents and external documents should be investigated and incorporated.

PART B – IPSWICH'S NATURAL ASSETS

6. THE NATURAL ENVIRONMENT

The history of the Ipswich local government area has been dominated by rural activities, with the area being used for sheep and cattle grazing from the 1840's, with logging following shortly after, leaving a legacy of cleared and degraded land. Other common land use activities which have been, and are currently, occurring in Ipswich include coal mining and quarrying activities. Land management and catchment health is strongly related to these past and present land uses and will impact on the overall health of the ecosystem.

Climate

Ipswich City enjoys a humid subtropical climate, with warm humid summers and mild winters. The City lies outside of the higher rainfall belt of SEQ, with an average annual rainfall of 855mm[26]. Ipswich experiences a greater range of temperatures than the coastal areas of SEQ, with minimums and maximums often several degrees colder and hotter; the annual mean maximum temperature sits at 26.8°C and annual the mean minimum temperature at 13.1°C.

Ipswich Soils

The Ipswich City LGA is located within the Middle Triassic Ipswich Basin, extending from the northern New South Wales border for about 8,000km[27]. The basin is dominated by sandstones, shales, conglomerates and coals deposited in alluvial, fluvial and lacustrine environments, with some interbedded volcanics[27]. It is the geological history that has resulted in Ipswich's current rock units, landforms, soils and patterns of erosion.

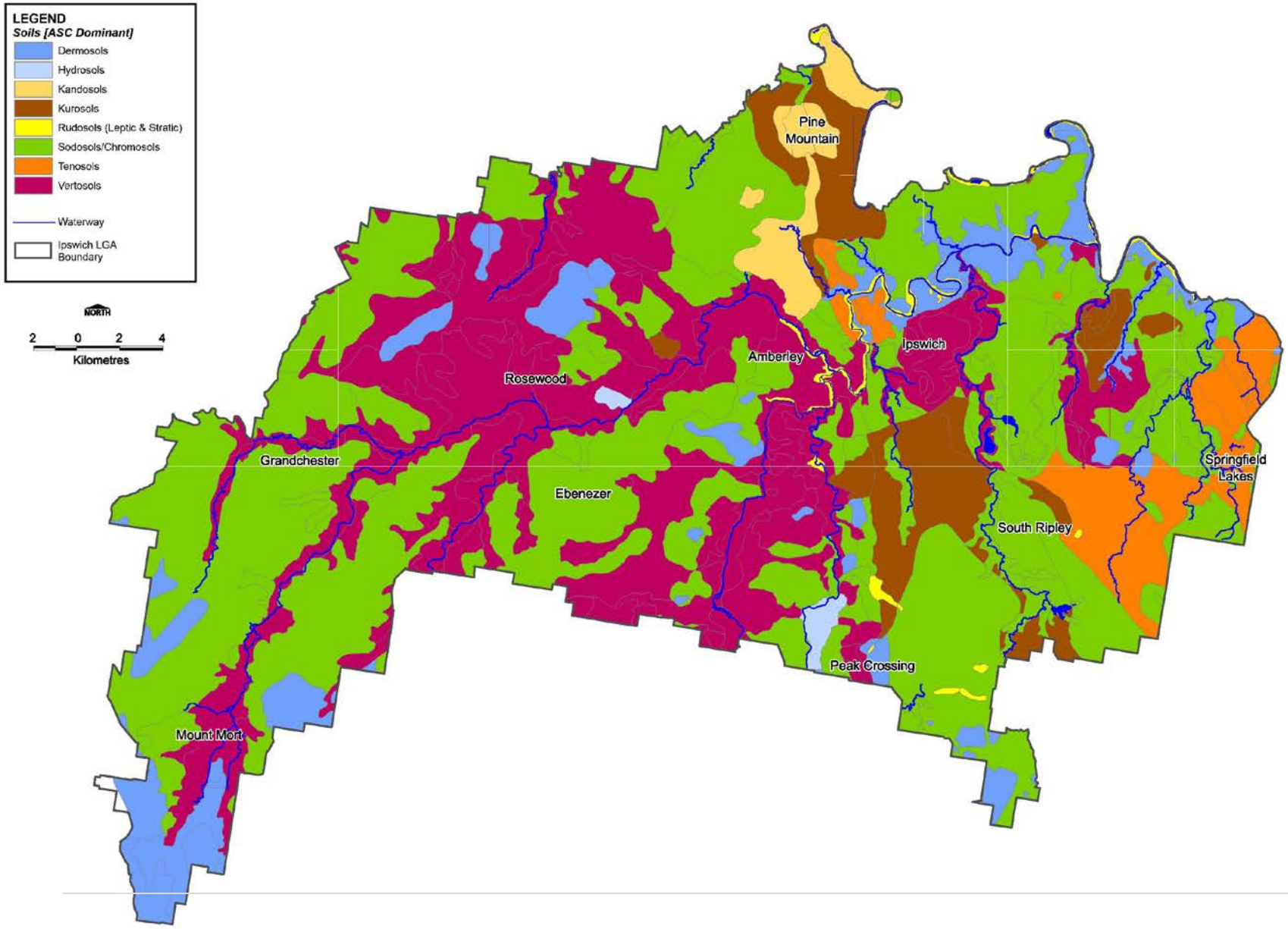
The main rock types within the Ipswich Basin area are[27]:

- Organic-rich sediments
- Siliclastic sediments and
- Sedimentary rocks.

Map 1 demonstrates major and minor soil types within the Ipswich LGA.

Cat 2 1583 J McNamara, Enviroplan Photographic Competition entrant

Map 1 – Major and minor soil types within the Ipswich LGA



Catchments and rivers

There are three main catchments within Ipswich City: Bremer River Catchment, Mid Brisbane River Catchment and Lower Brisbane River Catchment, with the majority of the Ipswich City LGA falling within the Bremer River Catchment (Map 2).

The Brisbane River is the largest river system (345km) in SEQ and extends from its headwaters north-east of Nanango to Moreton Bay at Luggage Point, a RAMSAR wetland which provide important breeding grounds for dugongs, turtles and migratory wading birds.

This river provides locally significant linkages across the landscape. Vegetated riparian corridors also play an important role as they provide a number of ecosystem services which are beneficial to the human community, including:

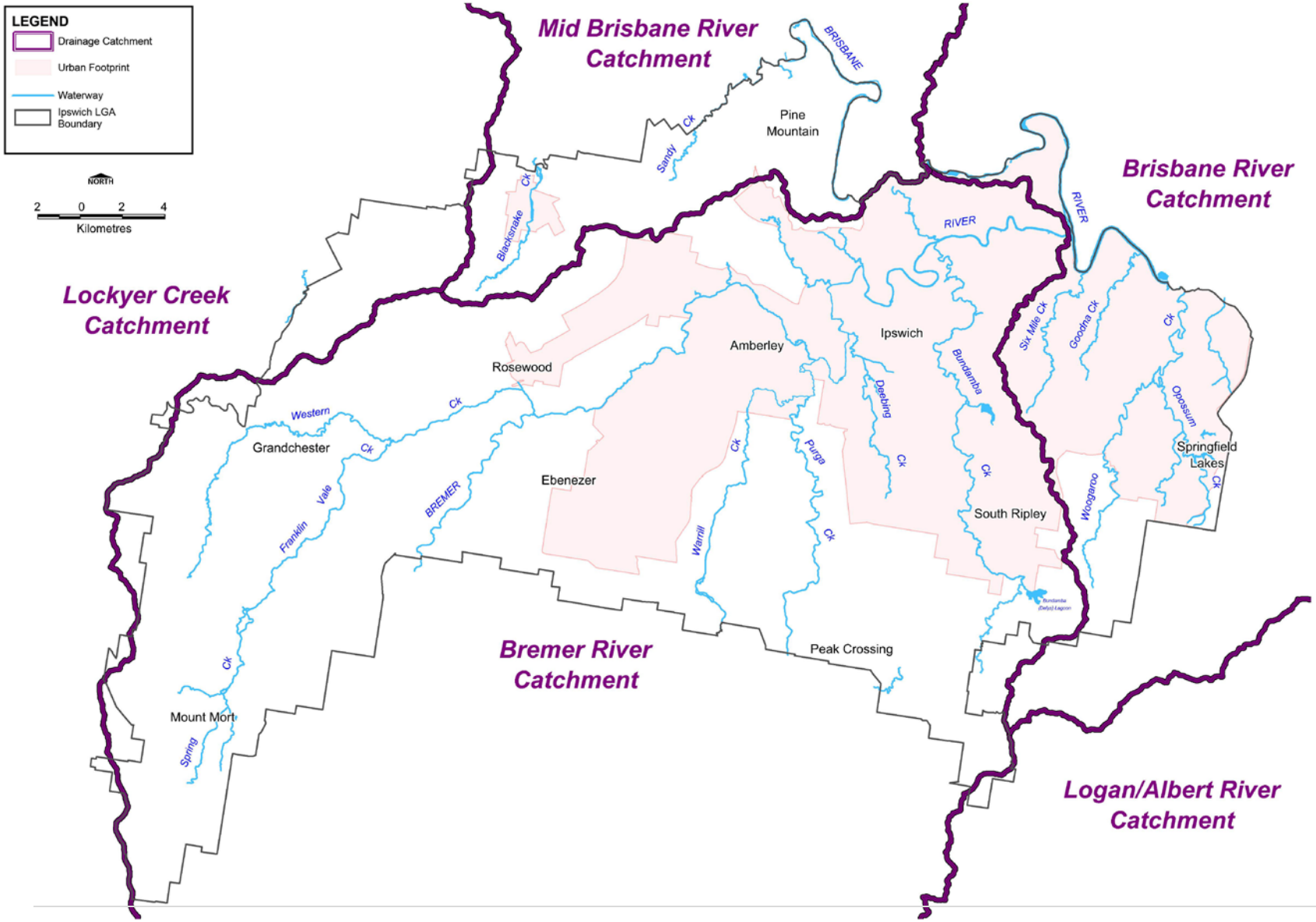
- Flood mitigation
- Erosion control
- Improved water quality by trapping sediments and nutrients
- Buffer to polluted run-off
- Decreased algal growth
- Carbon sequestration
- Recreational opportunities

The river itself provides important habitat for a number of interesting fauna species, amongst them the rare Queensland Lungfish, unique Brisbane River Cod and aggressive Bull Shark, whilst the riparian area provides important habitat for terrestrial wildlife as they move across the landscape.

A number of creeks, including the locally significant Bremer River, flow into the Brisbane River, providing further connectivity opportunities across the City:

- Six Mile Creek
- Goodna Creek
- Woogaroo Creek
- Opossum Creek
- Black Snake Creek
- Sandy Creek
- Spring Creek – Franklin Vale Creek – Western Creek
- Warrill Creek – Purga Creek
- Bundamba Creek
- Deebing Creek

Map 2 – Ipswich and its catchments



Vegetation Cover

Vegetation cover in Ipswich is measured from two main perspectives: wooded vegetation cover and remnant vegetation cover. Wooded vegetation includes stands of native vegetation, disturbed areas of native vegetation, woody regrowth following clearing, plantations of native and exotic species, some woody weeds and urban woody vegetation which can be distinguished via satellite imagery. Remnant vegetation is defined as patches of native vegetation that has remained after the widespread clearing of the region and meet the following criteria (*Vegetation Management Act 1999*, VMA):

- 50% of the cover and 70% of the height of the dominant canopy that would exist if the vegetation community were undisturbed; and
- Composed of the same floristic species that would exist if the vegetation community were undisturbed

High-value regrowth is considered as non-remnant vegetation and is identified under the VMA.

Remnant Vegetation

Remnant vegetation in Queensland is further categorised into Regional Ecosystems (REs), which are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The RE Framework defines the classes of REs under the VMA which also feeds into sections of the EPA, SPA and delineates threatened ecological communities listed under the EPBC Act.

Ipswich City sits within the SEQ Bioregion, one of Australia's 85 bioregions and covers an area of 59,403km. There are six land zones present within the Ipswich City LGA (Table 6) and 38 mapped REs (Appendix II).

Table 6 – Land zones and associated vegetation found within the Ipswich City LGA[28]

Land Zone	General Term	Description	Associated Vegetation
3	Alluvial river and creek flats	Recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes and associated wave built lunettes. Soils within this land zone are usually fertile which has resulted in extensive clearing and development for agriculture and pastures.	A diversity of species ranging from rain forests, vine thickets, eucalypt forests and woodlands, grasslands, sedgelands, forblands and shrublands. Prominent species include Queensland blue gum (*E. tereticornis*) and Tea-tree (*Melaleuca* spp.) communities.
5	Old loamy and sandy plains	Tertiary-early Quarternary extensive, uniform near level or	Eucalypts predominate in the humid to semi-arid coastal

		gently undulating plains with sandy or loamy soils. Land development is generally limited with some clearing in higher rainfall areas for cropping; in lower rainfall areas cropping is occurring where irrigation is available. Fertility is generally low due to highly weathered and leached soils.	and subcoastal bioregions; cypress pine and Melaleuca species and characteristics of deep sands and wet soils respectively.
8	Basalt plains and hills	Cainozoic igneous rocks, predominantly flood basalts forming extensive plains and occasional low scarps. Also includes hills, cones and plugs on trachytes and rhyolites, and associated interbedded sediments, and talus. Basaltic soils have been extensively developed for cropping and introduced pastures due to their high fertility and soil moisture availability (excludes rhyolite landscapes which have shallow infertile soils).	Includes vine forest in more favourable sites, eucalypt open forest and woodland, and open woodlands and grasslands.
9	Undulating country on fine grained sedimentary rocks	Fine grained sedimentary rocks generally with little or no deformation and usually forming undulating landscapes. Soils have been extensively developed for introduced pastures or cleared to increase native pasture production, or developed for cropping in higher rainfall areas.	A diverse range of eucalypt open forest and woodland, *Acacia* woodlands (gidgee, brigalow), grasslands and herbfields, and some vine forest in more favourable sites.
10	Sandstone ranges	Medium to coarse grained sedimentary rocks, with little or no deformation, forming plateaus, benches and scarps.	Eucalyptus predominated in all bioregions.
11	Hills and lowlands on metamorphic rocks	Metamorphosed rocks, forming ranges, hills and lowlands.	A diverse range of eucalypt open forest and woodland, with vine forests in Ipswich.

Pre-European Settlement

The two most common REs present within the Ipswich City LGA pre-European settlement was 12.9-10.7, *Eucalyptus crebra* (Narrow-leaved ironbark) woodland on sedimentary rocks, and 12.3.3, *Eucalyptus tereticornis* (Blue Gum) woodland to open forest on alluvial plains, which together covered over 48,851 Ha of the area. Today only 3% of the Blue gum RE remains in the area (Appendix II).

Vegetation communities within the City that have most of their pre-clearing extent intact include 12.3.8, swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp. (71% of its pre-clear cover still intact); 12.8.14, *Eucalyptus eugenioides* (Thin-leaved Stringybark)*, E. biturbinata* (Large-fruited Grey Gum)*, E. melliodora* (Yellow Box) open forest on Cainozoic igneous rocks (88%), and; 12.8.19, Montane shrubland on Cainozoic igneous rocks (98%)

Current Situation

Today the City is dominated by 12.9-10.2, the *Corymbia citriodora* (Lemon-scented Gum)*, Eucalyptus crebra* (Narrow-leaved Ironbark) open forest on sedimentary rocks vegetation community, which is making up about 42.51% of the City's existing remnant vegetation cover. The second most common vegetation community within the City is 12.9-10.7, the Narrow-leaved Ironbark, *E. crebra*, woodland on sedimentary rocks (16.99% of the City's remnant vegetation cover), followed by 12.9-10.19, *E. fibrosa* subsp. *fibrosa* open forest on sedimentary rocks (11.26%) and 12.8.17 *Eucalyptus crebra, E. melanophloia* woodland on Cainozoic igneous rocks (6.49%).

Some vegetation types (vineforest; *E. moluccana; E. citriodora/ E. siderophloia/ E. crebra*) are spread over a range of geographic locations in the City. In contrast, several vegetation types such *as E. melliodora, Corymbia henryi, E. carnes* and heath are all found in confined areas with limited distribution. There are two REs that have been cleared to such extent that 0% of its coverage still exists within the City (12.8.27 and 12.9-10.8). Another four has less than 5% of its pre-clear coverage still intact, including the federally listed Endangered Brigalow ecological community (12.3.3; 12.3.10; 12.8.23; 12.9-10.6). RE 12.11.13 has 100% of its SEQ distribution located within the Ipswich LGA, while 12.9-10.11 has 70% of its SEQ extent within Ipswich.

According to the Statewide Landcover and Trees Study Report 2011-2012 (SLATS)[12], there was 59.14% of woody vegetation cover within the local government area of Ipswich in 2011. Of the pre-European settlement remnant vegetation extent, 21.5% is intact across the City[11].

Conservation Status of Regional Ecosystems

The VMA divides the REs into three conservation statuses:

- Endangered:
    - <10% remains of pre-clearing extent or 10-30% remains with the remnant vegetation being less than 10,000 ha, and
    - less than 10% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss, or
    - 10-30% remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 ha, or
    - It is a rare RE, subject to a threatening process.

- Of concern:
  - Remnant vegetation is 10-30% of its pre-clearing extent across the bioregion; or more than 30% remains and the remnant extent is less than 10,000 ha, and
  - 10-30% remains unaffected by moderate degradation and/or biodiversity loss.

- Least concern:
  - Remnant vegetation is >30% of pre-clearing extent remaining across the bioregion, and the remnant area is greater than 10,000 ha, and
  - The degradation criteria listed above for 'Endangered' or 'Of concern' REs are not met.

Table 7 outlines number of REs occurring in Ipswich City within each class, further description of these ecosystems can be viewed in Appendix II.

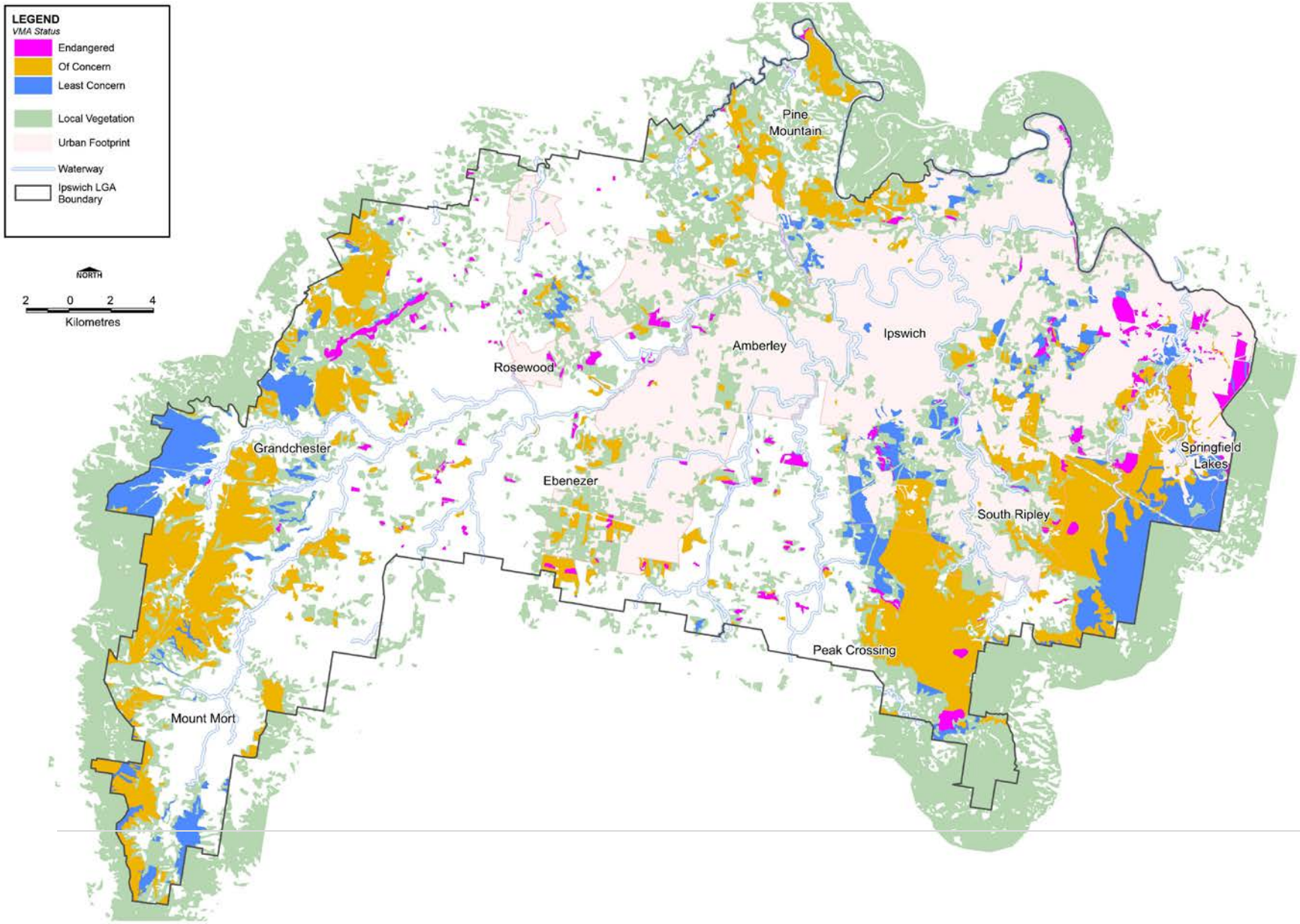
Table 7 – Conservation status and number of REs present within the Ipswich City LGA

Status	Nr. present in Ipswich City
Endangered	12
Of concern	11
Least concern	13

Map 3 provides a spatial representation of the City's native vegetation framework, showcasing areas containing dominant and sub-dominant endangered, of concern and least concern regional ecosystems.

Cat 2 3195 B Cave - Mt Blaine, Enviroplan Photographic Competition entrant

Map 3 – Ipswich's native vegetation framework

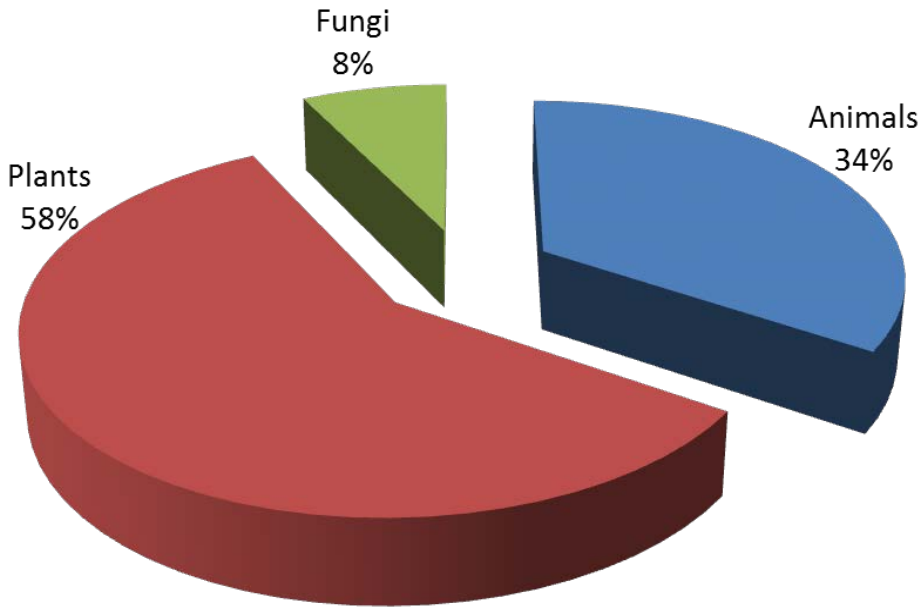


Biodiversity

Biodiversity refers to the variety of plant and animal life within a specific area. Diversity of species within the environment is vital to maintain ecosystem health as this results in greater resilience to threatening processes. A diverse environment allows for the continuation of a range of pathways and ecosystem functions to occur, such as nutrient cycling; if one pathway falters, an alternative pathway could allow for that specific function to remain[2]. SEQ is one of the most species diverse regions in Australia, with many of these species only found here. The former Federal Department of Sustainability, Environment, Water and Communities stated in a biodiversity summary report for the SEQ NRM region that there are 403 species with a greater than 50% of their recorded range in the region[4]. Of these, 217 species have 100% of their recorded range within the SEQ region[4].

Ipswich supports a high variety of species, with 1,651 native species recorded within the local government area across the plant, fungi and animal kingdoms (figure 9). The native vertebrate fauna in Ipswich is dominated by birds (55%), with mammals only making up approximately 13%.

Figure 9 – Biodiversity statistics for Ipswich City[29]



7. MATTERS OF ENVIRONMENTAL SIGNIFICANCE

Within the Ipswich LGA there are a number of species which are considered to be matters of environmental significance under Queensland and/or Federal legislation (the NCA and EBPC Act). An example of this can be seen in the Swift Parrot, *Lathamus discolor,* which declined by approximately 29% between 1987/88 and 1995/96 due to habitat loss[30] and is now listed as Endangered under both State and Federal legislation. Another example is the Australian Lungfish, *Neoceratodus forsteri*, whose distribution is restricted to SEQ. The species is native to the Mary and Burnett River systems but have been successfully introduced into the Brisbane River.

These matters also include native plants, four of these are considered to be endangered under State legislation and one, *Notelaea ipsviciensis*, is considered critically endangered on a national level.

Matters of National Environmental Significance

Matters of National Environmental Significance (MNES) are protected under EPBC Act and include:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions
- A water resource, in relation to coal seam gas development and large coal mining development.

A summary of the MNES present within Ipswich can be found in Table 8.

The Australian Government runs an interactive mapping tool through the Protected Matters Search Tool on the Department of Environment webpage, http://www.environment.gov.au/epbc/pmst/. Via this search tool a report can be generated outlining what MNES are likely to occur within a specified area. For full EPBC Act Protected Matters Report see Appendix III. Please note that this report was accurate at the date of printing.

Table 8 – Summary of MNES that may be present within the Ipswich local government area[32].

MNES	
World Heritage Properties	None
National heritage places	None
Wetlands of international importance	1
Great Barrier Reef Marine Park	None
Commonwealth Marine Areas	None
Threatened Ecological Communities	4
Threatened Species	65*
Migratory Species	32*

**These numbers represents species that occur within the LGA but also species, or a species habitat, which are likely to occur within the area.*

Federally Listed Ecological Communities

The Australian Government defines ecological communities as naturally occurring groups of native plants, animals and other organisms that are interacting within a unique habitat. A federally listed ecological community is considered threatened on a national level if they have become depleted across their full range. In Queensland there are a total of 14 ecological communities listed under the EPBC Act occurring in Queensland, consisting of 119 REs. Though four of these are identified within the Protected Matters Search Tool to exist within Ipswich, only three are mapped to occur within the Ipswich City LGA (Map 4):

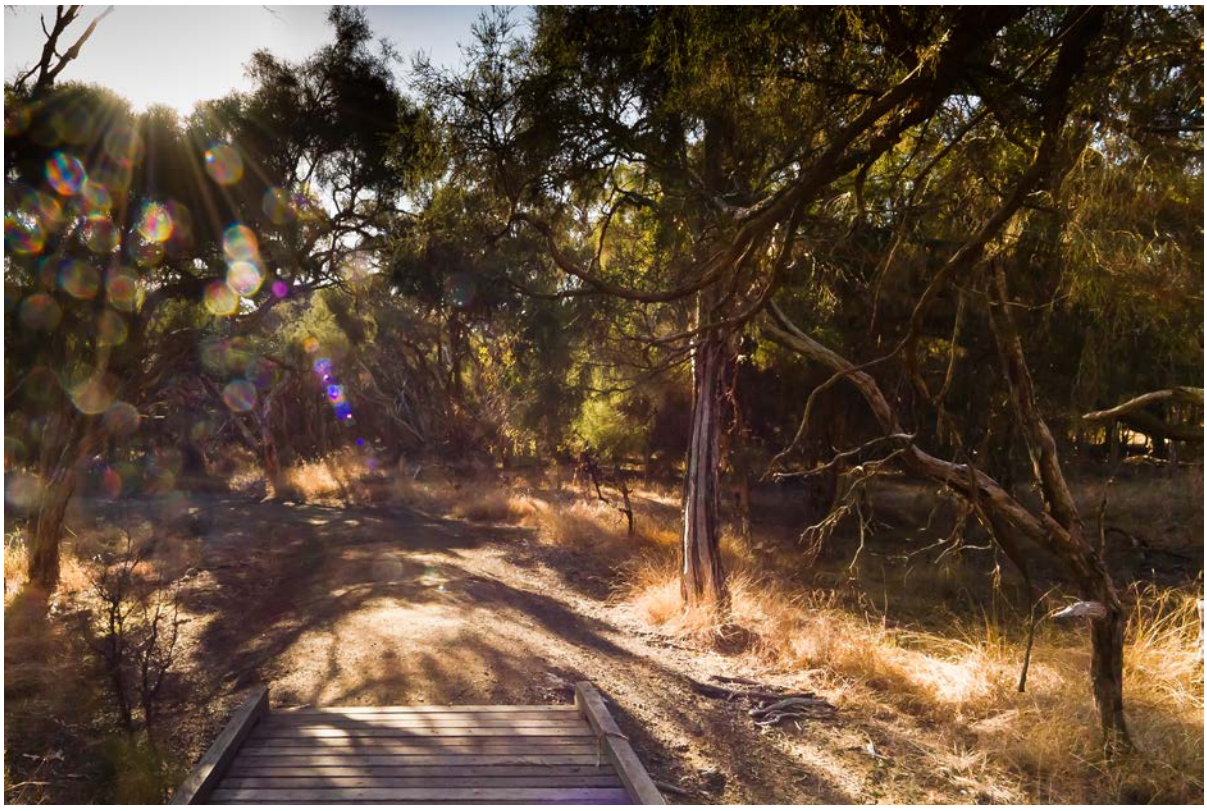
Brigalow Ecological Community: Nationally there is estimated to have been an original extent of 7,324,560 ha of which only approximately 804,264 ha remains (661,314 ha in Queensland). Thus nationally, Brigalow (*Acacia harpophylla* dominant and sub-dominant) has declined to approximately 10% of its former area and is now an endangered ecological community.

Swamp Tea Tree Forest of SEQ: The pre-European extent of the Swamp Tea-tree (*Melaleuca irbyana*) Forest of SEQ is estimated to be 2,474 ha but is Critically Endangered at a national level today.

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland: Less than 5% of this formerly widespread community remains in good condition, much of it occurs in small isolated patches. The ecological community can consist of more than 400 native flora species and provides important habitat for a large number of native fauna.

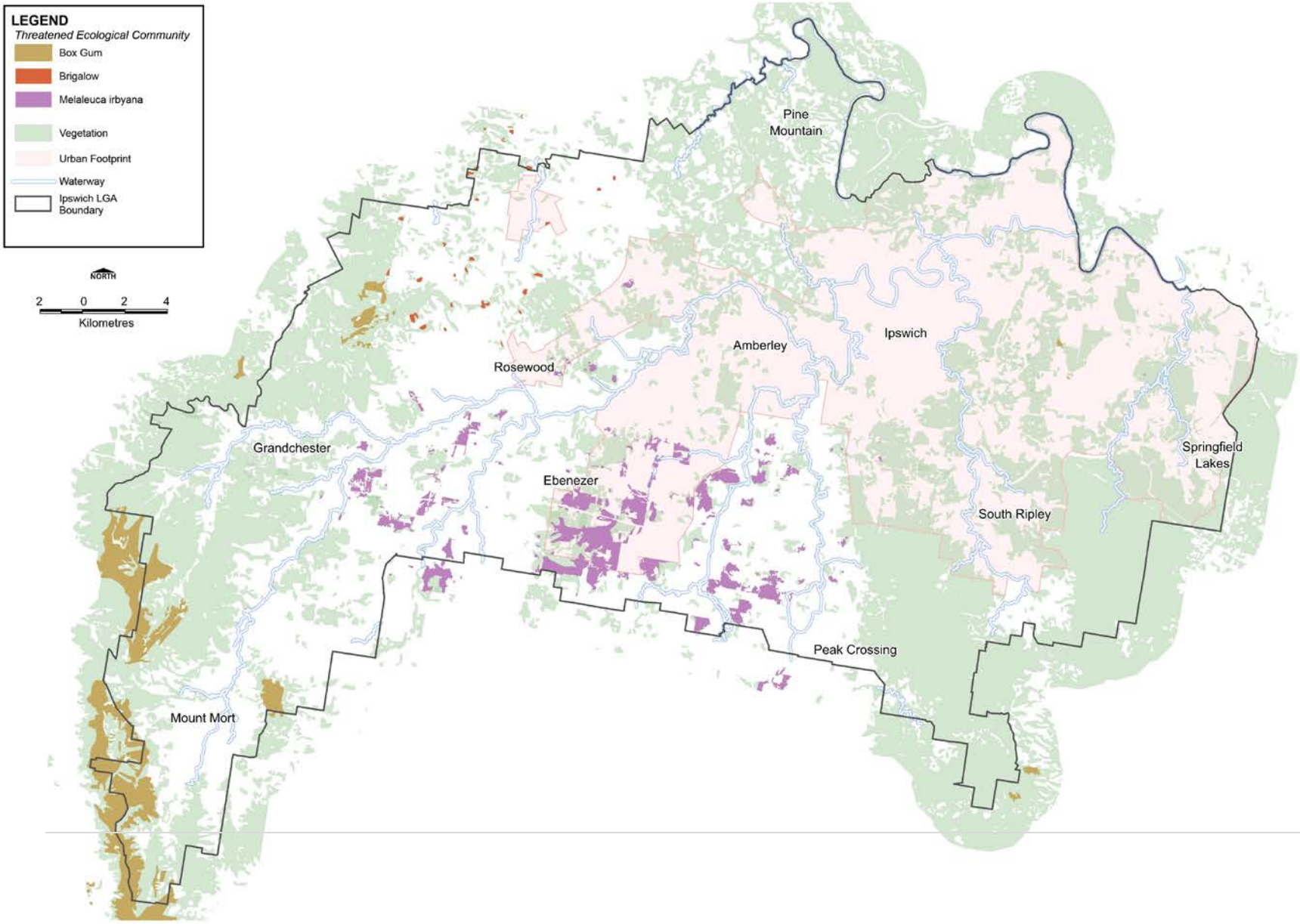
Table 9 – Ipswich threatened ecological communities and associated regional ecosystems in Ipswich

Ecological community	Status	Associated REs in Ipswich	Estimated extent of pre-clearing area remaining	% of SEQ bioregion extent in Ipswich
Brigalow (*Acacia harpophylla* dominant and co-dominant)	Endangered	12.8.23; 12.9-10.6	<10%	12.8.23 = 6% 12.9-10.6 = 6%
Swamp Tea-tree (*Melaleuca irbyana*) Forest of SEQ	Critically Endangered	12.3.3c; 12.9-10.11	<10%	12.3.3 = 2% 12.9-10.11 = 70%
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	12.8.16	10-30%	1%



L Oliver_Sunbeams on Tea Trees, Enviroplan Photographic Competition entrant

Map 4 – Federally listed ecological communities under the EPBC Act



Matters of State Environmental Significance

Matters of State Environmental Significance (MSES) are protected under Queensland's legislation and underpin the Queensland State Planning Policy's (SPP) state interest – biodiversity. The SPP sets out the state's interest for biodiversity as:

'Matters of environmental significance are values and protected, and the health and resilience of biodiversity is maintained and enhanced to support ecological integrity.'

MSES include:

- Protected area estates (including all classes of protected area except coordinated conservation areas) under the NCA;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under *the Marine Parks Act 2004*;
- Areas within declared fish habitat areas that are management A areas or management B areas under *the Fisheries Regulation 2008*;
- Threatened wildlife under the NCA 1992 (including plants, animals and breeding places) and special least concern animals under the *Nature Conservation (Wildlife) Regulation 2006*;
- Regulated vegetation under the VMA;
- High preservation areas of wild river areas under *the Wild Rivers Act 2005*;
- Wetlands in a wetland protection area or wetlands of high ecological significance shown on the Map of Referable Wetlands under *the Environment Protection Regulation 2008*;
- Wetlands and watercourses in high ecological values waters as defined in *the Environmental Protection (Water) Policy 2009*; and,
- Legally secured offset areas.

State has produced mapping relating to some of these matters as a guide to assist planning and development assessment decision-making to support implementation of the SPP biodiversity interest. Further information regarding the method for mapping MSES can be found on the Queensland Government Department of Environmental and Heritage Protection website http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html.

For mapping purposes, State categories the MSES into five themes containing similar biodiversity interests (Table 10).

Table 10 – MSES categories and available mapping for the Ipswich City LGA.

MSES category	Mapped for Ipswich
State conservation areas	X – See Section 8
Wetlands and waterways with statutory protection	X
Threatened wildlife and special least concern animals habitat	X
Regulated vegetation	X
Secured offsets	-

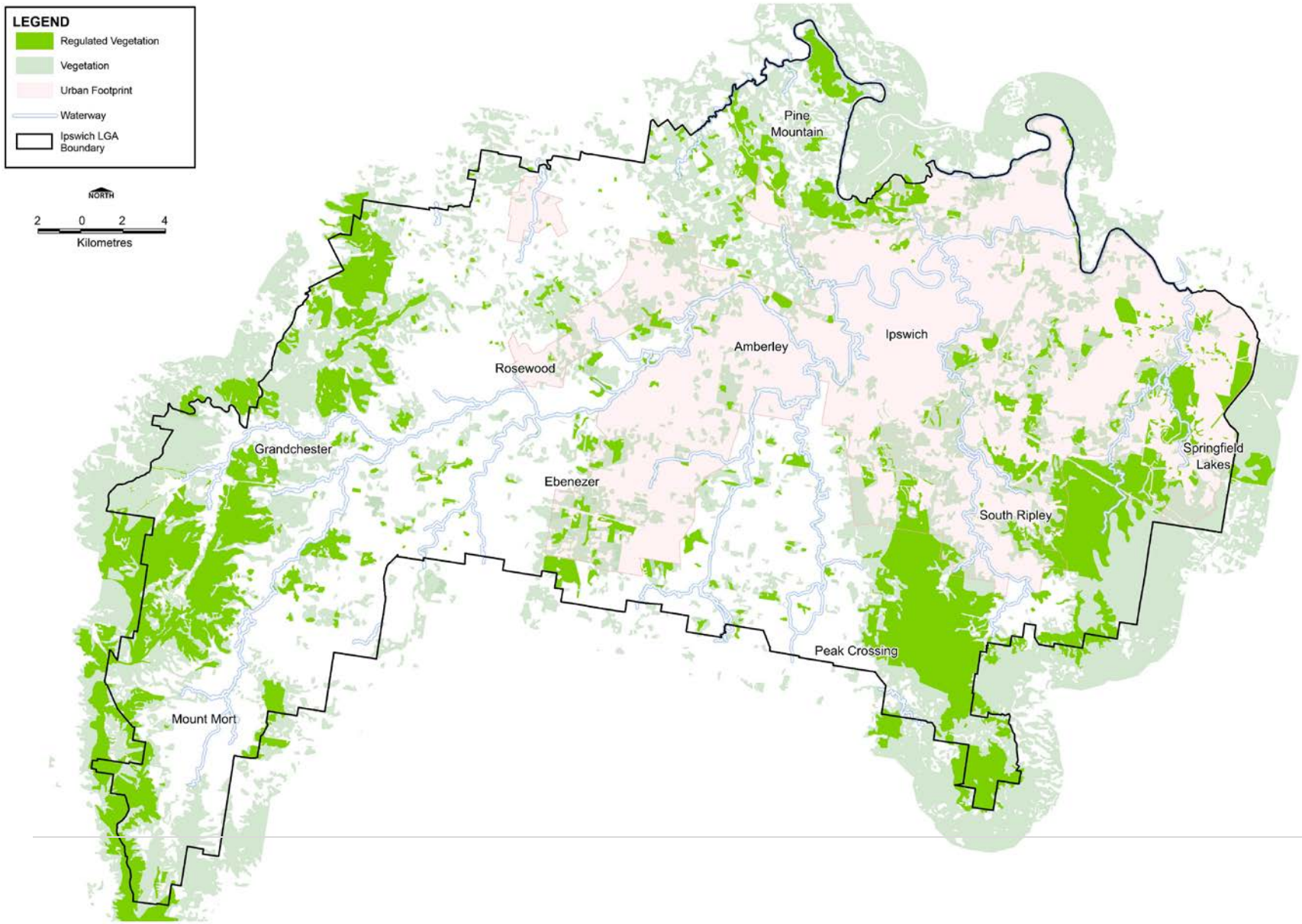
Regulated Vegetation

The regulated vegetation map refers to vegetation regulated under the VMA, which includes vegetation that is[33]:

- Endangered or Of Concern dominant and subdominant remnant vegetation mapped as Category B on the regulated vegetation management map
- Endangered or Of Concern high value regrowth and mapped as Category C on the regulated vegetation management map (only on leasehold land for agriculture and grazing)
- Areas mapped as Category R on the regulated vegetation management map (regrowth watercourse areas in priority reef catchments)
- Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse map
- Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map

Regulated vegetation within the Ipswich LGA can be seen in Map 5.

Map 5 – Regulated within the Ipswich LGA



Threatened Wildlife

Threatened wildlife under the NCA and special Least Concern wildlife under *the Nature Conservation (Wildlife) Regulation 2006* are spatial represented through associated essential habitat. Mapping attributes include[33]:

- VMA essential habitat
- Modelled habitat
- Mapped areas based on known habitat factors (climate, elevation, bioregion, regional ecosystems) or
- Point records buffered to 1000m that are within remnant or regrowth REs.

The Koala populations of SEQ are listed as vulnerable under the NCA and therefore considered as threatened wildlife and a MSES (as well as MNES). The mapping of essential habitat for threatened species includes habitat for the City's koala populations (Map 6).

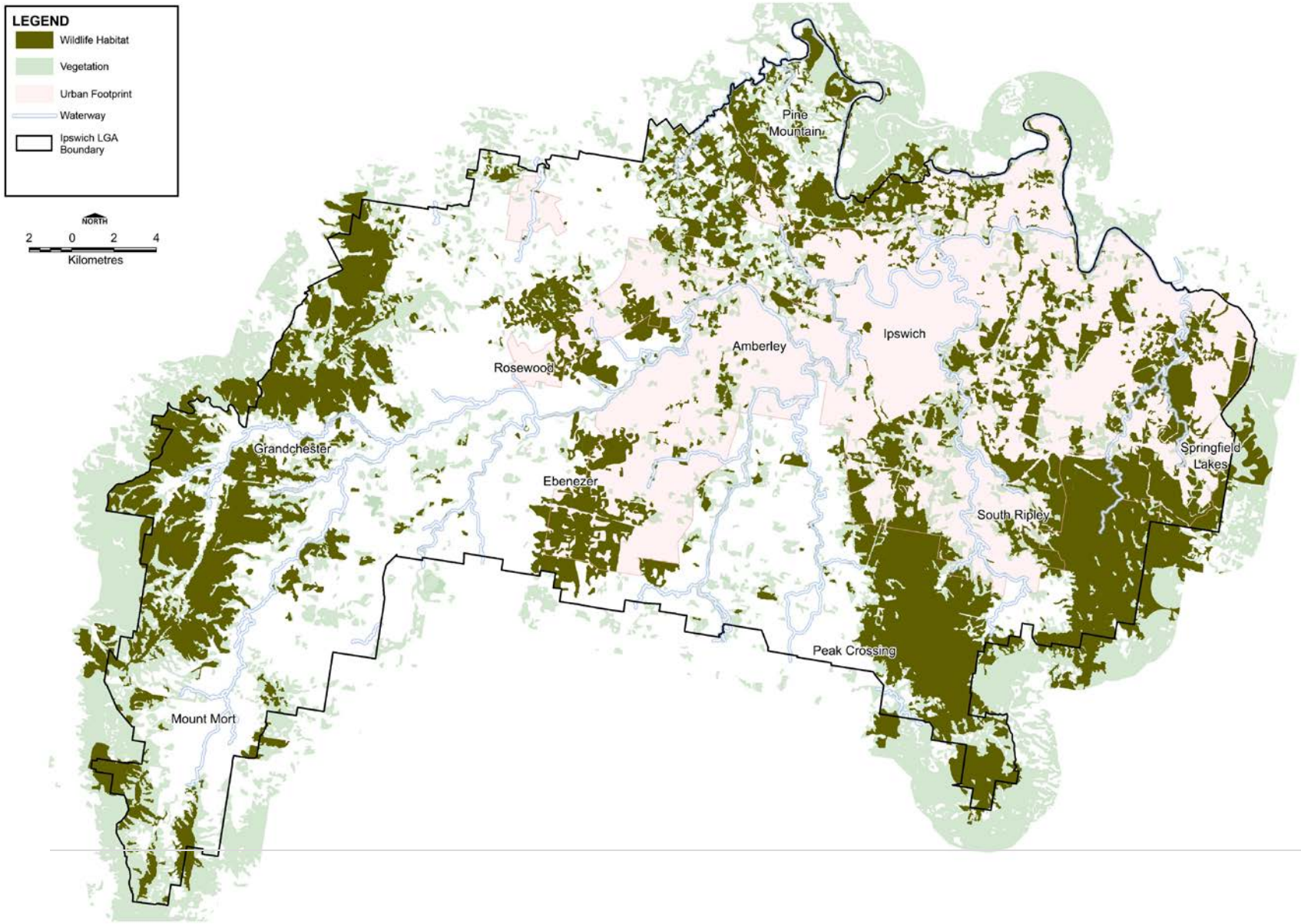
Table 11 – Biodiversity within Ipswich listed as threatened or near threatened under the *Nature Conservation Act 1992*

Scientific Name	Common Name	Status	Scientific Name	Common Name	Status
BIRDS					
Psephotus pulcherrimus, Paradise parrot		PE	*Erythrotriorchis radiatus,* Red goshawk		E
Cyclopsitta diophthalma coxeni, Coxen's fig-parrot		E	*Lathamus discolor,* Swift parrot		E
Geophaps scripta scripta, Squatter pigeon (southern subspecies)		V	*Atrichornis rufescens*, Rufous scrub-bird		V
Turnix melanogaster, Black-breasted button-quail		V	*Rostratula australis,* Australian painted snipe		V
Ninox strenua, Powerful owl		V	*Melithreptus gularis,* Black-chinned honeyeater		NT
Numenius madagascariensis, Eastern curlew		NT	*Haliaeetus leucogaster*, White-bellied sea-eagle		SL
Pandion cristatus, Eastern osprey		SL	*Acrocephalus australis,* Australian reed-warbler		SL
Hirundapus caudacutus, White-throated needletail		SL	*Apus pacificus*, Fork-tailed swift		SL
Ardea ibis, Cattle egret		SL	*Coracina tenuirostris*, Cicadabird		SL
Pluvialis fulva, Pacific golden plover		SL	*Cuculus optatus*, Oriental cuckoo		SL
Hydroprogne caspia, Caspian tern		SL	*Sterna hirundo*, Common tern		SL
Merops ornatus, Rainbow bee-eater		SL	*Symposiarchus trivirgatus*,		SL

		Spectacled monarch	
Myiagra cyanoleuca, Satin flycatcher	SL	*Monarcha melanopsis*, Black-faced monarch	SL
Phaethon lepturus, White-tailed tropicbird	SL	*Rhipidura rufifrons*, Rufous fantail	SL
Tringa nebularia, Common greenshank	SL	*Limosa limosa*, Black-tailed godwit	SL
Tringa stagnatilis, Marsh sandpiper	SL	*Numenius minutus*, Little curlew	SL
Limosa lapponica, Bar-tailed godwit	SL	*Actitis hypoleucos*, Common sandpiper	SL
Calidris ruficollis, Red-necked stint	SL	*Calidris ferruginea,* Curlew sandpiper	SL
Gallinago hardwickii, Latham's snipe	SL	*Calidris acuminata*, Sharp-tailed sandpiper	SL
Calidris melanotos, Pectoral sandpiper	SL	*Tringa glareola*, Wood sandpiper	SL
Plegadis falcinellus, Glossy ibis	SL		
MAMMALS			
Bettongia gaimardi gaimardi, Eastern bettong	PE	*Petrogale penicillata,* Brush-tailed rock-wallaby	V
Phascolarctos cinereus Koala *(Southeast Queensland bioregion),*	V	*Dasyurus maculatus maculatus,* Spotted-tailed quoll (southern subspecies)	V
Vombatus ursinus, Common wombat	NT	*Ornithorhynchus anatinus*, Platypus	SL
Tachyglossus aculeatus, Short-beaked echidna	SL		
REPTILES			
Hemiaspis damelii, Grey snake	E	*Delma torquate,* Collared delma	V
AMPHIBIANS			
Adelotus brevis, Tusked frog	V		
PLANTS			
Lilaeopsis brisbanica	E	*Plectranthus habrophyllus*	E
Notelaea ipsviciensis, Cooneana olive	E	*Sophora fraseri,* Brush sophora	V
Eucalyptus argophloia, Queensland western white gum	V	*Thesium australe,* Toadflax	V
Macadamia integrifolia, Macadamia nut	V	*Notelaea lloydii,* Lloyd's native olive	V
Eucalyptus curtisii, Plunkett mallee	NT	*Callitris baileyi,* Bailey's cypress	NT
Hernandia bivalvis, Cudgerie	NT	*Pterostylis nigricans*	NT

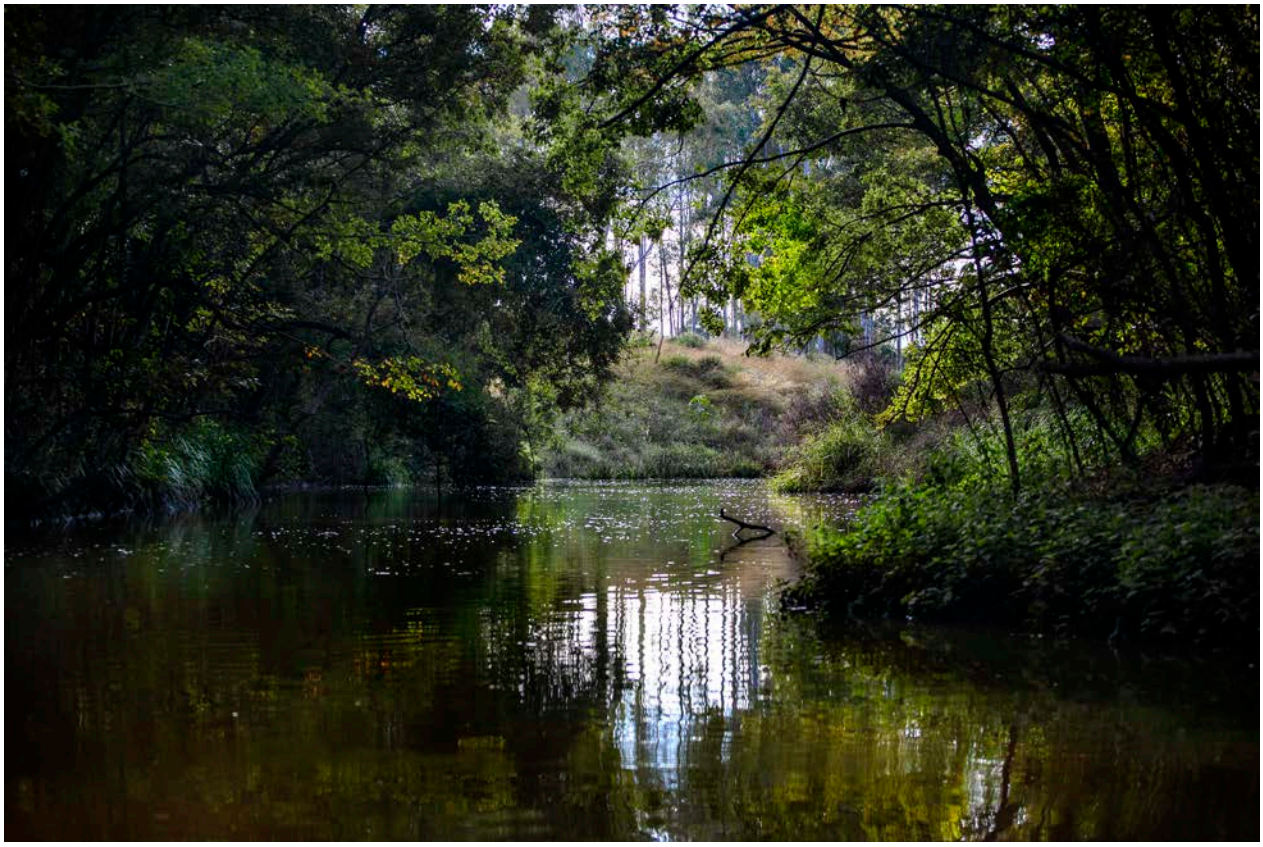
P – Extinct in the Wild; E – Endangered; V – Vulnerable; NT – Near Threatened; SL – Special Least Concern

Map 6 – Wildlife Habitat, including koala bushland, for significance species mapped as MSES



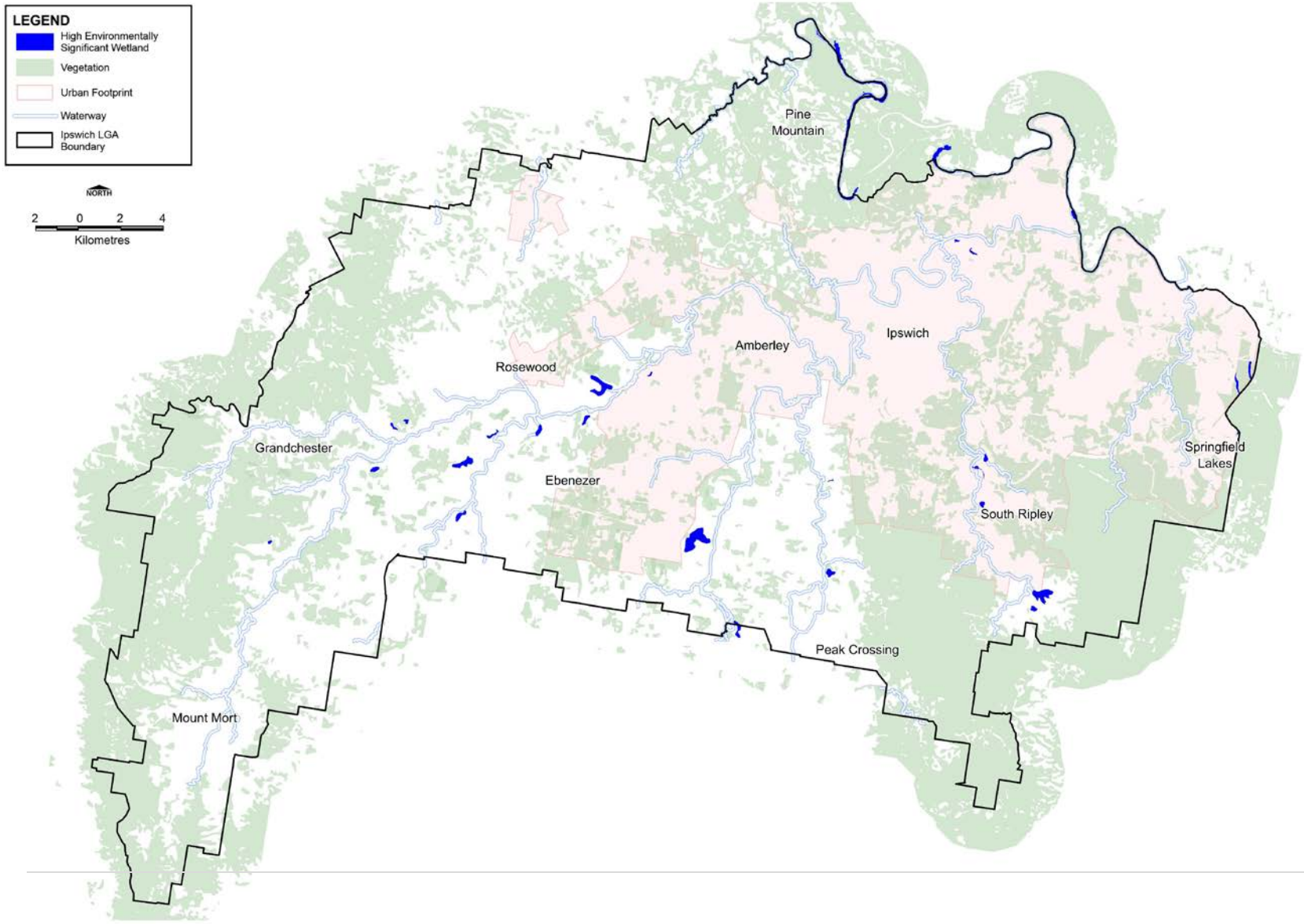
Wetlands and Watercourses with Statutory Protection

Wetlands and watercourses in high ecological values waters as defined in *the Environmental Protection (Water) Policy 2009* are considered MSES. Map 7 represents mapping of areas which are considered to be of 'High Ecological Significance' (HES) or 'High Ecological Values' (HEV).



Passier G_Follow Me_Confluence Bremer & Bundamba Creek, Enviroplan Photographic Competition entrant

Map 7 – Wetlands and waterways considered to be MSES



Matters of Local Environmental Significance

The SPP biodiversity state interest and the Queensland environmental offset framework, guided by the *Environmental Offset Act 2014*, also encourage the identification of Matters of Local Environmental Significance (MLES). In this context, MLES are defined as a matter of environmental significance dealt with under a local planning scheme or planning scheme policy made by a local government and not considered MNES or MSES. Council also utilises the identification of MLES as a guidance tool for the development of plans, partnerships and programs delivered by Ipswich City Council and a working list of MLES has been initiated within this Strategy. Criteria have been developed taking these considerations into account; these criteria are listed in order of local priority. Inclusion of these as a MLES is intended to raise their local profile and drive local conservation outcomes.

Table 12 – MLES criteria and local priority.

	Criteria
1	Local wildlife facing locally elevated levels of threat mainly associated with land clearing and development.
2	Species identified as having a cultural and/or iconic value at a local level.
3	Areas identified as providing high levels of refuge in a changing climate and are capable of supporting viable populations of a high diversity of species.
4	Areas identified as providing high levels of ecosystem functions and associated services.
5	Locally significant vegetation mapped as Least Concern remnant or high-value regrowth under the VMA pre December 2013.

Some species may fall within a number of the stated criteria but have only been identified under one.

Criteria 1 – Wildlife facing elevated levels of threat

Ipswich City is one of the fastest growing LGAs in Queensland and therefore many species, depending on certain habitats for survival, face elevated levels of threat on a local scale due to increased levels of habitat clearing and degradation. Though many of the species listed under this category are considered as 'common' across Queensland, they may become scarce within Ipswich City if care is not taken in assuring suitable habitats are retained.

This criterion also highlights species identified through the regional planning process, the Back on Track (BoT) species prioritisation framework[34], as a priority for conservation measures within the Ipswich region based on current threat levels.

The BoT species prioritisation framework is assessed against three main criteria:

1. Probability of extinction
2. Consequences of extinction
3. Potential for successful recovery

Table 13 – MLES identified under Criteria 1

Species	Justification
Plants	
Bailey's Cypress Pine, *Callitris baileyi*	Identified as being of medium priority in SEQ under the Back on Track Species Prioritisation Framework (BoT) and are currently under threat from habitat degradation and competition.
Frogbit, *Hydrocharis dubia*	An aquatic plant considered to be of high priority in SEQ under the BoT as a result of changes to water quality and flow regimes.
Insects	
Varied Sword-grass Brown, *Tisiphone abeona*	A moth considered to be of high priority in SEQ according to BoT as a result of habitat degradation due to inappropriate fire regimes.
Fish	
Ornate Rainbowfish, *Rhadinocentrus ornatus*	Identified as being of high priority in SEQ due to loss of habitat, including drainage of wetlands, habitat degradation as a result of high velocity stormwater run-off and pollution, as well as competition with feral fish.
Estuary Stingray, *Dasyatis fluviorum*	Identified as being of high priority in SEQ mainly due to degradation of habitat and water quality.
Reptiles	
Common Delma, *Delma plebeian*	Identified as being of high priority in SEQ due to loss of habitat as a result of clearing and inappropriate fire regimes.
Elf Skink, *Eroticoscincus graciloides*	Identified as being of high priority in SEQ due to declining numbers as a result of habitat degradation, loss and predation by feral cats.
Birds	
Red-browed Treecreeper, *Climacteris erythrops*	Inhabits forests and woodlands, along watercourses and gullies, and is believed to have disappeared from some habitats as a result of clearing and fragmentation[35].
Turquoise Parrot, *Neophema pulchella*	The species range in Queensland has contracted and can now only be found south of Maryborough and down to Victoria. Main threats surround habitat loss and predation by foxes[36].
Sooty Owl*, Tyto tenebricosa tenebricosa*	As many other bird species, the Sooty Owl is experiencing elevated threats from habitat loss and degradation[37].

Mammals	
Yellow-bellied Glider, *Petaurus australis australis*	Though the species is widespread across SEQ it is facing elevated threats due to the reduction of available habitat. Identified as being of high priority in SEQ under BoT.
Greater Glider, *Petauroides volans*	The largest of the glider species in Australia, the Greater Glider prefers habitats that are in older forests and have a large number of hollows.
Squirrel Glider, *Petaurus norfolcensis*	Preferred habitat in SEQ is dry eucalypt forests and woodlands which is now in a fairly fragmented state and represents less than 50% of existing vegetation in the area[38].
Sugar Glider, *Petaurus breviceps*	The most widespread of all arboreal marsupials of Australia, the sugar glider also lives under the constant threat of habitat clearing and fragmentation.
Brush-tailed Phascogale, *Phascogale tapoatafa*	Though their distribution is widespread it is fragmented and they are believed to have disappeared from roughly half of their former range over the past 30 years as a result of habitat clearing and predation by foxes and cats[39].
Greater Broad-nosed Bat*, Scoteanax rueppellii*	Identified as being of high priority in SEQ mainly due to extensive clearing and fragmentation leading to loss of habitat.
Golden-tipped Bat, *Kerivoula papuensis*	Identified as being of high priority in SEQ mainly due to clearing leading to loss of habitat and habitat degradation.

Criteria 2 – Species of iconic value

A species of iconic value refers to a species not necessarily under any current high threat to the species population but provide a representation of the unique natural environment of Ipswich.

Table 14 – MLES identified under criteria 2

Species	Justification
Plants	
Plunkett Mallee, *Eucalyptus curtisii*	The Plunkett Mallee's natural distribution is limited to SEQ and was adopted as Ipswich City Council's floral emblem in 1996.
Grass Tree, *Xanthorroes* spp.	These species have become less prominent within the urban footprint. Grass tree species have served an important role for Aboriginal people in

	Australia.
Reptiles	
Frilled Lizard, *Chlamydosaurus kingii*	Mainly found in the northern regions of Australia, SEQ is the southern limit of the species.
Birds	
Wedge-tailed Eagle, *Aquila audax*	The largest eagle in Australia.
Black-necked Stork, *Ephippiorhynchus asiaticus*	The only representative of the stork family found in Australia. Though the species is fairly abundant in Australia, this species is in steep decline in South and South-east Asia with a total less than 400 individuals[40].
Brolga, *Grus rubicunda*	Featured on the Queensland Coat of Arms, the Brolga in considered one of the state's most distinctive native bird species.
Mammals	
Platypus, *Ornithorhynchus anatinus*	The platypus is an iconic species to Australia which has recently been observed around urban areas of Ipswich.
Short-beaked Echidna, *Tachyglossus aculeatus*	Another national icon, the short-beaked echidna is still fairly common across Australia.
Eastern Grey Kangaroo, *Macropus giganteus*	Populations of this iconic Australian species are under pressure within Ipswich City due to urban encroachment and development.

Criteria 3 – Climate Change Refugia

Ipswich is expected to experience a range of potential impacts from climate change including: more hot days, more intense short duration storms, less overall rainfall, increased risk of heatwaves, increased bushfire risk, increased risk of storm damage and more frequent drought periods over the next 60 years. The natural environment and biodiversity is highly vulnerable to climate change due to the current rate of change, limiting the species' ability to adapt. This may lead to biodiversity within Ipswich facing ecological changes such as: shifts in genetic composition, changes in migration patterns of some birds, altered life cycles, changes in vegetation compositions, increased extinction risks and changes in fire regimes. Even seemingly small increases in temperature and rainfall variability can have profound impacts on individual species. To assist Ipswich's natural environment and biodiversity to gain a level of resilience to the impacts generated by a changing climate, Council is working towards catering for areas providing local refuge to biodiversity from the extremes of climate change.

A climate change refugia is defined as an area which will face the least change to its climate in the future. It is an area which is stable, accessible and large enough to sustain viable populations of the species residing within it. Areas of high climate change refugia value are considered to be of importance as the identification and management of climate change

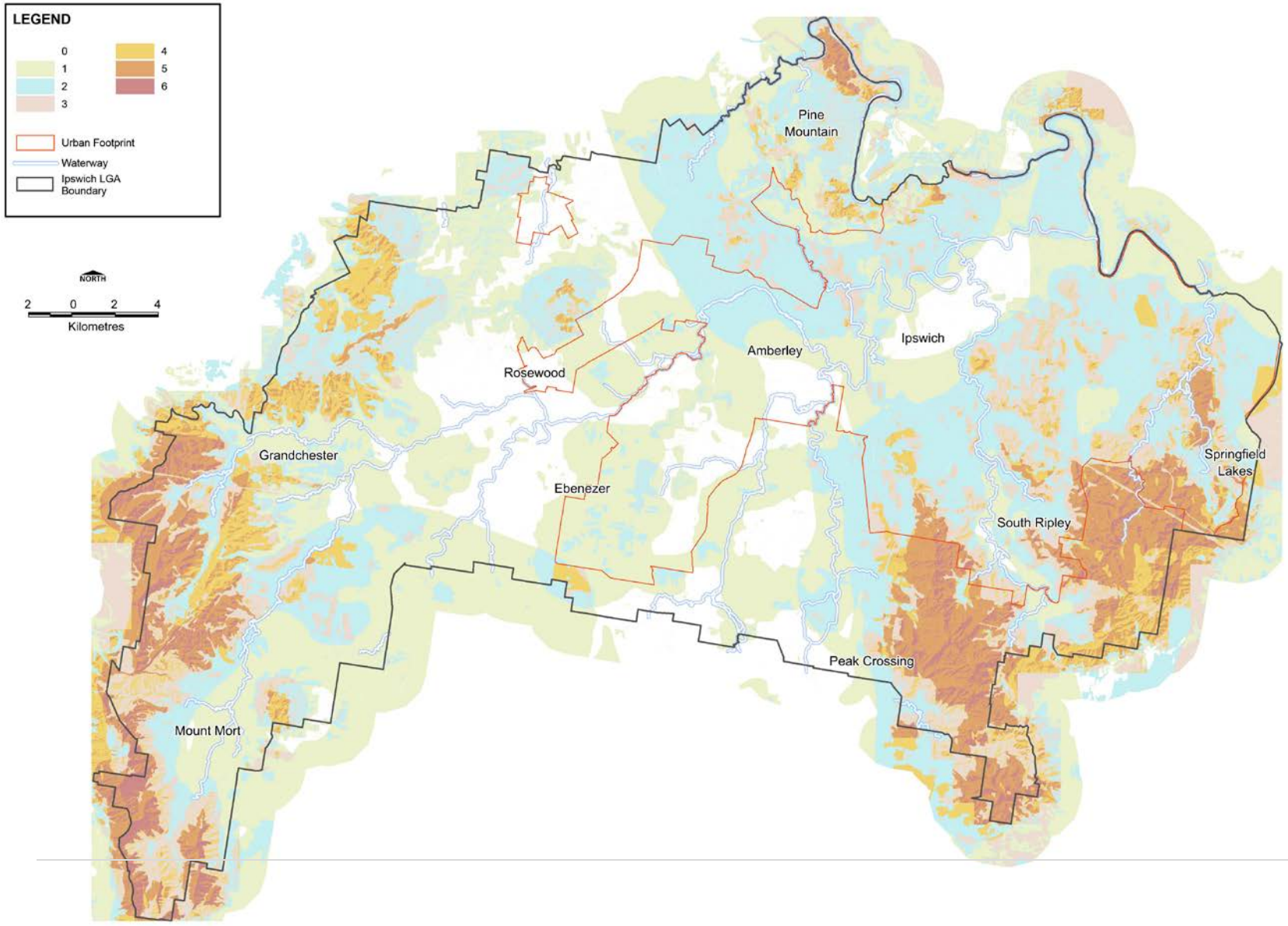
refugia within the City is essential for promoting resilience of the Ipswich natural environment in the face of climate change. They provide a safe haven for species who seek shelter from a warming climate. For a climate change refugia to be viable the following key properties also apply[41]:

- Sufficient size to sustain viable populations of species that live within it
- Accessible to a variety of species via connecting corridors or stepping stones
- Fairly protected from potential negative impacts

There were six criteria utilised for the identification of Ipswich's climate change refugia: areas of high rainfall gradient, remnant vegetation forests equal to or greater than 100 ha, elevated terrain, remnant ecosystem diversity, well shaded landscapes and areas of combined vegetation over 70 ha. These criteria were then overlapped to identify areas which provided most aspects required by a climate change refugia (Map 8).

Cat 2 1541 B Bruggemann - White Rock Reserve, Enviroplan Photographic Competition entrant

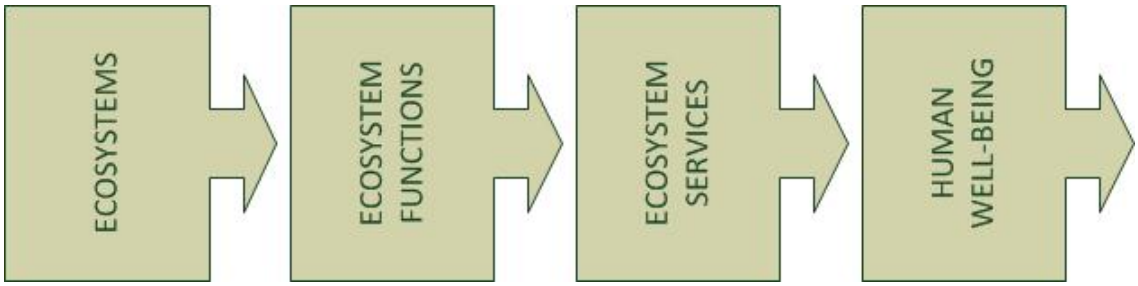
Map 8 – Mapping of climate change refugia demonstrating areas of overlapping criteria within the Ipswich City LGA.



Criteria 4 – Ecosystem Functions and Services

An ecosystem can be defined as *a system that includes all living organisms in an area as well as its physical environment functioning together as a unit*[42]. These functions result in services which sustain and fulfil human life[43], supporting human well-being[44] (Figure10). So in essence, ecosystem services are the benefits people obtain from ecosystems[44].

Figure 10 – Image depicts the linkages between ecosystems, its functions and services, to human well-being. Image has been adapted from the SEQ Ecosystem Services Framework research project[45].



Ecosystem services can be divided up into four categories: provisioning, regulating, cultural and supporting service. Table 15 highlights some of the services provided by a healthy ecosystem.

Table 15 – Four categories of ecosystem services provided by healthy functioning ecosystems

Provisioning Services *Products obtained from ecosystems* • Food • Fresh water • Fuel • Biochemicals • Genetic resources	**Regulating Services** *Benefits obtained from regulation of ecosystem processes* • Climate regulation • Disease regulation • Water regulation • Water purification • Pollination	**Cultural Services** *Nonmaterial benefits obtained from ecosystems* • Spiritual and religious • Recreation and ecotourism • Aesthetic • Inspirational • Educational • Sense of place • Cultural heritage
Supporting Services *Services necessary for the production of all other ecosystem services* • Soil formation	• Nutrient cycling	• Primary production

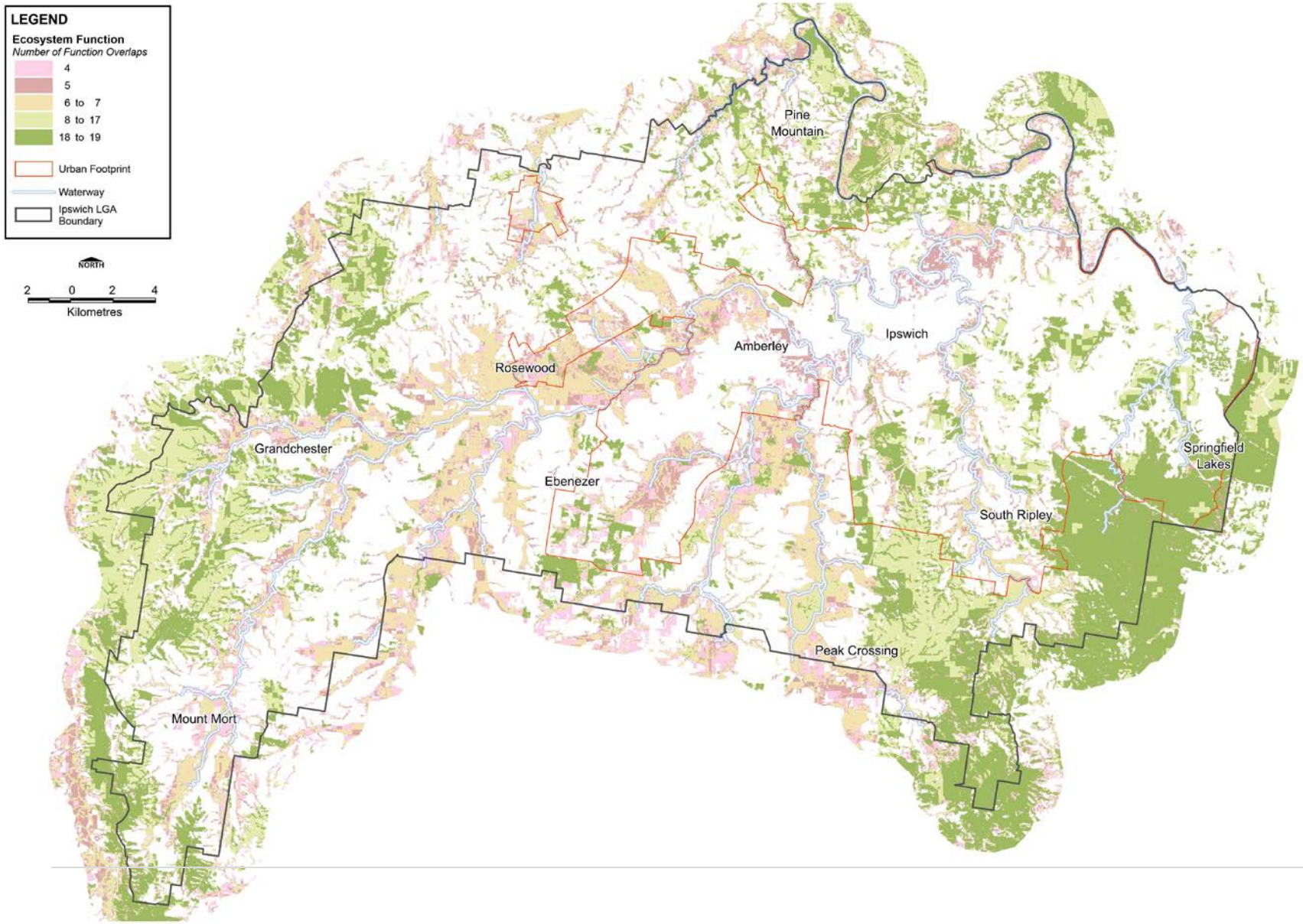
As biodiversity in the environment declines, the decrease in the function of an ecosystem leads to a reduction in services provided to the community. In recent years, economists have expressed that the reason behind why humans allow for the decline in ecosystems to continue is because we do not value ecosystems and its services as highly as we value other activities and products which may be degrading to the ecosystem[46]. The economic value of an ecosystem service is often calculated based on people's willingness to pay for receiving these goods or services[46]. This approach can be considered problematic as currently people do not pay directly for most ecosystem services and, as a result, their disposition to put a dollar value on these services may be vague.

The mapping of ecosystem services in Ipswich has been based on the SEQ Ecosystem Services Framework[45] which assesses the potential of an ecosystem to provide services rather than the actual services provided.

Identifying and managing areas of high ecosystem functions is an important planning tool to ensure a healthy environment and is therefore considered a MLES. This also assists in maintaining diversity and ensuring numerous pathways for functions to remain in the light of threatening processes such as climate change and vegetation loss. Map 9 provides a spatial representation of areas of high ecosystem functions and therefore high number of potential ecosystem services.

Cat 2 2783 C Poore - Taken Kholo, Enviroplan Photographic Competition entrant

Map 9 – Areas of high ecosystem functions and associated services in Ipswich City LGA

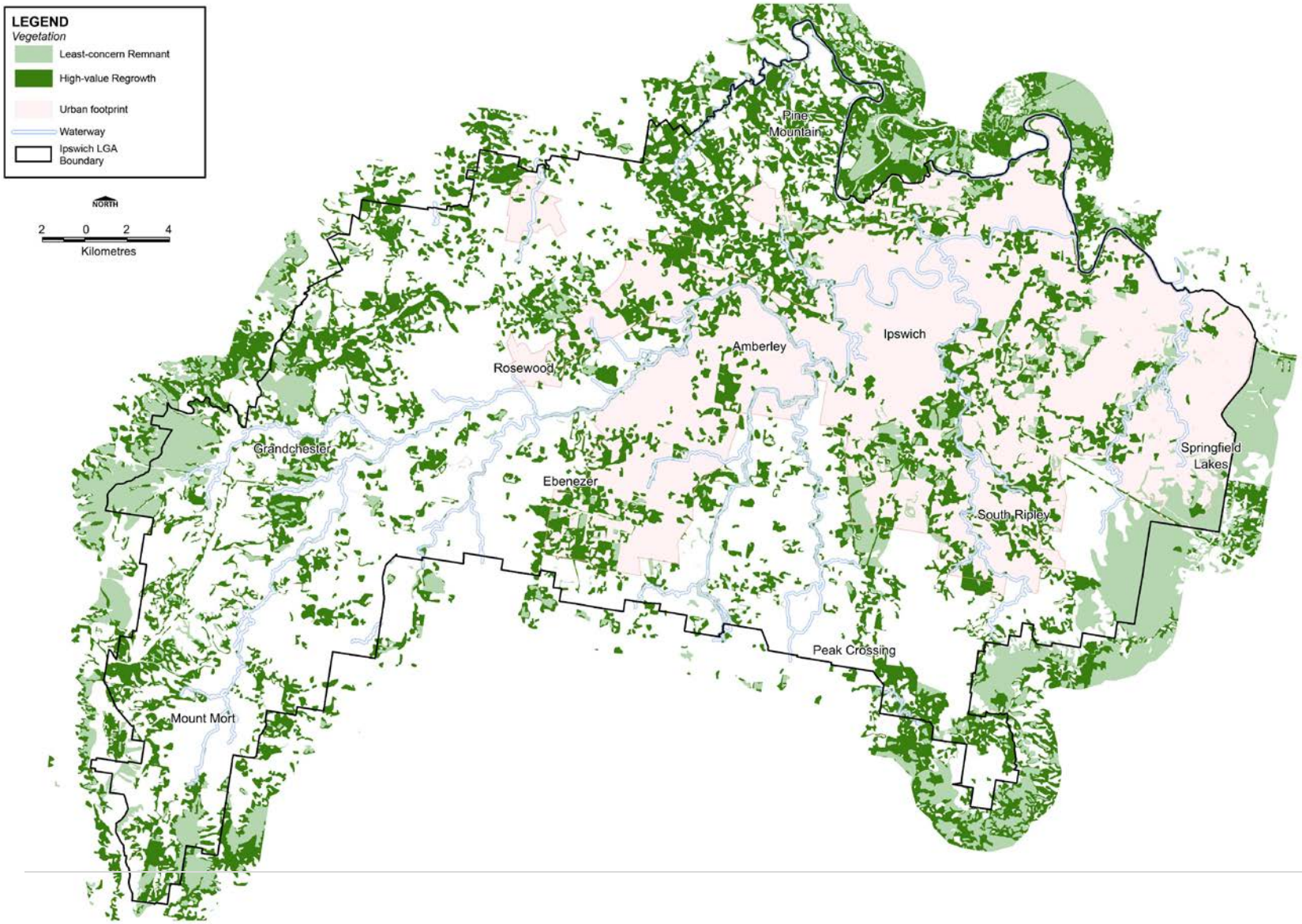


Criteria 5 – Locally significant vegetation

Remnant vegetation listed as Endangered or Of Concern under the VMA is considered to be a MSES. However, Ipswich City Council recognises that regional ecosystems considered to be of least concern on a regional level may still be at risk of disappearing on a local scale. All levels of remnant vegetation, together with high-value regrowth, are of importance for the City to promote a connected and resilient landscape. Therefore, least concern remnant vegetation and high-value regrowth located within Ipswich City are considered to be MLES (Map 10).

Cat 2 0969 A Reiner tree, Enviroplan Photographic Competition entrant

Map 10 – Least Concern remnant vegetation and high-value regrowth.



PART C: ENHANCING LANDSCAPE CONNECTIVITY

8. SUMMARY OF EXISTING CONSERVATION MECHANISMS

Main Protection Mechanisms

There are areas within the Ipswich LGA which are specifically protected, or have restrictions placed on them, for the environmental values they contain. The main protection mechanisms utilised in Ipswich for this purpose can be divided up into three levels of protection:

- High level of protection – land considered to be:
    - Matters of State environmental significance and receives legislative regulation through State legislation (State conservation areas) and/or
    - Land acquired under Council's environmental levy, Ipswich Enviroplan.
- Medium level of protection – land currently:
    - Regulated under the local Planning Scheme for conservation and special land management purposes and/or
    - Land participating in a Voluntary Conservation partnership.
- Low level of protection – land inside the urban footprint located within the City's recreational and industry buffer zones regulated under the local Planning Scheme.

State Conservation Areas

A highly protected area relates to areas provided legislative protection through being declared a State Conservation Area under the SPP. These are protected areas under the NCA, with the exception of coordinated conservation areas, under the following categories:

- National Park
- Regional Park
- Forest Reserve
- Nature Refuge Area
- Areas of critical habitat

State conservation areas in Ipswich are described in Table 16.

Table 16 – State conservation areas present within the Ipswich LGA

Nature Refuges	Bowman Park Koala Nature Refuge
	Old Hiddenvale Nature Refuge
	Tir Na Crann Nature Refuge
	Edward Corbould (Reserve and Retreat) Nature Refuge / Sapling Pocket
	Gum Tips Nature Refuge
Regional Parks	Mount Beau Brummell Regional Park
	Flinders Peak Regional Park
	White Rock Regional Park
	Denmark Hill Regional Park
	Ipswich Pteropus Regional Park

A Nature Refuge Agreement is a voluntary agreement between a private landowner, or local government, and the Queensland Government under Section 22 of NCA, committing a certain management area to:

a) Conserve the area's significant cultural and natural resources; and

b) Provide for the controlled use of the area's cultural and natural resources; and

c) Provide for the interests of landholders to be taken into account

Regional parks are generally owned by State Government and in Ipswich these are then managed by Council as a component of Council's Natural Area Estate Network.

Ipswich Planning Scheme

Planning protection refers to statutory protection through planning scheme mechanisms. The current Ipswich Planning Scheme was developed under the repealed *Integrated Planning Act 1997* (IPA) and adopted by Council in 2006 (planning schemes are currently regulated under SPA). The purpose of the planning scheme is to provide a framework for managing development in accordance with the IPA by:

- Identifying assessable and self-assessable development, and
- Identifying outcomes sought to be achieved in the LGA as the context for assessing development.

The planning scheme seeks to achieve four main outcomes (Figure 11), including a set of desired environmental outcomes (Table 17), by dividing the LGA into localities and zones, with areas of overlays (Figure 12).

Figure 11 – Planning Scheme outcomes hierarchy

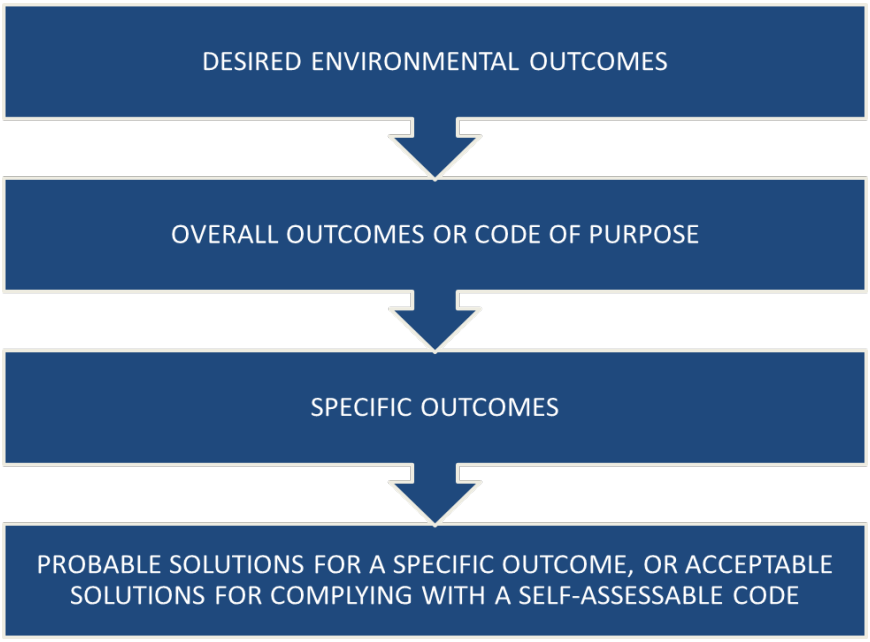
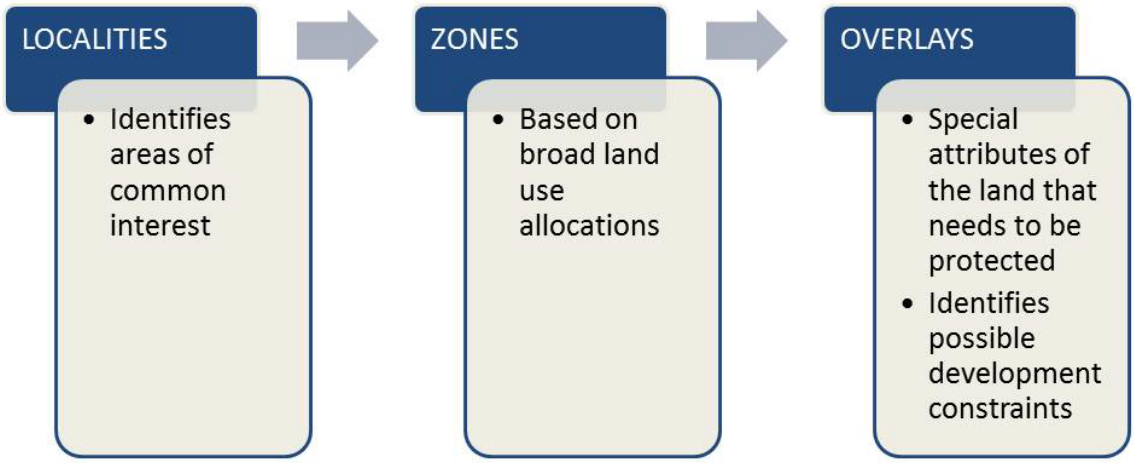


Table 17 – The Ipswich Planning Scheme Desired Environmental Outcomes for the Ipswich LGA reflecting the conservation of the natural environment.

1. The values of significant natural features, including the principal conservation areas, are not compromised.	2. Adverse effects on the natural environment are minimised or prevented with respect to the loss of natural vegetation and associated habitat, soil degradation, air pollution and water pollution owing to erosion, chemical containment, acidification, salinity, sewage and wastewater treatment, management and effluent disposal and the like.
3. Agriculture, mining and extractive activity in the rural areas, business and industry activities in the urban and township areas and tourism activity throughout the LGA reflect the economic potential of the LGA.	4. The availability of resources, including significant extractive and mineral resources, water resources and good quality agricultural lands are protected for ongoing use.
5. The adverse effects from natural and other hazards, including flooding, land subsidence, bush fires, ordnance explosions and aircraft operations, are minimised.	6. Areas and places of cultural significance or streetscape value are conserved and protected as much as practicable.
7. Rural areas are conserved and protected from incompatible uses such as urban residential.	

Figure 12 – The Ipswich Planning Scheme components



The Queensland Government's State Planning Policy (SPP)[32] dictates that a local Planning Scheme is required to reflect MNES and MSES, as well as identify MLES. The SPP is a component of Queensland's land use planning system, which enables development whilst recognising the protection of our natural resources and that planning should enhance sustainability. The state interests featured in the SPP that are applicable to the Strategy mainly surround biodiversity, stating that planning and development decisions can maintain and enhance biodiversity by protecting ecosystems, their ecological processes and the associated ecosystem services. The Policy also states that it is important to manage and protect areas that provide links between natural areas in regions where habitat fragmentation has occurred, such as within the local corridors identified in the ecological network.

The Planning Scheme is designed to reflect the biodiversity state interests by:

- Locating development in areas that avoid significant adverse impacts on MSES
- Maintaining or enhancing ecological connectivity
- Facilitating protection of MSES by requiring development to, in order of priority:
    - Avoid significant adverse environmental impacts
    - Mitigate significant adverse environmental impacts, where these cannot be avoided
    - Where applicable, offset any residual adverse impacts
- Facilitating a net gain in koala bushland habitat.

The highest level of protection provided through the Planning Scheme is via zoning. In Ipswich areas identified to contain sensitive environmental values are zoned for Conservation or Special Land Management which puts restraints around development or land use that can be promoted within the areas. These zones are designed to conserve:

- Areas or features of particular habitat significance
- The diversity of habitats for flora and fauna
- Land which acts as wildlife corridors
- Important areas of remnant, endangered, vulnerable, rare and other significant species
- Significant wetlands and
- Natural areas of particular importance in terms of scenic amenity.

Nature Conservation on Public Land

Ipswich City Council also has a number of mechanisms in place aimed at the protection and management of Ipswich City's natural environment, primarily acquisition of high-value land and partnerships with private landholders.

Council's Natural Area Estate

Since the late 1990s, Ipswich City Council has acquired a number of land parcels containing large tracts of native vegetation to provide long-lasting protection and management of Ipswich's core habitats. The Ipswich Enviroplan Acquisition Policy states that the Enviroplan is a key strategy for Council, which aims to "provide both strategic and locally based environmental initiatives to facilitate the retention and management of the natural resources within Ipswich City."

When considering areas for potential securement it should be linked to enhancing strategic directions 1 and/or 2 under the Strategy, and has to be in accordance with one or more of the following objectives[47]:

- Enhancement of the overall protection and sustainable use of the natural environment within the City
- Protection of environmentally significant land through purchase, as part of a wider strategy for habitat protection based on water quality, catchment value, aesthetic value, ecological value, corridor linkage value, bushland value, landscape value, presence of rare and endangered species or community benefits
- Maximisation of the use of the available funding in light of the ultimate cost of the property, the community benefits gained by the purchase, the environmental significance of the site, and the threat to each sites significant environmental values.

Currently, there are approximately 6,611.34 ha of land acquired through Enviroplan, an initiative of Ipswich City Council aimed at the promotion of important environmental issues. The Enviroplan program is funded through an environmental levy, paid by the ratepayers of Ipswich City, and is aimed at the securement of core areas, management of the Natural Area Estate, conservation partnerships, plus education and awareness activities.

Once an area has been acquired, it is essential that it is provided with sufficient management to ensure the continuous viability of the identified values. Council has established, or is in the process of establishing, management plans for all natural area estates and reserves acquired through Enviroplan to undertake best practice conservation management principles. These plans include guidelines allowing Council to: identify environmental values of the area, determine allowed activities which are compatible with the area in question, set a sustainable fire regime and more.

Land acquired through the Enviroplan Acquisition Program are zoned for Conservation under the Ipswich Planning Scheme, the highest level of land use protection available under the Planning Scheme.

Enviroplan Acquisitions Portfolio

Below are short descriptions of some of the main natural areas incorporated within the Enviroplan acquisition portfolio. The location of these acquisitions can be viewed in Map 10 in Section 8.

Purga Nature Reserve

This 138.5 hectare reserve contains one of the largest remaining stands of the endangered Swamp Tea-tree, *Melaleuca irbyana*, and also supports a healthy koala population within the endangered Blue Gum, *Eucalyptus tereticornis*, community along Purga Creek.

The reserve shelters around 150 native flora species, including the afore-mentioned *M. irbyana* and the vulnerable *Marsdenia coronata*, Slender Milkvine. Table 18 lists regional ecosystems present within the reserve.

Table 18 – Regional ecosystem types represented (VMA version 7 mapping)

RE Type	Description	Conservation status under the VMA
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	Endangered
12.3.8	Swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp.	Of Concern
12.9-10.7	*Eucalyptus crebra* woodland on sedimentary rocks	Of Concern
12.9-10.11	*Melaleuca irbyana* low open forest on sedimentary rocks	Endangered

The Purga Nature Reserve Tier 3: Operational Management Plan (2009) listed 11 species of mammals, 89 species of birds, 14 reptiles and 8 amphibians as occurring within the reserve. Including the locally important Wedge-tailed Eagle, *Aquila audax*, Eastern Grey Kangaroo, *Macropus giganteus*, and Short-beaked Echidna, *Tachyglossus aculeatus*.

Flinders-Goolman Conservation Estate

This estate of 2,207 hectares forms part of the largest remaining tract of lowland eucalyptus forest in SEQ and sits within the Flinders-Karawatha Corridor. A number of regional ecosystems are supported within the estate (Table 19).

Table 19 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	Endangered
12.8.9	*Lophostemon confertus* open forest on Cainozoic igneous rocks	Least Concern
12.8.19	Montane shrubland on Cainozoic igneous rocks	Of Concern
12.8.24	*Corymbia citriodora* open forest on Cainzoic igneous rocks especially trachyte	Endangered

12.9-10.2	*Corymbia citriodora, Eucalyptus crebra* open forest on sedimentary rocks	Least Concern
12.9-10.7	*Eucalyptus crebra* woodland on sedimentary rocks	Of Concern
12.9-10.17	Open forest complex often with *Eucalyptus acmenoides, E. major, E. siderophobia* +/- *Corymbia citridora* on sedimentary rocks	Of Concern

Faunal and floral surveys described within the Flinders-Goolman Conservation Estate Tier 3: Operational Management Plan (2009) identifies over 500 native plant species within the estate as well as 21 native species of mammals, 131 birds, 13 reptiles, and 7 amphibians. Special mention was provided to the Vulnerable Brush-tailed Rock Wallaby and the Glossy Black Cockatoo.

White Rock-Spring Mountain Conservation Estate

One of Ipswich's biggest estates, at 2,635 hectares, forms an important core habitat area within the Flinders Karawatha Corridor. The White Rock-Spring Mountain Conservation Estate Tier 3: Operational Management Plan (2009) described over 400 native flora species and over 260 native fauna species consisting of 34 mammals, 161 birds, 48 reptiles and 18 amphibians (Table 20).

Table 20 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.8.24	*Corymbia citriodora* open forest on Cainzoic igneous rocks especially trachyte	Endangered
12.9-10.2	*Corymbia citriodora, Eucalyptus crebra* open forest on sedimentary rocks	Least Concern
12.9-10.7	*Eucalyptus crebra* woodland on sedimentary rocks	Of Concern
12.9-10.9	Shrubland/low woodland on sandstone lithosols	Of Concern
12.9-10.12	*Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks	Endangered
12.9-10.17	Open forest complex often with *Eucalyptus acmenoides, E. major, E. siderophobia* +/- *Corymbia citridora* on sedimentary rocks	Of Concern
12.9-10.19	*Eucalyptus fibrosa* subsp. *fibrosa* open forest on sedimentary rocks	Least Concern

Mount Grandchester Conservation Estate

This 977 hectares core habitat area is a major contributor to Ipswich's western corridor, the Little Liverpool Range. The Mount Grandchester Conservation Estate Tier 2: Management Plan (2014) states that 74 native terrestrial vertebrate species can be found within the estate, including 3 mammals, 36 birds, 20 reptiles and 15 amphibians (Table 21). This includes the federally listed Koala.

Table 21 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.3.7	*Eucalyptus tereticornis, Callistemon viminalis, Casuarina cunninghamiana* fringing forest	Least Concern
12.8.17	*Eucalyptus crebra, E. melanophloia* woodland on Cainozoic igneous rocks	Least Concern
12.8.24	*Corymbia citriodora* open forest on Cainzoic igneous rocks especially trachyte	Endangered
12.9-10.2	*Corymbia citriodora, Eucalyptus crebra* open forest on sedimentary rocks	Least Concern
12.9-10.3	*Eucalyptus moluccana* on sedimentary rocks	Of Concern
12.9-10.5	Open forest complex often with *Corymbia trachyphloia, C. citriodora, Eucalyptus crebra, E. fibrosa* subsp. *fibrosa* on quartzose sandstone	Least Concern
12.9-10.7	*Eucalyptus crebra* woodland on sedimentary rocks	Of Concern

Cameron's Scrub Reserve (Kholo Enviroplan Reserve)

This reserve covers an area of 158 hectares and adjoins the 216.7 hectare Sapling Pocket Nature Refuge, bordering the Brisbane River. The reserve is made up of three regional ecosystems (Table 22) and contains over 400 species of native flora and 130 species of native terrestrial vertebrates (10 mammals, 97 birds, 13 reptiles and 10 amphibians).

Table 22 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.3.7	*Eucalyptus tereticornis, Callistemon viminalis, Casuarina cunninghamiana* fringing forest	Least Concern
12.11.11	Araucarian microphyll vine forest on metamorphics +/- interbedded volcanics	Least Concern

12.11.13	Semi-evergreen vine thicket on metamorphics +/- interbedded volvanics	Of Concern

Stirling Road Reserve

The Stirling Road Reserve covers an area of 33.2 hectares, providing a home to 59 native floral species and 110 native faunal species, including the nationally listed Black Breasted Button Quail. The high species diversity of the reserve makes this a local hotspot, dominated by two regional ecosystems (Table 23).

Table 23 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.8.13	*Araucarian* complex microphyll vine forest on Cainozoic igneous rocks	Of Concern
12.8.17	*Eucalyptus crebra, E. melanophloia* woodland on Cainozoic igneous rocks	Least Concern

Haig Street Quarry Bushland Reserve

Located within the urban footprint, this 20.22 hectare reserve provides an urban refuge for urban fauna species. The Haig Street Quarry Bushland Reserve Management Plan – Tier 3 (2010) lists 70 flora species as existing within the reserve, as well as 24 native terrestrial vertebrate species (Table 24).

Table 24 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.9-10.2	*Corymbia citriodora, Eucalyptus crebra* open forest on sedimentary rocks	Least Concern

Hillview Drive Reserve

Totalling 37.23 hectares this reserve provides an extension buffer to the Kholo Botanic Gardens and the Brisbane River. The Hillview Drive Bushland Management Plan (2010) describes 40 native flora species as existing within the reserve and 135 native terrestrial vertebrate species (Table 25).

Table 25 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.9-10.2	*Corymbia citriodora, Eucalyptus crebra* open	Least Concern

	forest on sedimentary rocks	
12.9-10.7	*Eucalyptus crebra* woodland on sedimentary rocks	Of Concern
12.9-10.17	Open forest complex often with *Eucalyptus acmenoides, E. major, E. siderophobia* +/- *Corymbia citridora* on sedimentary rocks	Of Concern
12.9-10.19	*Eucalyptus fibrosa* subsp. *fibrosa* open forest on sedimentary rocks	Least Concern

Ric Nattrass Environmental Park

This is a 37.23 hectare park which provides an urban refuge for mobile species within the urban footprint. The park harbours over 110 native floral species and three native terrestrial vertebrate fauna species: Common Dunnart*, Sminthopsis murina,* Swamp Wallaby, *Wallabia bicolour,* and Pied Butcherbird, *Cractucus nigrogularis* (Table 26).

Table 26 – Regional ecosystem types represented (VMA version7 mapping)

RE Type	Description	Conservation status under the VMA
12.9-10.2	*Corymbia citriodora, Eucalyptus crebra* open forest on sedimentary rocks	Least Concern

Nature Conservation on Privately Owned Land

For the past 15 years, Ipswich City Council has offered a range of partnerships to the City's private landowners through the Ipswich Enviroplan, aimed at the conservation of our natural environment. Through the Enviroplan Private Landowner Support Programs, Council provides support to the City's land owners for the purpose of conserving the natural environment on private land and promoting sustainable natural resource management. The location of privately owned land managed for nature conservation is illustrated in Map 11.

Voluntary Conservation Agreements

A Voluntary Conservation Agreements (VCA) is a cooperative agreement between a landowner and Council.

This program seeks to:

- Develop a sense of community ownership and responsibility for nature conservation and better land management practices
- Enhance community and landholder recognition and appreciation of the ecological, social and economic importance and benefits of protecting native flora and fauna on private land

- Enable landholders, through financial, technical, education and material support mechanisms, to integrate nature conservation as part of everyday land management, normal business practice and whole farm planning
- Recognise and reward continued and improved nature conservation by private landholders
- Operate as an integral member of the Ipswich City Council's Conservation Partnerships Program, to ensure the strategic and integrated protection and sustainable management of the City's natural resources

There are four types of VCAs available to Ipswich land owners, designed to suit the needs of the individual land owners and properties (Table 27).

Table 27 – Voluntary Conservation Agreement types available to private landowners within the Ipswich LGA

Agreement Type	Criteria
Nature Conservation Agreement	• Contains high value vegetation • Located within, or prepared to rezone to Rural D and • Suitable for properties over 1 ha
Bushland Conservation Agreement	• Contains medium vegetation • Located within, or prepared to rezone to Rural E and • Suitable for properties over 1 ha
Waterways Conservation Agreement	• Properties are situated in a strategic linkage or waterways identified by Council's Nature Conservation Strategy and waterway mapping layers • Any property size within an adjoining waterway
Nature Corridors Conservation Agreement	• Situated in a strategic linkage identified by Council's Nature Conservation Strategy • Suitable for any property size aimed at creating a nature corridor and connecting large intact areas of native vegetation

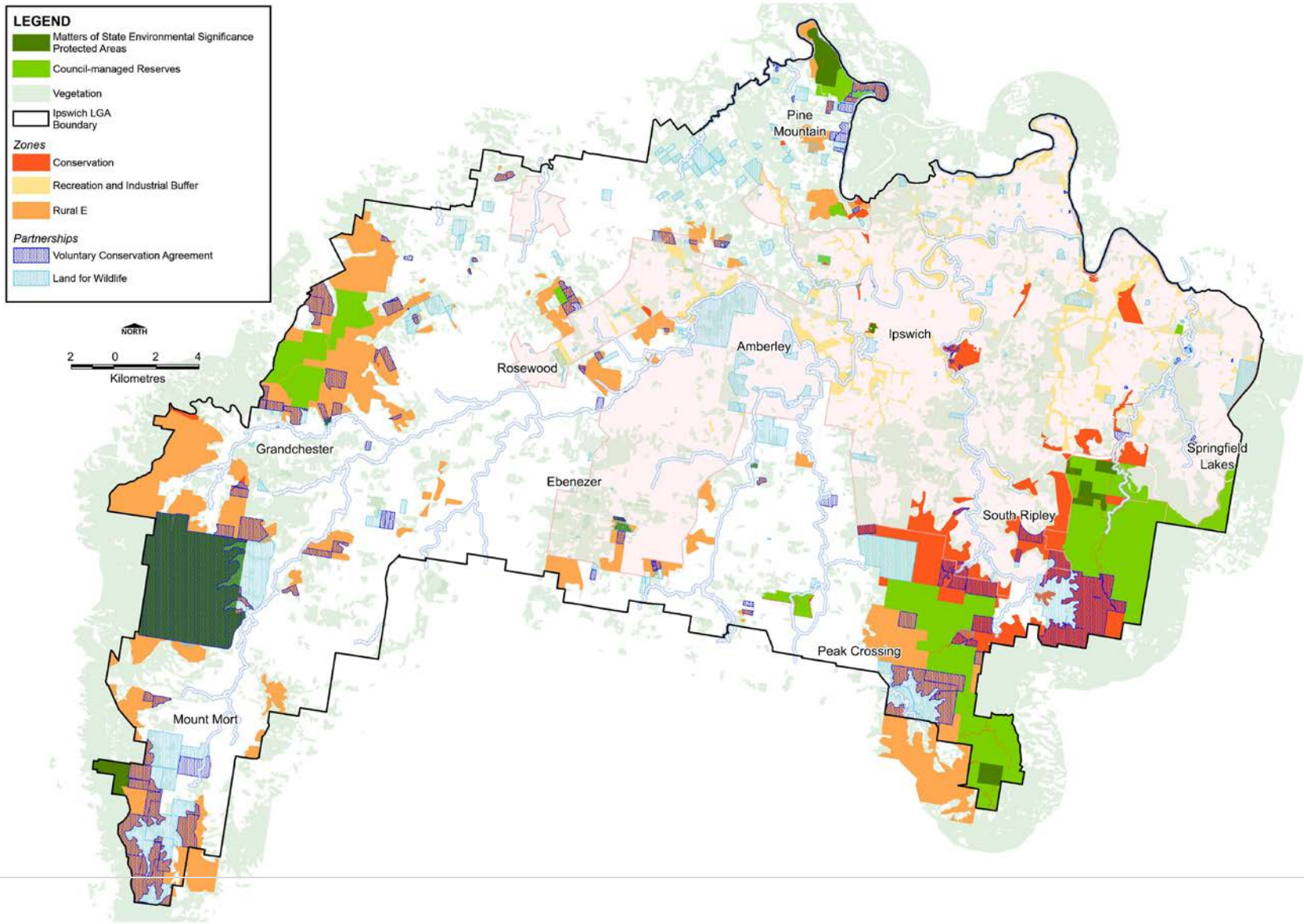
Wildlife Partnerships

A wildlife partnership is a voluntary scheme which encourages and assists private landowners to maintain wildlife habitat on their property. There are two types of wildlife partnerships catering to properties from one hectare of rural land to smaller urban blocks (Table 28).

Table 28 – Wildlife Partnerships available to private landowners within the Ipswich City LGA

Wildlife Partnerships	
Land for Wildlife	• Property has a minimum of 1ha of native vegetation (includes all ecological features)
Habitat Gardens Partnership	• Property not eligible for a VCA • Target area is urban areas

Map 11 – Natural areas managed and/or protected for conservation purposes within the Ipswich LGA.



9. IPSWICH'S HABITAT NETWORK

Connectivity throughout the landscape is vital to the survival of the City's biodiversity. Connectivity refers to how the landscape allows for movement of wildlife between habitats, allowing for species to track their climatic niche[41] and promote genetic diversity. Pockets of isolated, fragmented vegetation reduces the environment's ability to function naturally and will suffer more greatly from projected rising temperatures and declining rainfall, as well as being more prone to fire, weeds, edge effects and land-use pressures as they lack a natural buffer against these changes[48].

A habitat network comprises of a system of core habitat areas connected through the landscape by corridors. Outside of the connected network lie areas of remnant vegetation (rural and urban) providing support to the health of the habitat network by promoting the delivery of ecosystem services across the landscape. Native habitats in Ipswich are currently in a fairly fragmented state, mainly as a result of human impacts, such as clearing of vegetation to allow for alternative land uses. Strengthening the habitat network is a way to combat the impacts of this fragmentation by connecting several habitat areas together.

The identification and mapping of the City's habitat network was conducted through a four stage process:

1. Identifying areas containing a high concentration of matters of environmental significance
2. Identifying current connectivity across the landscape
3. Evaluating against a number of set criteria around network components
4. Eliminating areas within the urban footprint except where consistent with set criteria

Identifying areas containing a high concentration of matters of environmental significance

A mapping exercise was conducted identifying "hot spots" of matters of environmental significance by highlighting areas containing high concentrations of mapped MNES, MSES and MLES across the City (Map 12). Each matter of environmental significance was provided with equal weighting.

Table 29 – Matters of Environmental Significance Confluence Map attributes

Environmental value	Mappable Attribute
MNES	• Threatened ecological communities
MSES	• Threatened wildlife habitat • Regulated vegetation (not including riparian vegetation) • State conservation areas
MLES	• High-value climate change refugia • High amount of ecosystem functions • Least Concern remnant vegetation and high-value regrowth

Identifying current connectivity

To identify the existing habitat network within the Ipswich LGA, current connectivity levels based on existing vegetation was analysed (Map 13). The approach was based on number of vegetation units per hectare on a two kilometre grid (Table 30). This focal sum analysis provided the potential

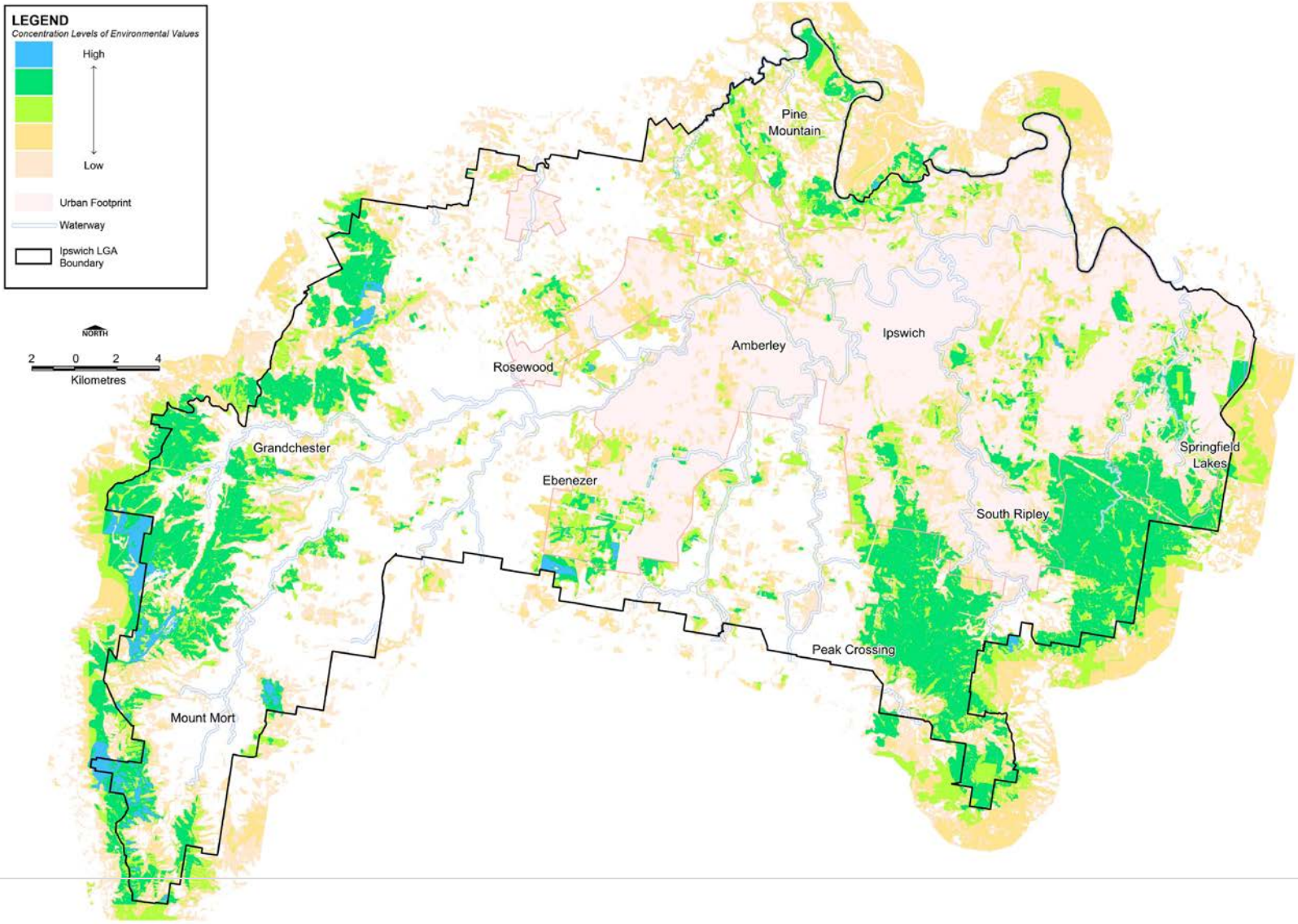
foundation for Ipswich's habitat network and provided assistance when identifying the most appropriate locations for natural linkages between core habitat areas.

Table 30 – Vegetation units for connectivity mapping

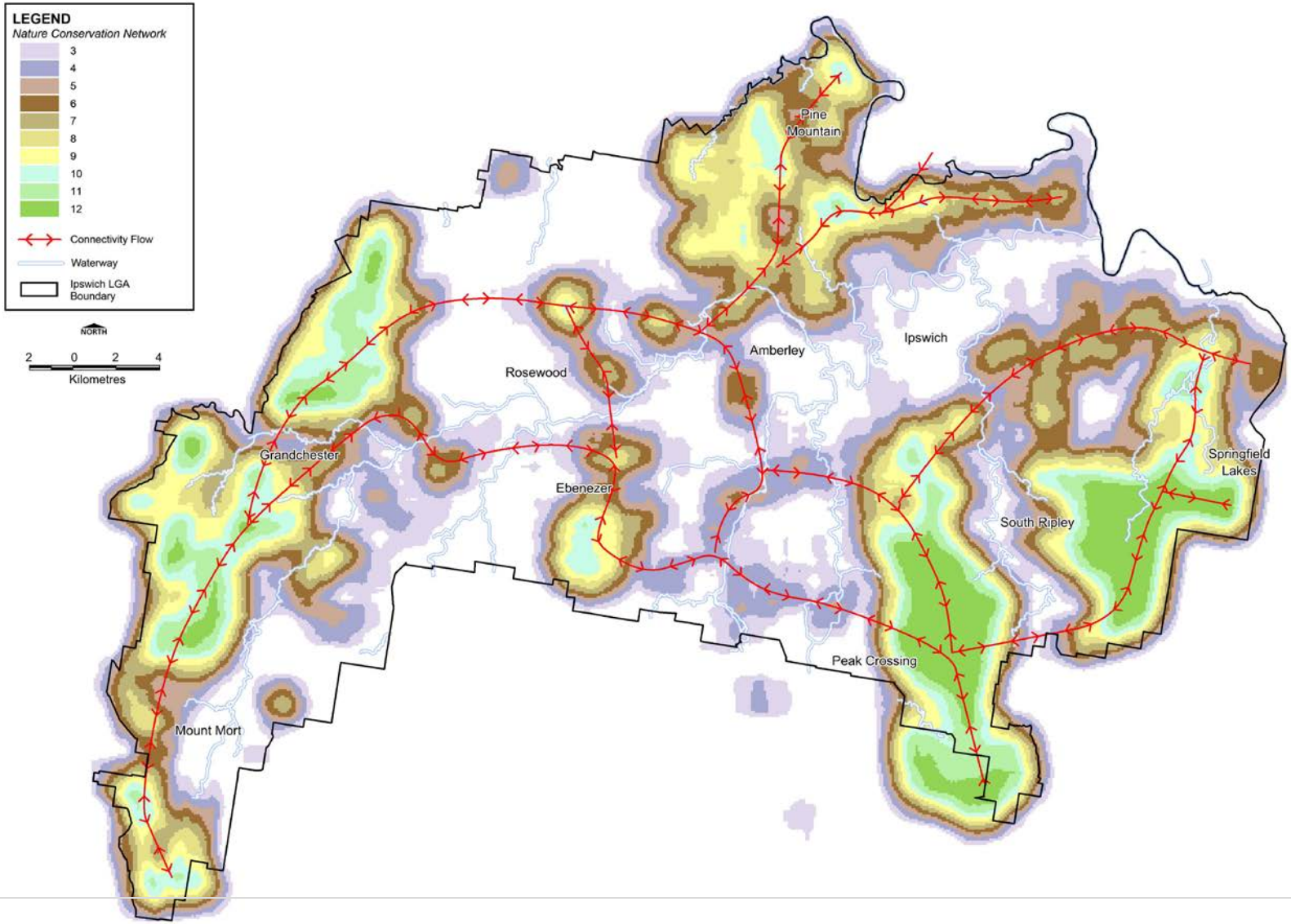
Focal sum calculated on a 2 km grid → 4 km² grid size area → 1 km² = 100 ha → Total grid size area is equivalent to 400 ha	
1.	1 – 24
2.	25 – 52
3.	53 – 83
4.	84 – 116
5.	117 – 149
6.	150 – 182
7.	183 – 217
8.	218 – 252
9.	253 – 287
10.	288 – 324

McBain E_Reflect_Ipswich-Flinders Peak

Map 12 – Areas containing high concentrations of matters of environmental significance



Map 13 – Current connectivity flow



Habitat network components and criteria

By analysing areas containing high concentrations of environmental values and the current connectivity levels, the habitat's network components were identified and weighted against specified criteria for each of the habitat network components (Table 31).

Components of the Ipswich habitat network:

- Core habitat areas
- Urban nodes
- Strategic remnants
- Corridors (rural and urban)

Table 31 – Network components and mapping rules

Network component	Description	Criteria
Core habitat areas	Core habitat areas are larger vegetated areas which provide habitat for a variety of the City's biodiversity and shelters the majority of matters of environmental significance identified in Section 7. Due to their size and generally good condition, these areas assist in ensuring conservation of a diverse range of native species and ecosystems as well as providing a variety of functions resulting in the services fundamental for human well-being. These, therefore, provide the most critical areas for nature conservation measures across the local government area.	• Areas with over 400 hectares of remnant vegetation and high-value regrowth; and • Current land-use zoning within the Ipswich Planning Scheme (Section 8): ➢ Conservation zone or ➢ Special land management zone or ➢ Areas which are to be zoned as conservation or special land management.
Strategic remnants	Strategic remnants are patches of remnant vegetation or high-value regrowth strategically located within the habitat network to facilitate the movement of biodiversity across the landscape by providing stepping stones within identified wildlife movement corridors. These stepping stones are located close enough to each other for some species to be able to move from one patch to the	• Mapped remnant or high-value regrowth under State mapping and • Located within an identified rural local corridor

	next. They are mostly suitable for highly mobile animals.	
Urban Nodes	Patches of remnant vegetation providing important wildlife habitat within the urban footprint.	• Conservation zoning within the Ipswich Planning Scheme or • Existing parks/reserve with environmental values
Rural local corridors	Local corridors have been identified within the rural landscape to increase the local connectivity and provide focal points for rehabilitation, aimed at battling fragmentation by encouraging increases of the current vegetation cover.	• Current and potential connectivity status
Urban local corridors	Areas providing connectivity within the urban landscape.	• Areas zoned for recreation, industry buffer and conservation under the Ipswich Planning Scheme (Section 8) • Areas providing multiple uses for preservation of environmental values and other community usages.

Regional Cross-border Corridors

Ipswich's habitat network is intersected by three regional corridors which are supporting mobile species to travel large distances. These corridors are large landscape connections, linking core habitats within a regional context. Another important cross-border linkage is the Brisbane River.

Little Liverpool Range Corridor –

The Little Liverpool Range connects to the Main Range National Park to the south, running towards the west of Aratula and north towards Hatton Vale. The Main Range is part of the World Heritage Site Gondwana Rainforest of Australia and extends from the New South Wales border to the north of Cunninghams Gap. Little Liverpool Range also has the potential to add connectivity to the Great Eastern Ranges Corridor, which extends along Australia's great eastern ranges from Victoria, through NSW to Atherton in Queensland.

Flinders Karawatha Corridor –

The Flinders Karawatha Corridor is approximately 56,350 ha and 60 km long, extending from the Karawatha Forest in Brisbane, through the Greenbank Military Area, to Flinders Peak in Ipswich and

down to Wyaralong Dam just north of Boonah. It is the largest remaining continuous stretch of open eucalypt forest in south-east Queensland and includes a range of other habitats including rocky hills and wetlands.

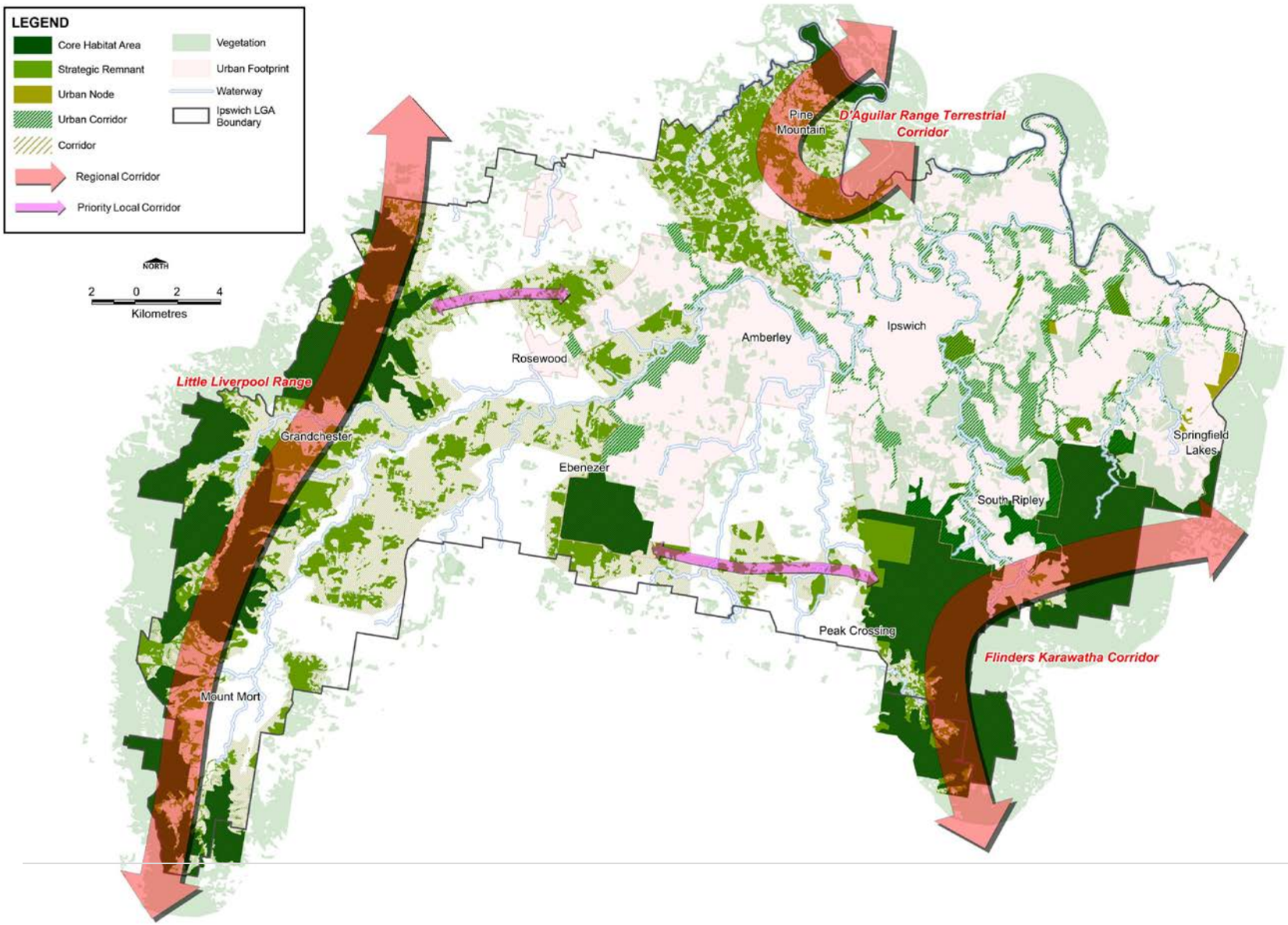
D'Aguilar Range Terrestrial Corridor –

This corridor follows the ridgeline of the D'Aguilar Range just north of the Ipswich suburb of Pine Mountain and has the potential to provide a vital connection between Ipswich and the State significant corridor.

Areas falling within the urban footprint, and not complying with the criteria set for urban nodes and urban corridors, were then eliminated. The resulting habitat network can be viewed in Map 14.

S Paczkowski_Natural Forest, Enviroplan Photographic Competition entrant

Map 14 – The Ipswich Nature Conservation Strategy Habitat Networ



10. PRIORITY AREAS FOR CONSERVATION AND REHABILITATION

Each habitat network component serves a different purpose, from providing habitat for the city's native flora and fauna to providing areas for movement between habitats. To ensure an efficient network, Council needs to manage these components effectively to build upon existing habitat availability and vegetation cover.

Priority Conservation Areas (PCAs) are areas of significance that provide high ecosystem services and contain biodiversity which face elevated threats whilst Priority Rehabilitation Areas (PRAs) are areas which do not currently contain very high levels of environmental value but provide important linkages within the habitat network (Table 32). Conservation and rehabilitation efforts within these areas will be promoted through local designation by:

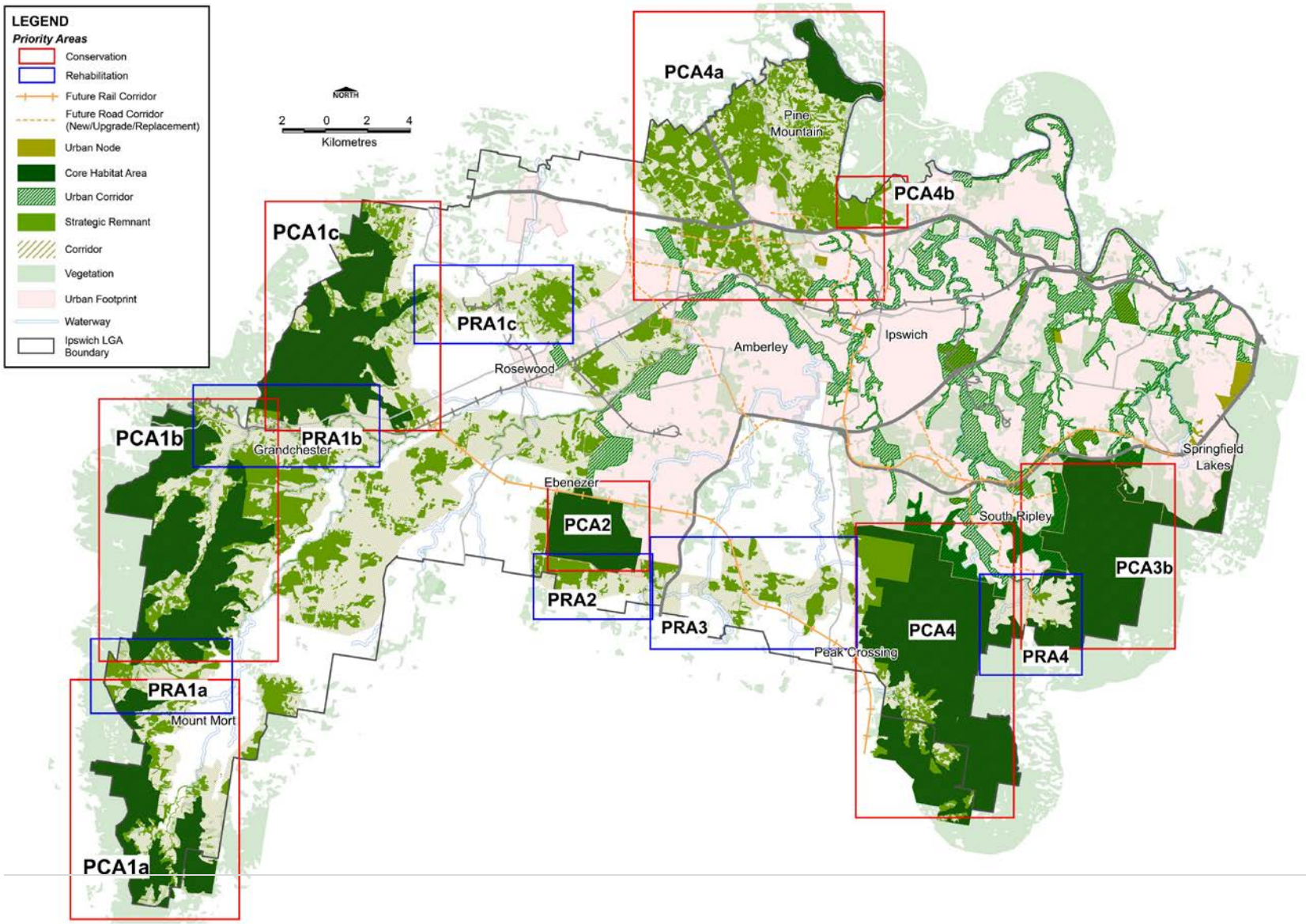
- Coordinating conservation efforts within the PCAs and PRAs
- Building upon existing natural area estate and conservation partnerships
- Providing opportunities for new partnerships and
- Leveraging offset investments.

Table 32 – Criteria utilised to identify priority areas for conservation and rehabilitation.

PCAs	PRAs
Located within the habitat network.	Located within the habitat network.
Areas containing high levels of existing environmental values.	Areas that may not contain current environmental values, however, play an important role in providing local linkages between core habitat areas.

Wells J_Landcare Lanterns_Amberley, Enviroplan Photographic Competition entrant

Map 15 – Priority areas for conservation and rehabilitation



Priority Conservation Areas

PCA 1a, 1b and 1c: Little Liverpool Range

Key rationale for PCA	➢ Connects to the Main Range National Park and the Great Eastern Ranges extending from Victoria ➢ Contains the following core habitat areas: Mount Grandchester Conservation Estate, Hidden Vale Nature Refuge and Mount Brummell Regional Park ➢ Provides climate change refugia, contains key flora and fauna species and an area for where the community can engage with the natural environment

Significant environmental values	➢ Mapped MNES values:
	  ➢ Endangered ecological community of Box Gum Grassy Woodland
	➢ Mapped MSES values:
	  ➢ Wildlife habitat and koala bushland
	  ➢ Regulated vegetation
	➢ Mapped MLES values:
	  ➢ High-value climate change refugia
	  ➢ Highly functioning ecosystems
	  ➢ Locally significant vegetation

Current level of protection	➢ Range currently receives moderate protection through the Rural E (Special Land Management) Zone ➢ Parts of PCA 1c receives a high level of protection through the Mount Grandchester Conservation Estate as well as a section of PCA1b at Hidden Vale Nature Refuge and a small section of PCA 1a where Mount Brummel Regional Park is located and is zoned Rural D (Conservation) within the Ipswich Planning Scheme
Potential Challenges	➢ Potential for unsustainable grazing practises leading to increased clearing rate

PCA 2: Ebenezer/ Mount Forbes

Key rationale for PCA	➢ Provides significant core habitat and stepping stone communities between the regional corridors of the Little Liverpool Range and the Flinders – Karawatha ➢ Contribute towards the protection of two of the City's key species (Koala and *Melaleuca irbyana*) and ➢ Provides a central area for community members to engage with the natural environment

Significant environmental values	➢ Mapped MNES values:
	  ➢ The *Melaleuca irbyana* ecological ecosystem
	➢ Mapped MSES values:
	  ➢ Koala bushland
	  ➢ Wildlife habitat

	➢ Regulated vegetation ➢ Mapped MLES values: ➢ Highly functioning ecosystems ➢ Locally significant vegetation
Current level of protection	➢ Current level of protection for the area is limited, however, conservation areas within the Ebenezer Regional Industrial Area is planned
Potential Challenges	➢ Area will undergo high development levels

PCA 3a & 3b: Flinders – Goolman and White Rock – Spring Mountain

Key rationale for PCA	➢ Builds upon the existing Council Conservation Estate network ➢ Located within the regionally recognised Flinders Karawatha Corridor ➢ Consists of two of the City's main climate change refugias and core habitat areas ➢ Protection leads to increased koala habitat protection and connectivity ➢ Aligns to regional nature corridor planning and ➢ Provides a central area for community members to engage with the natural environment
Significant environmental values	➢ MNES: ➢ Known population of the Brush-tailed Rock Wallaby ➢ Mapped MSES values: ➢ Koala bushland ➢ Wildlife habitat ➢ Regulated vegetation ➢ Mapped MLES values: ➢ High-value climate change refugia ➢ Highly functioning ecosystems ➢ Locally significant vegetation
Contribution of area to achievement of Strategy objectives	➢ Two of the City's main climate change refugias and core habitat areas, increased koala habitat protection and connectivity, aligns to regional nature corridor planning and provides a central area for community members to engage with the natural environment
Current level of protection	➢ Areas immediately surrounding current Conservation Estates are zoned for Conservation and Special Land Management, surrounded by areas zoned for pastoral uses on the western side
Potential Challenges	➢ Low connectivity between the two core habitat areas as well as surrounding core habitats

PCA 4a & 4b: Ironbark/ Pine Mountain/ Murilea/ Chuwar

PCA 4a and 4b consists of the suburbs of Ironbark, Pine Mountain, Murilea and Chuwar. PCA 4a is currently zoned for rural living within the Ipswich Planning Scheme whilst PCA 4b is the only

identified PCA that falls within the Urban Footprint and is zoned for future urban. Both areas border the Brisbane River which flows into the internationally recognised Moreton Bay (listed as a wetland of international importance under the Ramsar Wetland Convention 1971). Brisbane River contributes to the majority of drinking water for Brisbane and Ipswich and flows through Pine Mountain before reaching the treatment plant in Mount Crosby.

These are considered priority conservation areas due to: the presence of core habitat and major stepping stones, potential connection to the D'Aguilar Range regional corridor, endangered and threatened regional ecosystems (such as the endangered Blue Gum), climate change refugia, high-value regrowth and high value bushland and koala habitat. The area provides habitat for a number of threatened fauna species, including: the koala, green-thighed frog, black-chinned honeyeater, square-tailed kite, Australian lungfish, powerful owl and tusked frog.

PCA 4b provides a significant linkage into the State protected Mt Crosby Weir Nature Refuge within the Brisbane City LGA, connecting into the D'Aguilar Range Terrestrial Corridor.

Key rationale for PCA	➢ Located on the fringe of the regionally recognisied the D'Aguilar Range Terrestrial Corridor ➢ Contains the core habitat areas of Sapling Pocket and Kholo Enviroplan Reserve ➢ Bordering the Brisbane River which contributes to the majority of drinking water for Ipswich and Brisbane ➢ Provides climate change refugia, contains key flora and fauna species, provides potential for riparian restoration activities within the regions drinking water catchment and an area for where the community can engage with the natural environment ➢ PCA 4b connects to a MSES Protected Area within the Brisbane City LGA and the D'Aguilar Range Terrestrial Corridor

Significant environmental values	➢ Mapped MSES values:
	  ➢ Koala bushland
	  ➢ Wildlife habitat
	  ➢ Brisbane River (environmentally significant waterway)
	➢ Mapped MLES:
	  ➢ High-value climate change refugia in the northern section
	  ➢ Highly functioning ecosystems
	  ➢ Locally significant vegetation

Current level of protection	➢ The core areas in the north are under high protection through one section being incorporated into Council's Natural Area Estate and zoned Rural D (Conservation) and one section being listed as a Nature Refuge. The remaining area in 4a is, however, not currently receiving any protection as it is zoned Rural C (Rural Living). 4b is zoned for future urban areas and is therefore not currently entitled to any level of protection.
Potential Challenges	➢ Conflicting land uses as majority of area is zoned for rural living ➢ 4b is under large threat of future clearing due to location within urban footprint

	➢ Mining activities and haul route

Priority Rehabilitation Areas

The City's corridor network sets the basis for the PRAs as high value revegetation areas to increase connectivity. Currently local corridors mainly comprise of strategic remnants, or stepping stones, to allow for wildlife to travel between core habitat areas. The distance between patches of vegetation limits the types of wildlife that are able to utilise the corridor as the current set-up is more appropriate for highly mobile species. Rehabilitation efforts are therefore to be prioritised within identified corridors in the habitat network. The PRAs are areas where some of these efforts should be focused from a landscape connectivity perspective.

PRA	DESCRIPTION	JUSTIFICATION	POTENTIAL CHALLENGES
1a – Mount Mort	PRA 1 is located within the locally and regionally significant Little Liverpool Range. The corridor allows for wildlife movement from the City's south-western corner up to the City's northern regions. The area does not currently hold many existing significant environmental values.	Rehabilitation efforts of this PRA would increase the areas climate change refugia status as well as the current levels of locally significant vegetation. It would also lead to increased resilience of the landscape through connectivity within one of the City's main regional corridors. This is a vital PRA for the functioning of an effective habitat network.	
1b – Grandchester/ Calvert	PRA 2 is located within the locally and regionally significant Little Liverpool Range. The corridor allows for wildlife movement from the City's south-western corner up to the City's northern regions. The area currently allows for low-value climate change refugia and low-value ecosystem services.	This is a vital PRA for the functioning of an effective habitat network and increasing resilience of the landscape through connectivity within one of the City's main regional corridors. Council would seek to establish a partnership with the adjoining local government, Lockyer Valley Regional Council, aimed at the preservation and rehabilitation of a corridor connection just west of the Ipswich border as vegetation within the corridor on the Ipswich side has been heavily fragmented.	➢ Future urban footprint ➢ Planned Gowrie to Grandchester Rail Corridor Study
1c – Tallegalla/ The Bluff/ Ashwell/ Rosewood	PRA 3 is located to the east of the northern Ipswich section of the Little Liverpool Range. The area contains the important Rosewood scrub remnants, which	Rehabilitation of this PRA would contribute towards increased resilience of the landscape by providing a linkage to one of the City's major stepping stones. This	➢ Continuous clearing and fragmentation

	provides a significant stepping stone for wildlife travelling between the Little Liverpool Range and D'Aguillar Range to the north as well south towards the Flinders Karawatha Corridor.	area is important from a local connectivity perspective and connects to the following significant environmental values: ➢ Federally listed Brigalow community ➢ Patches of regulated vegetation ➢ Koala bushland ➢ Wildlife habitat ➢ High-value climate change refugia around the Rosewood scrub	
2 – Mount Forbes	Situated south of the Ebenezer core habitat area this PRA provides koala bushland/ wildlife habitat as well as patched of critically endangered *Melaleuca irbyana* communities.	This area builds upon an existing, important core habitat area. The area is in a fairly fragmented state but does contain some existing important environmental values, such as populations of *M. irbyana.*	➢ Southern Freight Railway Corridor
3. Mutdapilly/ Purga	This PRA is located to the west of PCA 2.	This local corridor provides the basis for an important east-west linkage between PCA2 and 3a. It provides an important koala corridor but is currently in a very fragmented state.	➢ Clearing and fragmentation
4 – South Ripley	Situated between Ipswich's main conservation estate, this PRA provides an important linkage within Ipswich's habitat network. The area includes the Stewartdale Nature Refuge.	Provides an important linkage between Flinders – Goolman Conservation Estate and White Rock – Spring Mountain Conservation Estate.	➢ Ripley road upgrade

GLOSSARY

Abiotic	Non-living/ void of life.
Bioregion	A region defined by characteristics of the natural environment rather than by man-made divisions.
Cainozoic	The current geological era that began 66 million years ago.
Carbon Sequestration	A natural or artificial process by which carbon dioxide is removed from the atmosphere.
Carbon Sink	A forest, ocean or other natural environment viewed in terms of its ability to absorb carbon dioxide from the atmosphere.
Ecosystem	A system formed by the interaction of a community of organisms with their environment.
Ecosystem Diversity	Variety in available ecosystems.
Ecosystem Services	The benefits people obtain from ecosystems.
Fragmentation	The act of fragmenting or the state of being fragmented.
Fragment	A part broken off or detached.
Green Economy	Economy that results in reducing environmental risks and ecological scarcities and aims for sustainable development without degrading the environment.
Known Habitat	Comprises of the correct mix of vegetation and regional ecosystems for which threatened species are most commonly associated with and within 500m of a high precision record.
Lacustrine Wetlands	Large, open, water-dominated systems.
Matters of National Environmental Significance	Matters protected by the *Environment Protection and Biodiversity Conservation Act 1999*.
Matters of State Environment Significance	Components of the biodiversity state interest that is defined under the State Planning Policy and includes certain environmental values that are protected under Queensland legislation.
Metamorphic Rocks	Rocks that have been subjected to extremes of heat and pressure sufficient to change their chemical and physical properties.
Offsets	A compensation/counterbalance method.
Paleo-estuary	The evolution of freshwater systems to estuaries as a result of marine inundations of freshwater due to sea-level rises.
Palustrine Wetlands	Inland, non-tidal wetlands dominated by vegetation.
Potential Habitat	The correct mix of vegetation and regional ecosystems, however lacking high precision records.
Quaternary	The most recent of the three periods of the Cenozoic Era in the geological time scale of the International Commission on

	Stratigraphy.
Rainfall Gradient	The rate of change in rainfall.
Remnant Vegetation	Woody vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominant by species characteristics of the vegetation's undisturbed canopy.
Resilience	The power or ability to recover.
Riverine Wetlands	Connected by waterways and occur within or along natural or artificial channels.
Sedimentary Rocks	Consolidated fragmental material transported and deposited by wind, water, and ice, chemically precipitated from solution, or secreted by organisms, and that form in layers.
Sustainable	Able to be maintained at a certain rate of level.
Tertiary	Geological period prior to the Quaternary.
Urban Footprint	Identified land predominately allocated to accommodate urban development up to 2026.

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APPENDIX I – LINKING NATURE CONSERVATION OUTCOMES ACROSS COUNCIL

Document	Description	Alignment with nature conservation strategy outcomes
Urban Forest Policy 2007	The purpose of this policy is the protection and enhancement of the urban forest through its planting and management practices.	Policy contributing towards nature conservation include: ❖ Council will protect the Urban Forest through best practice management, local laws and the planning scheme to ensure the overall Urban Forest is increasing ❖ Council will maintain a zero reduction strategy of trees on Council control land in the Urban Forest in that any trees removed will be replaced ❖ All trees and significant vegetation on rural roads and reserves areas under Council's control yet outside the Urban Forest area will be protected and managed based on the criteria and strategies of this policy ❖ Council will ensure species selected for planting in streetscapes, parks and Council managed land comply with current strategies (eg. The Street Tree Strategy), where practical be indigenous to the region and will contribute positively to the City's environment ❖ All tree plantings on Council controlled land will be carried out based on current industry best practises and reflect any local or regional environmental issues at the time of planting ❖ Ipswich City Council will develop management plans for significant trees under their control to ensure the longevity and specific needs of those trees are met
Habitat/ Nest Box Policy 2013	Commits to the installation of habitat/nest boxes to sustain the ecological processes of less common and threatened species.	This policy contributes towards our nature conservation goals as it supports the survival of threatened species through the provision of habitat.
Conservation Estates and Reserves Management Policy 2013	The Policy represents the application of sound environmental management principles to the ongoing planning and management of these natural areas, providing a means to manage their future integrity, use	Overarching objectives: ❖ Protect, manage and enhance the diversity of local indigenous flora and fauna communities ❖ Protect, manage and enhance water quality and processes in natural watercourses and groundwater

	and embellishment.	❖ protect, manage and enhance ecosystem services provided by the natural environment ❖ protect and manage Indigenous and European cultural heritage values ❖ protect, manage and enhance the scenic and aesthetic qualities provided by the natural environment ❖ promote and provide for sustainable nature based recreational opportunities ❖ promote and provide scientific and educational enquiry into the natural environment
Environmental Protection Policy 1996	It is the policy of the Ipswich City Council to achieve a high standard of environmental care in all of its activities as a local government.	This policy commits Ipswich City Council to: ❖ Carry out an assessment covering all environmentally relevant activities operated by Council and their actual and possible impacts on the environment ❖ Develop and maintain a system of operating, monitoring and reporting all environmentally relevant activities to ensure all statutory requirements are met using best practise environmental management ❖ Provide necessary resourcing to ensure best practice is achieved ❖ Ensure that all employees, contractors and suppliers are aware of the Policy ❖ Strive to be a community leader in environmental management
Environmental Weeds Policy 2013	Purpose is to protect and enhance native vegetation via the management of environmental weeds.	The Environmental Weeds Policy establishes the range of species which are environmental weeds within Ipswich City and the preferred management of these species.
Enviroplan Acquisition Policy 1998	Aims to secure significant conservation and bushland areas for the purpose of retaining and managing Ipswich's environmental values.	❖ Enhancement of the overall protection and sustainable use of the natural environment within the City ❖ Protection of environmentally-significant land through purchase, as part of a wider strategy for habitat protection for its water quality, catchment value, aesthetic value, ecological value, corridor linkage value, bushland value, landscape value, presence of rare and endangered species, or other community benefits
Free Plant	The Free Plant Policy seeks to encourage the greening of the City	Involve community in decreasing the City's carbon emissions.

Policy 2012	by providing free annual plant entitlements to all ratepayers and other relevant groups and individuals as outlined.	
Native and Local Plants Policy 1999	This policy aims to Continue to use Australian native plants within Ipswich City's network of parks, reserves, sporting fields and roadsides.	Policy objectives directly targeting nature conservation includes the promotion of the beauty, versatility and appropriateness of Australian native plants' preservation of Ipswich City's identity.
Ipswich Streetscape Design Guideline	Assist in enhancing the urban forest and improve transport planning and design within Ipswich.	❖ Respond to the local climate, soils and topography ❖ Manage impacts of climate change and avoid negative impacts on the total water cycle and ❖ Improve air quality, carbon sequestration, energy efficiency and use of appropriate materials
Bushland Fire Management Policy 2013	This policy outlines the management regimes to be used on Council owned bushland to ensure protection of life and property from wildlife and to maintain or enhance environmental values.	Contributions towards native conservation goals: ❖ Maintain or enhance biodiversity within all native vegetation associations ❖ Assist the protection of rare and threatened species of wildlife ❖ Ensure the long term viability and survival of populations of native wildlife and ❖ Minimise impacts on regional air quality
Environmental Protection Plan	The purpose of the Environmental Protection Plan is: • To protect the natural and built environment from the impacts of human activities • To protect humans from the impacts that a degraded environment can have on them	Deals with many environmental issues including climate change, regional air quality and waterway management. The identified actions have potential to positively contribute to management of environmental protection issues far beyond the geographic boundaries of the city.
Ipswich Waterway Health Strategy 2009	Objectives: • Provide Council with a broad understanding of the current status of waterway health in Ipswich • Guide management actions to ensure desired outcomes are achieved • Guide management activities to protect and enhance the integrity, amenity, habitat value and	Land use and land cover has a direct effect on waterway health, supporting a strong working relationship between the two. Current land use will affect the quality of related water resources whilst the availability of water resources will have an effect on land use and associated land cover.

	recreational opportunities of our waterways • Provide an integrated management framework to meet commitments to regional planning strategies and obligations under national and state legislation • Encourage community participation in management, use and appreciation of our waterways	
Ipswich City Council Pest Management Plan 2010-2014	The Ipswich City Council Pest Management Plan sets the strategic goals and actions for the management of pest plants and animals in Ipswich City for the years 2010-2014. The vision for managing pests is: *Ipswich City Council will strategically manage pests to protect the city's environmental, social and economic values.*	The presence of pests is identified as one of the key threats to biodiversity within Ipswich City and the Strategy aims to reduce and manage pest infestations through the implementation of the Pest Management Strategy.
Ipswich City Council Climate Change Review and Roadmap	Vision: *Ipswich City Council is a leader in local government action to reduce greenhouse gas emissions and energy use, and provides civic leadership to the local climate change response.*	The effects of Climate Change are identified as one of the main threats to Ipswich's biodiversity in the Strategy. The Ipswich City Council Climate Change Review and Roadmap assists the Strategy in reaching its goals and objectives in relation to this threat as it outlines a review of current actions within the Council and sets a roadmap for the future.
Waste Management Strategic Plan	The purpose of the Waste Management Strategic Plan is to provide a framework to ensure waste is managed in a sustainable manner within Ipswich.	The Waste Management Strategic Plan shares the Strategy's conclusion that the increasing population growth and impending climate change are key drivers for the management of Ipswich City. The plan recognised that sustainable waste management practices will be critical as our society accepts our contribution to climate change and implements strategies to reduce greenhouse gas emissions.
Ipswich Environmental Management System	Council is in the process of developing an Environmental Management System (EMS) to assist meeting obligations under the Environment Protection Act 1994, specifically in relation to Environmentally Related Activities (ERAs) and Councils General	EMS will form a vital part in the protection of the environment and therefore plays an important role in the conservation of Ipswich's nature.

	Environmental Duty (GED). The EMS assesses possible impacts on the environment; develops a system from which to manage, operate and monitor; and promotes the adoption of best practice environmental management.	
Ipswich Open Space and Recreation Strategy	Aims to set the direction for open space and recreation for the City.	Provides guiding principles for use of open space and nature-based recreation
Integrated Water Strategy	Sets a framework for how water issues that are within Ipswich City Council's influences are managed.	This strategy's visions seeks a city which values its precious water resources to provide environmental, social and economic benefits to support the city's long term liveability.

APPENDIX II – REGIONAL ECOSYSTEMS WITHIN THE IPSWICH LOCAL GOVERNMENT AREA

Regional Ecosystem	Status VMA	Description	Remnant 2011 (ha)	Percentage of RE left in Ipswich from pre-clearing levels	Percentage of Ipswich RE cover	Percentage of RE in SEQ represented in Ipswich
12.3.1	Endangered	Gallery rainforest (notophyll vine forest) on alluvial plains	6	19.35%	0.03%	0.18%
12.3.3	Endangered	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	751	3.14%	3.20%	21.13%
12.3.6	Least Concern	*Melaleuca quinquenervia, Eucalyptus tereticornis, Lophostemon suaveolens* woodland on coastal alluvial plains	21	38.18%	0.09%	0.50%
12.3.7	Least Concern	*Eucalyptus tereticornis, Callistemon viminalis, Casuarina cunninghamiana* fringing forest	279	13.74%	1.19%	1.61%
12.3.8	Of Concern	Swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp.	246	70.69%	1.05%	10.33%
12.3.10	Endangered	*Eucalyptus populnea* woodland on alluvial plains	21	2.22%	0.09%	42.00%
12.3.11	Of Concern	*Eucalyptus siderophloia, E. tereticornis, Corymbia* intermedia open forest on alluvial plains usually near coast	47	26.70%	0.20%	0.61%
12.5.1	Least Concern	Open forest complex with *Corymbia citridora* on subcoastal remnant Tertiary surfaces. Usually deep red soil.	16	9.04%	0.07%	0.41%
12.5.2	Endangered	*Eucalyptus tereticornis, Corymbia intermedia* on remnant Tertiary surfaces, usually near coast. Usually deep red soil.	4	19.05%	0.02%	0.25%
12.5.3	Endangered	*Eucalyptus tindaliae* and/or *E. racemosa* open forest on remnant Tertiary surfaces	113	15.56%	0.48%	1.87%
12.8.4	Least Concern	Complex notophyll vine forest with *Araucaria* spp. on Cainozoic igneous rocks	8	11.76%	0.03%	0.10%

12.8.9	Least Concern	*Lophostemon confertus* open forest on Cainozoic igneous rocks	113	84.96%	0.48%	1.06%
12.8.13	Of Concern	*Araucarian* complex microphyll vine forest on Cainozoic igneous rocks	59	10.35%	0.25%	0.85%
12.8.14	Least Concern	*Eucalyptus eugenioides, E. biturbinata, E. melliodora* open forest on Cainozoic igneous rocks	106	87.60%	0.45%	0.44%
12.8.16	Of Concern	*Eucalyptus crebra, E. tereticornis* woodland on Cainozoic igneous rocks	372	28.33%	1.58%	1.86%
12.8.17	Least Concern	*Eucalyptus crebra, E. melanophloia* woodland on Cainozoic igneous rocks	1526	29.79%	6.49%	5.98%
12.8.19	Of Concern	Montane shrubland on Cainozoic igneous rocks	49	98.00%	0.21%	1.50%
12.8.20	Of Concern	Shrubby woodland with *Eucalyptus racemosa* or *E. dura* on Cainozoic igneous rocks	53	96.36%	0.23%	0.77%
12.8.21	Endangered	Semi-evergreen vine thicket with *Brachychiton rupestris* on Cainozoic igneous rocks.	81	62.31%	0.34%	5.22%
12.8.23	Endangered	*Acacia harpophylla* open forest on Cainzoic igneous rocks	25	3.71%	0.11%	14.62%
12.8.24	Endangered	*Corymbia citriodora* open forest on Cainzoic igneous rocks especially trachyte	455	64.45%	1.94%	12.86%
12.8.27	Endangered	*Dichanthium* spp., *Themeda triandra* grassland on igneous rocks	0	0.00%	0.00%	0.00%
12.9-10.2	Least Concern	*Corymbia citriodora, Eucalyptus crebra* open forest on sedimentary rocks	9988	44.98%	42.51%	17.28%
12.9-10.3	Of Concern	*Eucalyptus moluccana* on sedimentary rocks	513	13.01%	2.18%	11.42%
12.9-10.4	Least Concern	*Eucalyptus racemosa* woodland on sedimentary rocks	1	7.69%	0.00%	0.01%
12.9-10.5	Least Concern	Open forest complex often with *Corymbia trachyphloia, C. citriodora, Eucalyptus crebra, E. fibrosa* subsp. *fibrosa* on quartzose sandstone	154	38.79%	0.66%	0.78%

12.9-10.6	Endangered	*Acacia harpophylla* open forest on sedimentary rocks	47	0.86%	0.20%	6.08%
12.9-10.7	Of Concern	*Eucalyptus crebra* woodland on sedimentary rocks	3992	16.01%	16.99%	11.91%
12.9-10.8	Endangered	*Eucalyptus melanophloia, E. crebra* woodland on sedimentary rocks	0	0.00%	0.00%	0.00%
12.9-10.11	Endangered	*Melaleuca irbyana* low open forest on sedimentary rocks	414	8.39%	1.76%	70.41%
12.9-10.12	Endangered	*Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks	246	26.62%	1.05%	6.25%
12.9-10.15	Endangered	Semi-evergreen vine thicket with *Brachychiton rupestris* on sedimentary rocks	3	5.88%	0.01%	0.06%
12.9-10.16	Of Concern	*Araucarian microphyll* to notophyll vine forest on sedimentary rocks	47	23.98%	0.20%	1.08%
12.9-10.17	Of Concern	Open forest complex often with *Eucalyptus acmenoides, E. major, E. siderophobia* +/- *Corymbia citridora* on sedimentary rocks	701	29.58%	2.98%	3.64%
12.9-10.19	Least Concern	*Eucalyptus fibrosa* subsp. *fibrosa* open forest on sedimentary rocks	2645	53.65%	11.26%	26.09%
12.11.5	Least Concern	Open forest complex with *Corymbia citridora, Eucalyptus siderophloia, E. major* on metamorphics +/- interbedded volcanics	6	7.14%	0.03%	0.01%
12.11.11	Least Concern	*Araucarian microphyll* vine forest on metamorphics +/- interbedded volcanics	248	42.25%	1.06%	2.68%
12.11.13	Of Concern	Semi-evergreen vine thicket on metamorphics +/- interbedded volvanics	142	23.63%	0.60%	100.00%

APPENDIX III – EPBC PROTECTED MATTERS REPORT

Australian Government

Department of the Environment

EPBC Act Protected Matters Report

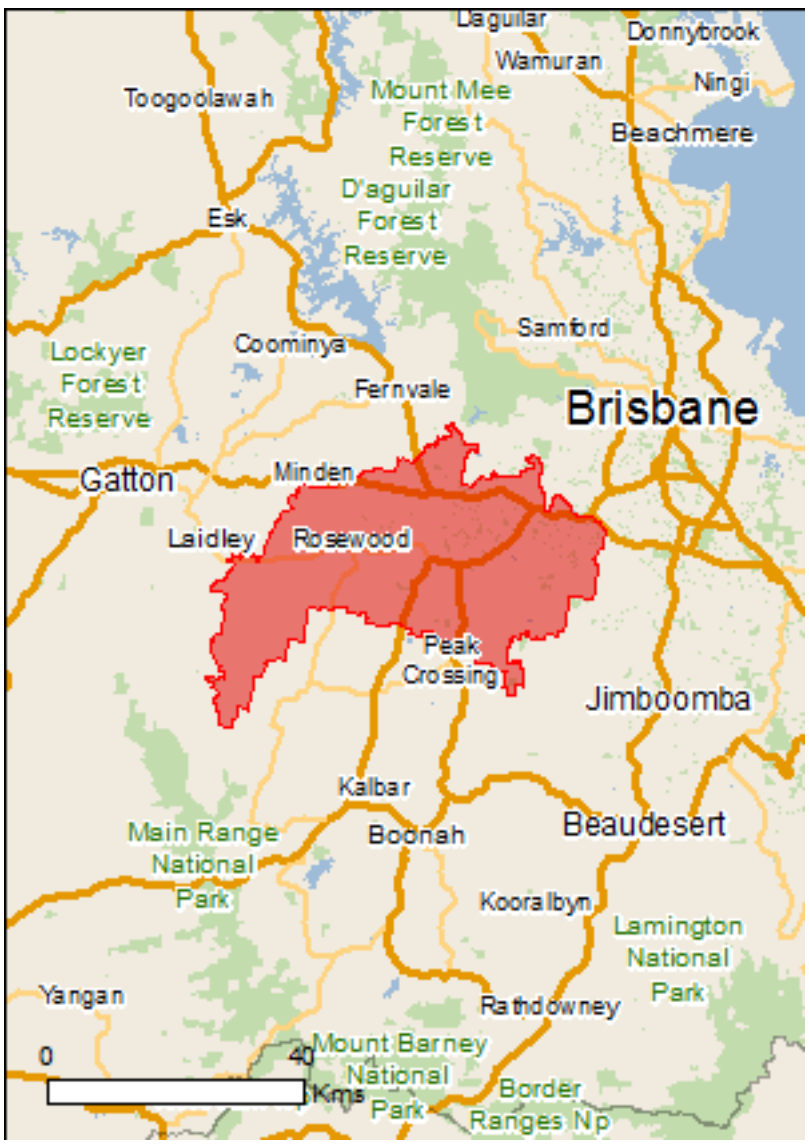
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

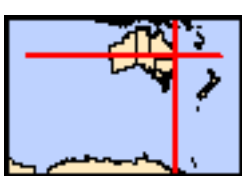
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

LGA IPSWICH CITY, QLD

Report created: 26/03/15 13:15:23





Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	4
Threatened Species:	65
Migratory Species:	32

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.

Commonwealth Lands:	14
Commonwealth Heritage Places:	2
Listed Marine Species:	33
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

Place on the RNE:	47
State and Territory Reserves:	13
Regional Forest Agreements:	None
Invasive Species:	51
Nationally Important Wetlands:	1

Details

Matters of National Environmental Significance

Wetlands of International Significance (RAMSAR) [Resource Information]

Name	Proximity
Moreton bay	Upstream from Ramsar

Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Swamp Tea-tree (Melaleuca irbyana) Forest of South-east Queensland	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Threatened Species [Resource Information]

Name	Status	Type of Presence
BIRDS		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans gibsoni Gibson's Albatross [82271]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Poephila cincta cincta Black-throated Finch (southern) [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat known to occur within area
FISH		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Maccullochella mariensis Mary River Cod [83806]	Endangered	Translocated population known to occur within area
Neoceratodus forsteri Australian Lungfish, Queensland Lungfish [67620]	Vulnerable	Species or species habitat known to occur within area
FROGS		
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
INSECTS		
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
MAMMALS		

Name	Status	Type of Presence
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus		
Northern Quoll [331]	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
OTHER		
Cycas ophiolitica		
[55797]	Endangered	Species or species habitat likely to occur within area
PLANTS		
Allocasuarina defungens		
Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat may occur within area
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Bertya ernestiana		
a shrub [78349]	Vulnerable	Species or species habitat may occur within area
Bosistoa selwynii		
Heart-leaved Bosistoa [13702]	Vulnerable	Species or species habitat likely to occur within area
Bosistoa transversa		
Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Bulbophyllum globuliforme		
Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area
Clematis fawcettii		
Stream Clematis [4311]	Vulnerable	Species or species habitat likely to occur within area
Corchorus cunninghamii		
Native Jute [14659]	Endangered	Species or species habitat likely to occur within area
Fontainea venosa		
[24040]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lepidium peregrinum Wandering Pepper-cress [14035]	Endangered	Species or species habitat may occur within area
Notelaea ipsviciensis Cooneana Olive [81858]	Critically Endangered	Species or species habitat known to occur within area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Phebalium distans Mt Berryman Phebalium [81869]	Critically Endangered	Species or species habitat likely to occur within area
Planchonella eerwah Shiny-leaved Condoo, Black Plum, Wild Apple [17340]	Endangered	Species or species habitat likely to occur within area
Plectranthus habrophyllus [64589]	Endangered	Species or species habitat likely to occur within area
Rhaponticum australe Austral Cornflower, Native Thistle [22647]	Vulnerable	Species or species habitat likely to occur within area
Sophora fraseri [8836]	Vulnerable	Species or species habitat likely to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
REPTILES		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat may occur within area
Delma torquata Collared Delma [1656]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Lepidochelys olivacea		
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable*	Species or species habitat may occur within area
Diomedea dabbenena		
Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni		
Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Macronectes giganteus		
Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto)		
Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Migratory Marine Species		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat known to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - AMBERLEY - AP1 FIRE TRAINING
Defence - AMBERLEY - AP2 TRANSMITTING STATION
Defence - AMBERLEY - AP3 REMOTE RECEIVERS SITE
Defence - AMBERLEY - AP4 VHF STATION
Defence - AMBERLEY - AP5 MQ AREA LADY SHERGER
Defence - AMBERLEY - AP6 MQ AREA
Defence - AMBERLEY - AP7 BUFFER ZONE
Defence - AMBERLEY - AP8 BUFFER ZONE
Defence - AMBERLEY - AP89 BUFFER ZONE
Defence - AMBERLEY - AP90 SMALL ARMS RANGE (PURGA)
Defence - AMBERLEY - RAAF BASE
Defence - Commonwealth Centre - 3rd Floor
Defence - GREENBANK TRAINING AREA
Defence - IPSWICH TRAINING DEPOT

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Greenbank Military Training Area (part)	QLD	Listed place
Historic		
Amberley RAAF Base Group	QLD	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lepidochelys olivacea		
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Orcaella brevirostris		
Irrawaddy Dolphin [45]		Species or species habitat known to occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Redbank Plains Fossil Site	QLD	Indicative Place
Woogaroo Creek Environmental Park	QLD	Indicative Place
Flinders Peak - Ivorys Rock Areas	QLD	Registered
Greenbank Military Training Area (part)	QLD	Registered
Mount Beau - Brummel Environmental Park	QLD	Registered
Mount Mistake National Park	QLD	Registered
Sapling Pocket	QLD	Registered
Historic		
Ipswich Post Office	QLD	Indicative Place
New London Pharmacy (former)	QLD	Indicative Place
Queen's Park	QLD	Indicative Place
Queensland Country Womens Association Girls Hostel	QLD	Indicative Place
School of Arts	QLD	Indicative Place
Soldiers Memorial Hall	QLD	Indicative Place
Tallegalla State School (former)	QLD	Indicative Place
Wright Family Houses and Surrounds	QLD	Indicative Place
Amberley RAAF Base Group	QLD	Registered
Booval War Memorial and Associated Structures	QLD	Registered
Burley Griffin Incinerator	QLD	Registered
Claremont	QLD	Registered
Court House	QLD	Registered
Divine Word Seminary (former)	QLD	Registered
Flour Mill (former)	QLD	Registered
Franklin Vale Homestead Group	QLD	Registered
Garowie	QLD	Registered
Ginn Cottage	QLD	Registered
Glendalough	QLD	Registered
Gooloowan	QLD	Registered

Name	State	Status
Grandchester Railway Station	QLD	Registered
Grandchester Sawmills	QLD	Registered
Ipswich Central Mission	QLD	Registered
Ipswich Courthouse	QLD	Registered
Ipswich Grammar School	QLD	Registered
Ipswich Railway Workshops Complex	QLD	Registered
Ipswich Railway Workshops War Memorial & Surrounds	QLD	Registered
Keiraville	QLD	Registered
Kyeewa and Garden	QLD	Registered
Lime Kiln Remains	QLD	Registered
Lowood - Rosewood Blue Nursing Building	QLD	Registered
Marburg Hotel	QLD	Registered
Mary Tregaer Hostel	QLD	Registered
Residents Association Headquarters	QLD	Registered
Rising Sun Hotel	QLD	Registered
St Brigids Catholic Church	QLD	Registered
St Francis Xavier Church	QLD	Registered
St Pauls Anglican Church	QLD	Registered
Toronto	QLD	Registered
Uniting Church Central Memorial Hall	QLD	Registered

State and Territory Reserves

[Resource Information]

Name	State
Bowman Park Koala	QLD
Danroben	QLD
Denmark Hill	QLD
Edward Corbould (Reserve and Retreat)	QLD
Flinders Peak	QLD
Gum Tips	QLD
Ipswich Pteropus	QLD
Mount Beau Brummell	QLD
Mount Perry 1	QLD
Old Hiddenvale	QLD
Stewartdale	QLD
Tir Na Crann	QLD
White Rock	QLD

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit,

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina		
Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus		
Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus		
Goat [2]		Species or species habitat likely to occur within area
Equus caballus		
Horse [5]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis		
Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus		
Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa		
Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides		
Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf		Species or species habitat likely to occur

Name	Status	Type of Presence
Madeiravine, Potato Vine [2643]		within area
Asparagus aethiopicus		
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus		
Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus		
Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Cryptostegia grandiflora		
Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Dolichandra unguis-cati		
Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana		
Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis		
Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana		
Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Opuntia spp.		
Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata		
Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus		
Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Protasparagus densiflorus		
Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Greenbank Army Training Area C	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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