



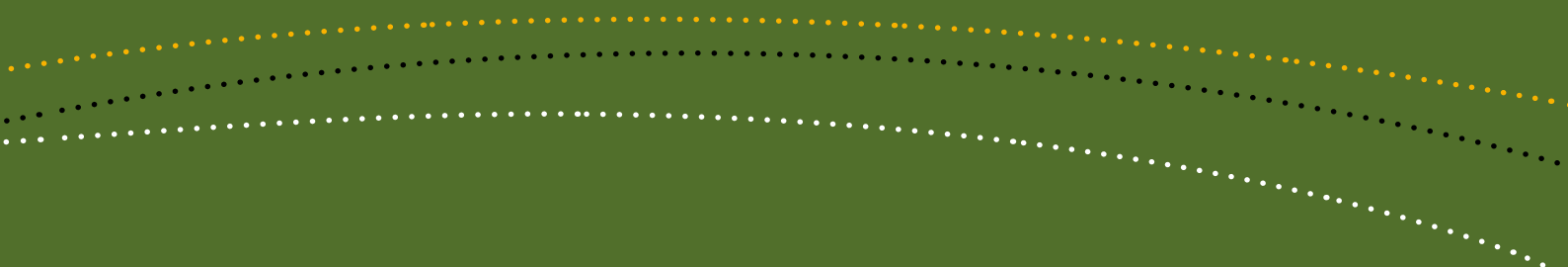
**Australian Government**

**Department of Sustainability, Environment,  
Water, Population and Communities**



# Magnetic Island, Queensland

Region  
EPBC Act policy statement 5.1



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# INTRODUCTION

This policy statement provides information on matters of national environmental significance likely to occur on Magnetic Island.

The matters of national environmental significance are prescribed in the Australian Government's national environment law—the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and those relevant to Magnetic Island include:

- listed threatened species and ecological communities
- migratory species protected under international agreements
- the Great Barrier Reef World Heritage Area
- the Great Barrier Reef National Heritage place, and
- the Great Barrier Reef Marine Park.

This policy statement is designed to help any person proposing to start a new development, activity or action on Magnetic Island<sup>1</sup> decide whether the action will require approval from the Australian Government environment minister (the minister) under the EPBC Act.

Approval is required if the action has, will have, or is likely to have a significant impact on a matter of national environmental significance. Matters of national environmental significance on Magnetic Island are discussed on page 6.

A 'significant impact' is an impact that is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the affected environment, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.

This policy statement:

- identifies key characteristics of Magnetic Island
- identifies matters of national environmental significance on the island
- provides guidance on activities that may have a significant impact, and
- identifies a range of actions that can be taken to avoid or reduce impacts.

<sup>1</sup> This document applies to matters of national environmental significance within three nautical miles of Magnetic Island.



# HOW TO INTERPRET AND APPLY THESE GUIDELINES

The measures outlined in this policy statement are not designed to be prescriptive, but rather to clarify the level and types of impact likely to be significant at a national level. This statement does not encompass all matters of national environmental significance on Magnetic Island and should be used as a guide only.

If you think that your action is likely to have a significant impact on a matter of national environmental significance on Magnetic Island, or if you are unsure, you should submit a referral to the federal environment department (the department) for a decision by the minister. The minister will make a decision within 20 business days on whether approval is required under the EPBC Act. Substantial penalties apply for taking an unapproved action that has, will have or is likely to have a significant impact without approval.

To decide whether or not to refer an action for a decision by the minister, you should consider the following questions:

Are there any matters of national environmental significance located in the area of the proposed action?  
See pages 6–15.



Is there potential for impacts on matters of national environmental significance?  
See pages 16–22.



Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?  
See pages 17–22.



Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts? See Table 2 for examples (pages 18–21).

Regardless of whether approval is required under the EPBC Act, separate environmental assessment and approval may be required under the *Great Barrier Reef Marine Park Act 1975* and state and local government legislation.

You should consider the need to refer the action under the EPBC Act before any preliminary work such as clearing.

You should read this policy statement in conjunction with other relevant policy statements, in particular *Significant impact guidelines 1.1—Matters of national environmental significance*.

## Characteristics of Magnetic Island

Magnetic Island lies eight kilometres offshore from Townsville (Figure 1, page 5). It is located within the dry tropics region of north Queensland and the Great Barrier Reef World Heritage Area (GBRWA) and is part of the Townsville City local government area. The island is about 5184 ha in size, contains around 40 km of coastline and is the seventh largest and the fourth highest of the 600 continental islands in the GBRWA. About half of the island (2533 ha) and much of the elevated country is protected (under the *Queensland Nature Conservation Act 1992*) as the Magnetic Island National Park and there are also two small areas designated as Conservation Parks (Figure 2, page 13).

The island's scenery has a diverse array of terrestrial and marine ecological communities. This beauty and diversity is highly valued by both residents and tourists.

The island is mostly covered by eucalypt woodland and low woodlands of acacias and mixed deciduous species, with small pockets of vine thicket occurring in sheltered gullies and on rock scree. Distinctive hoop pines and native kapok are also characteristic of Magnetic Island. The island supports several endemic species such as skipper butterflies and the Sadler's skink.

A variety of marine environments occur around the island, including mangrove forests, salt marshes, fringing coral reefs and seagrass communities; these provide important habitat for marine flora and fauna. Many listed species live in the waters around the island including sea snakes, turtles, dugongs and dolphins.



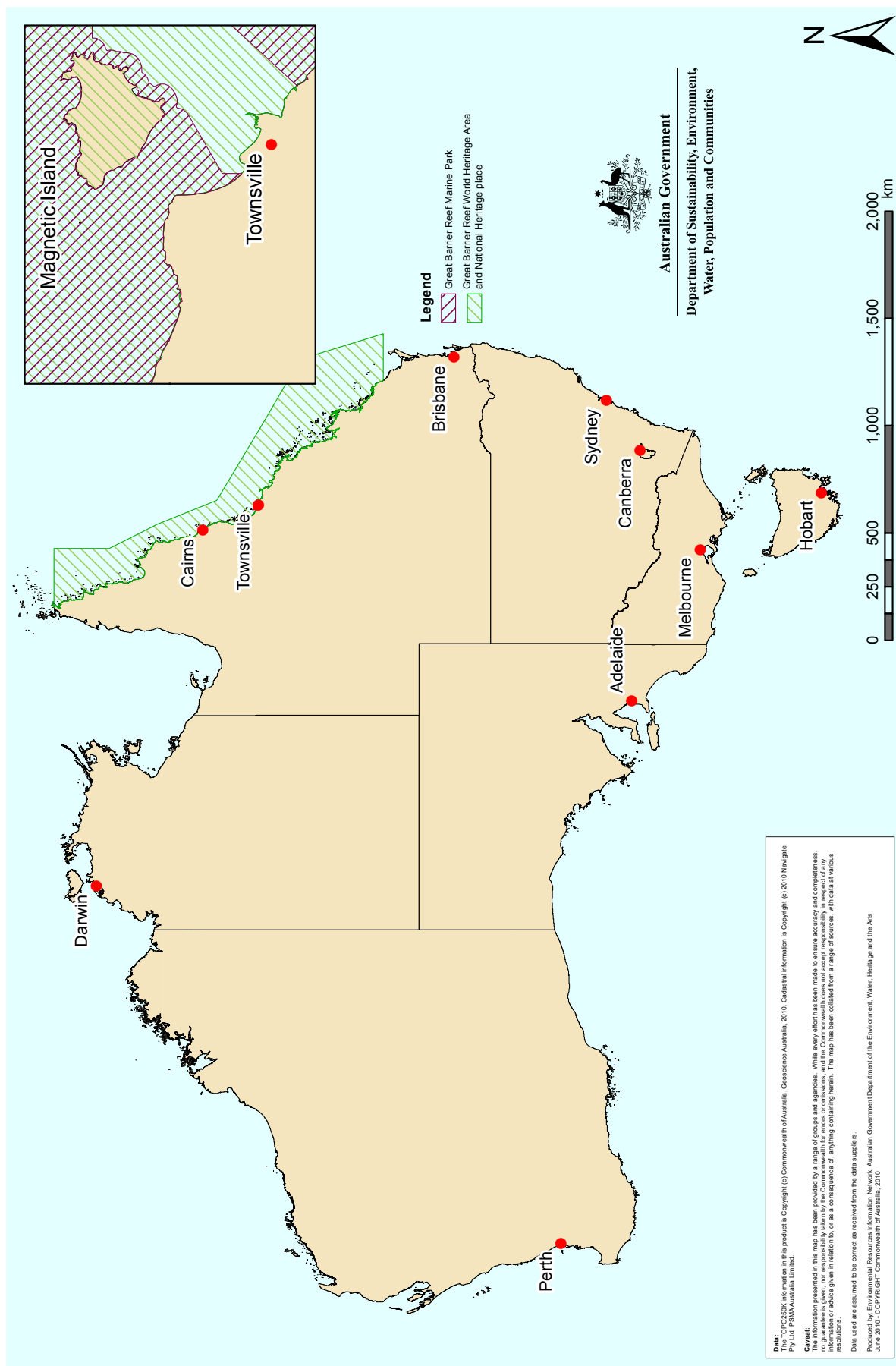
Magnetic Island is surrounded by the Great Barrier Reef Marine Park (Figure 2, page 13), with the exception of Horseshoe Bay, which is within the Queensland Great Barrier Reef Coast Marine Park.

Magnetic Island is experiencing significant development pressures. Much of this pressure is centred on the lowland and coastal areas of the island.

Key threats include:

- land clearing
- habitat degradation and fragmentation
- shipping and boating incidents including collisions with marine animals
- poor water quality (for example, elevated nutrients and sediment concentrations from land-based erosion, dredging, run-off and waste discharge)
- marine debris and litter
- illegal fishing
- introduction of exotic plants and animals, and
- increased human presence (for example, disturbance of sea turtle and bird nesting sites through noise, direct harassment, inappropriate lighting and increasing vessel traffic).

Figure 1: Magnetic Island within the Great Barrier Reef.







# MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE ON MAGNETIC ISLAND

There are five matters of national environmental significance relevant to Magnetic Island. Specifically, the island is:

- home or habitat to listed threatened species and a threatened ecological community
- habitat to listed migratory species
- part of the Great Barrier Reef World Heritage Area
- part of the Great Barrier Reef National Heritage place, and
- surrounded by the Great Barrier Reef Marine Park.

The remaining matters of national environmental significance are less relevant to Magnetic Island, and are not discussed further in this policy statement.

These include:

- Ramsar wetlands, nuclear actions and the Commonwealth marine area (which begins three nautical miles away from the shore). Guidance for determining the significance of actions impacting on these matters can be found in *Significant impact guidelines 1.1—Matters of national environmental significance*. [www.environment.gov.au/epbc/publications/neg-guidelines.html](http://www.environment.gov.au/epbc/publications/neg-guidelines.html)
- There is one small area of Commonwealth land on Magnetic Island. Guidance for determining the significance of actions having an impact on this area is covered in the *Significant impact guidelines 1.2—Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies*. [www.environment.gov.au/epbc/publications/commonwealth-guidelines.html](http://www.environment.gov.au/epbc/publications/commonwealth-guidelines.html)



## Listed threatened species and ecological communities

The threatened species and ecological communities likely to occur on the Island are described in Table 1 (page 8)<sup>2</sup>.

### Habitat distribution

Figure 2 (page 13) shows the distribution of the endangered semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions (SEVT) on Magnetic Island. Roughly 110 ha of SEVT habitat have been mapped on the island. Of this, about 30 ha are conserved in protected areas. On Magnetic Island, patches of SEVT mainly occur in the lowland areas. Due to the geography of the island, each patch is unique and important for maintaining diversity.

The bare-rumped sheath-tail bat has been recorded in Australia on islands in the Northern Territory and Queensland, including Magnetic Island. Mapping is based on the presence of vegetation ecosystems containing poplar gum, as this eucalypt is known to provide roosting and nesting habitat for the bat. The mapping includes areas that have been partially cleared because remnant trees can provide habitat for this species. On Magnetic Island the mapped habitat area is 681 ha, of which about 148 ha is conserved in protected areas. Figure 2 (page 13) indicates areas where the bat may occur.

These distributions are indicative only. If little or no information exists, on-ground surveys should be done to determine the presence or absence of any matters of national environmental significance. Surveys for listed species should be carried out by a qualified person. Survey guidelines can be found at: [www.environment.gov.au/erin/documentation/biodata.html](http://www.environment.gov.au/erin/documentation/biodata.html)

More information about threatened species and ecological communities is available at: [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html)

## Listed migratory species

Twenty-four listed migratory species may occur on and around Magnetic Island. Of these, 11 species may occur in large numbers and could be significantly affected by activities on the island (see Table 1, page 8). Significant impacts on migratory birds will occur if an action has an impact on important habitat, introduces a harmful invasive species or disrupts the lifecycle of an ecologically significant proportion of a population<sup>3</sup>.

More information about individual migratory species, threatened species and threatened ecological communities listed under the EPBC Act can be found on the department's species profile and threats database (SPRAT) at: [www.environment.gov.au/cgi-bin/sprat/public/sprat.pl](http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl).

Further information about migratory species is available at: [www.environment.gov.au/epbc/protect/migratory.html](http://www.environment.gov.au/epbc/protect/migratory.html)



<sup>2</sup> Table 1 is not exhaustive and the department's environmental reporting tool should be used in conjunction with relevant state tools. For a full list of species go to: [www.environment.gov.au/erin/ert/epbc/index.html](http://www.environment.gov.au/erin/ert/epbc/index.html)

<sup>3</sup> Discussion of the meaning of 'ecologically significant proportion of the population of a migratory species' can be found in *Significant impact guidelines 1.1—Matters of national environmental significance*.

**Table 1: Listed threatened species, ecological communities and migratory species that may be found on or near Magnetic Island**

Common name ( <i>Scientific name</i> )	EPBC Act status	Habitat	Key threats
Green turtle ( <i>Chelonia mydas</i> )	<ul style="list-style-type: none"> <li>• Vulnerable</li> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Adult and sub-adult green turtles forage in shallow tidal and sub-tidal coral, rocky reef habitats and inshore seagrass beds and feed on algae and seagrass around Magnetic Island and in Cleveland Bay.</li> <li>• Nesting activity has been recorded on beaches of Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss or degradation</li> <li>• incidental catch in fishing nets</li> <li>• marine debris</li> <li>• capture in ghost nets</li> <li>• boat strikes</li> <li>• aquaculture activities</li> <li>• disturbance to nesting females and hatchlings from coastal lighting</li> <li>• disturbance or damage to nesting turtles and hatchlings on beaches</li> <li>• unsustainable indigenous harvesting</li> <li>• pollution</li> <li>• predation of eggs by feral or domestic animals, and</li> <li>• poor water quality (increased turbidity, nutrient loading, influx of toxic contaminants and substrate disturbance).</li> </ul>
Flatback turtle ( <i>Natator depressus</i> )	<ul style="list-style-type: none"> <li>• Vulnerable</li> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Nesting activity has been recorded on beaches of Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss or degradation</li> <li>• incidental catch in fishing nets</li> <li>• marine debris</li> <li>• capture in ghost nets</li> <li>• boat strikes</li> <li>• aquaculture activities</li> <li>• disturbance to nesting females and hatchlings from coastal lighting</li> <li>• disturbance or damage to nesting turtles and hatchlings on beaches</li> <li>• unsustainable indigenous harvesting</li> <li>• pollution</li> <li>• predation of eggs by feral or domestic animals, and</li> <li>• poor water quality (increased turbidity, nutrient loading, influx of toxic contaminants and substrate disturbance).</li> </ul>



Common name ( <i>Scientific name</i> )	EPBC Act status	Habitat	Key threats
Hawksbill turtle ( <i>Eretmochelys imbricata</i> )	<ul style="list-style-type: none"> <li>• Vulnerable</li> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Once hawksbill turtles reach 30–40 cm curved carapace length, they settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat.</li> <li>• Hawksbill turtles have been recorded foraging on fringing and inshore reefs around Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss or degradation</li> <li>• incidental catch in fishing nets</li> <li>• marine debris</li> <li>• capture in ghost nets</li> <li>• boat strikes</li> <li>• aquaculture activities</li> <li>• disturbance to nesting females and hatchlings from coastal lighting</li> <li>• disturbance or damage to nesting turtles and hatchlings on beaches</li> <li>• unsustainable indigenous harvesting</li> <li>• pollution</li> <li>• predation of eggs by feral or domestic animals, and</li> <li>• poor water quality (increased turbidity, nutrient loading, influx of toxic contaminants and substrate disturbance).</li> </ul>
Loggerhead turtle ( <i>Caretta caretta</i> )	<ul style="list-style-type: none"> <li>• Endangered</li> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Once loggerhead turtles reach about 70 cm curved carapace length, they settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat and seagrass beds.</li> <li>• Loggerhead turtles exist across waters of tropical northern Australia.</li> <li>• Loggerhead turtles have been recorded captured on drum lines set around Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss or degradation</li> <li>• incidental catch in fishing nets</li> <li>• marine debris</li> <li>• capture in ghost nets</li> <li>• boat strikes</li> <li>• aquaculture activities</li> <li>• disturbance to nesting females and hatchlings from coastal lighting</li> <li>• disturbance or damage to nesting turtles and hatchlings on beaches</li> <li>• unsustainable indigenous harvesting</li> <li>• pollution</li> <li>• predation of eggs by feral or domestic animals, and</li> <li>• poor water quality (increased turbidity, nutrient loading, influx of toxic contaminants and substrate disturbance).</li> </ul>

Common name ( <i>Scientific name</i> )	EPBC Act status	Habitat	Key threats
Olive ridley turtle ( <i>Lepidochelys olivacea</i> )	<ul style="list-style-type: none"> <li>• Endangered</li> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Once olive ridley turtles complete the pelagic phase they move to feed in inshore and offshore habitats.</li> <li>• Individuals have been recorded from waters east of Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss or degradation</li> <li>• incidental catch in fishing nets</li> <li>• marine debris</li> <li>• capture in ghost nets</li> <li>• boat strikes</li> <li>• aquaculture activities</li> <li>• disturbance to nesting females and hatchlings from coastal lighting</li> <li>• disturbance or damage to nesting turtles and hatchlings on beaches</li> <li>• unsustainable indigenous harvesting</li> <li>• pollution</li> <li>• predation of eggs by feral or domestic animals, and</li> <li>• poor water quality (increased turbidity, nutrient loading, influx of toxic contaminants and substrate disturbance).</li> </ul>
Dugong ( <i>Dugong dugon</i> )	<ul style="list-style-type: none"> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Seagrass (foraging).</li> <li>• A dugong protection area is located adjacent to Magnetic Island (see Figure 2, page 13).</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss and degradation</li> <li>• incidental catch in fishing nets</li> <li>• boat strike (dugongs are particularly at risk to boat strike because they are slow moving and forage in shallow waters)</li> <li>• acoustic pollution from in-water sources (such as boat traffic), and</li> <li>• chemical pollutants.</li> </ul>
Estuarine crocodile ( <i>Crocodylus porosus</i> )	<ul style="list-style-type: none"> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Mangrove habitat and creeks around Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss and degradation</li> <li>• removal of 'problem' crocodiles, and</li> <li>• ingestion of marine debris.</li> </ul>
Australian snubfin dolphin ( <i>Orcaella heinsohni</i> , previously known as <i>O. brevirostris</i> )	<ul style="list-style-type: none"> <li>• Migratory species</li> </ul>	<ul style="list-style-type: none"> <li>• Near-shore waters.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss and degradation</li> <li>• incidental catch in fishing nets</li> <li>• overfishing of prey species</li> <li>• pollution</li> <li>• poisoning, and</li> <li>• human interaction threats arising from tourism and transport.</li> </ul>

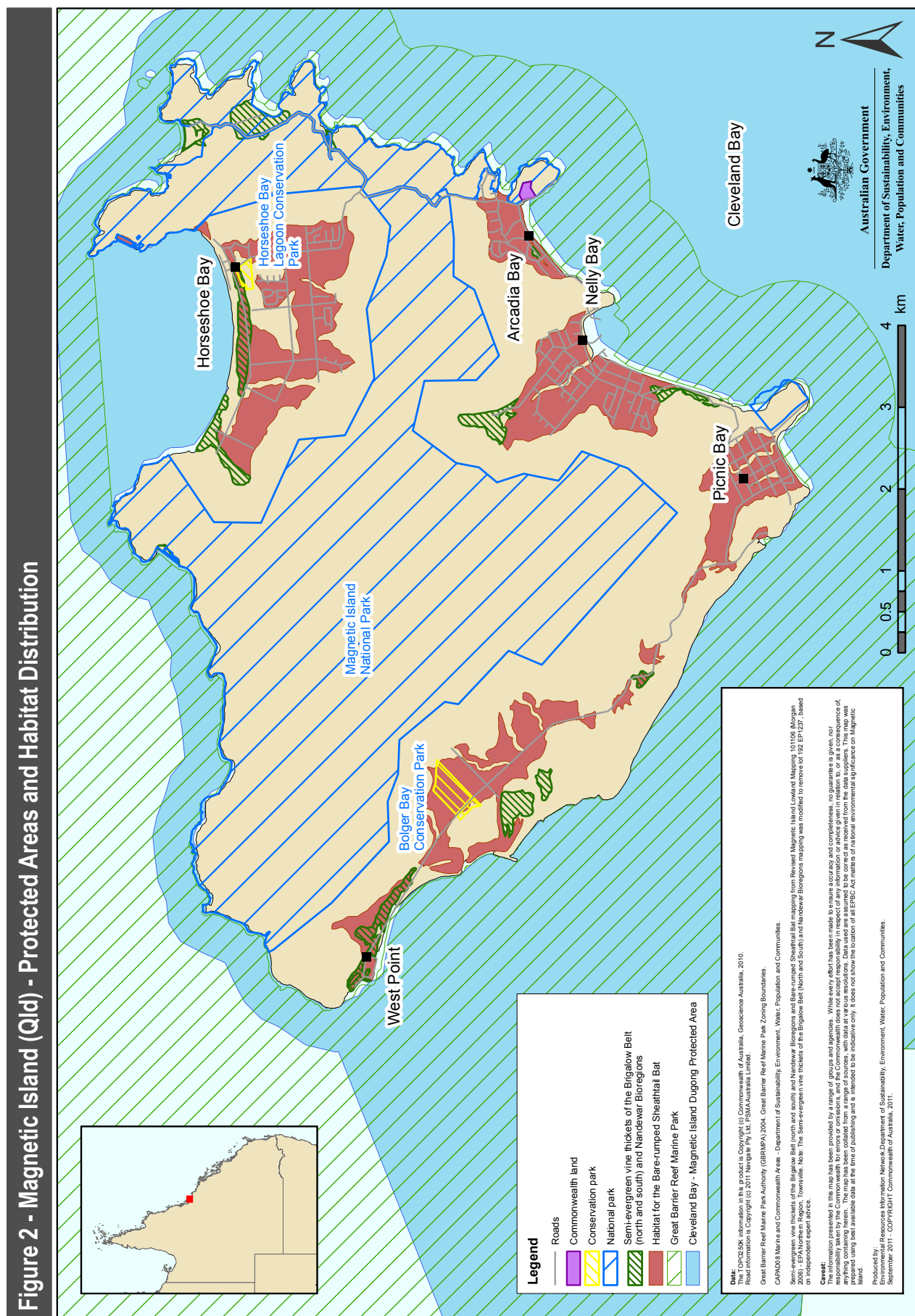


Common name ( <i>Scientific name</i> )	EPBC Act status	Habitat	Key threats
Indo-Pacific humpback dolphin ( <i>Sousa chinensis</i> )	• Migratory species	• Near-shore waters.	<ul style="list-style-type: none"> <li>• habitat loss and degradation</li> <li>• incidental catch in fishing nets</li> <li>• overfishing of prey species</li> <li>• pollution and poisoning, and</li> <li>• human interaction threats arising from tourism and transport.</li> </ul>
Bare-rumped sheath-tail bat ( <i>Saccolaimus saccolaimus nudiclunatus</i> )	• Critically endangered	<ul style="list-style-type: none"> <li>• Eucalypt forest/woodland containing poplar gum.</li> <li>• Figure 2 (page 13) shows habitat modelling for this species on Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss and degradation (for example, from timber removal)</li> <li>• damage to roosting sites from termites and fire</li> <li>• competition for hollows, and</li> <li>• disease.</li> </ul>
Little tern ( <i>Sterna albigula</i> )	• Migratory species	• Sheltered coastal environments, for example: lagoons, estuaries, river mouths, bays, sandbanks and ocean beaches.	<ul style="list-style-type: none"> <li>• habitat loss and degradation (for example, disturbance to colonies from residential and recreational development)</li> <li>• disturbance to nesting sites (for example, from humans, dogs and rats)</li> <li>• pesticide residues in ingested fish, and</li> <li>• oil-fouling.</li> </ul>
Northern quoll ( <i>Dasyurus hallucatus</i> )	• Endangered	• Creek and riparian vegetation as well as boulders and rocky outcrops.	<ul style="list-style-type: none"> <li>• changes in vegetation structure</li> <li>• inappropriate fire frequency</li> <li>• introduction of exotic herbivores leading to habitat change, and</li> <li>• poisoning by ingesting cane toads.</li> </ul>
Spectacled flying fox ( <i>Pteropus conspicillatus</i> )	• Vulnerable	• Associated primarily with rainforest and sometimes with mangroves.	<ul style="list-style-type: none"> <li>• habitat loss</li> <li>• tick paralysis</li> <li>• disturbance of roosts/camps</li> <li>• man-made obstacles (power lines, fences), and</li> <li>• inappropriate netting practices.</li> </ul>
Striped-tailed delma ( <i>Delma labialis</i> )	• Vulnerable	<ul style="list-style-type: none"> <li>• Wet sclerophyll forest and open woodland near beaches.</li> <li>• The species is likely to be broadly distributed across the island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss and degradation</li> <li>• urban and agricultural development</li> <li>• frequent disturbance by humans, and</li> <li>• predatory exotic species (such as cats).</li> </ul>

Common name ( <i>Scientific name</i> )	EPBC Act status	Habitat	Key threats
Water mouse ( <i>Xeromyz m. myoides</i> )	• Vulnerable	• Normally found in mangroves, but sometimes in adjacent coastal freshwater lagoons, swamps and sedged lakes.	<ul style="list-style-type: none"> <li>• waste discharge</li> <li>• habitat loss</li> <li>• fragmentation and degradation</li> <li>• coastal extractive industries</li> <li>• predators (cats and dogs)</li> <li>• changes to watertable</li> <li>• acid-sulphate pollution, and</li> <li>• construction of jetties or loading facilities.</li> </ul>
White bellied sea eagle ( <i>Haliaeetus leucogaster</i> )	• Migratory species	• Coastal habitats and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands.	<ul style="list-style-type: none"> <li>• loss of habitat due to land development, and</li> <li>• disturbance of nesting pairs by human activity.</li> </ul>
Yakka skink ( <i>Egernia rugosa</i> )	• Vulnerable	• Occur in a wide variety of vegetation types including poplar box, ironbark, brigalow, white cypress pine, mulga, bendee and lancewood woodlands and open forests.	<ul style="list-style-type: none"> <li>• loss of habitat due to clearing</li> <li>• inappropriate roadside management</li> <li>• removal of wood debris and rocks</li> <li>• ripping of rabbit warrens, and</li> <li>• predation by feral animals.</li> </ul>
Unnamed plant (shrub) ( <i>Croton magneticus</i> )	• Vulnerable	• Dry rainforest and vine thickets on various substrates including granite, sandstone, limestone and basalt.	<ul style="list-style-type: none"> <li>• habitat loss and degradation (especially land clearance)</li> <li>• inappropriate fire regimes, and</li> <li>• high-frequency tourist visitation.</li> </ul>
Unnamed plant ( <i>Leucopogon cuspidatus</i> )	• Vulnerable	• Open forest, woodland and heath on rocky slopes.	<ul style="list-style-type: none"> <li>• habitat loss and degradation.</li> </ul>
Unnamed plant ( <i>Marsdenia brevifolia</i> )	• Vulnerable	• Open eucalypt forest on dark massive acid agglomerate soils.	<ul style="list-style-type: none"> <li>• habitat loss and degradation (for example, land clearing, quarrying and gravel removal), and</li> <li>• recreational motorbike riding.</li> </ul>
Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions (SEVT)	• Endangered ecological community	<ul style="list-style-type: none"> <li>• Coastal lowland areas in eastern Queensland and northern New South Wales (associated with the Brigalow Belt Bioregion).</li> <li>• In 1999, about 17 per cent of pre-clearing extent remained.</li> <li>• Figure 2 (page 13) indicates habitat for this community on Magnetic Island.</li> </ul>	<ul style="list-style-type: none"> <li>• habitat loss and degradation (especially continued clearing which results in a high level of fragmentation and lack of connectivity between remnant patches)</li> <li>• inappropriate fire regimes, and</li> <li>• invasion by introduced species.</li> </ul>



figure 2: Magnetic Island protected areas and habitat distribution.





## World heritage properties

World heritage properties are places with natural or cultural heritage values that are recognised to have outstanding universal value. The Great Barrier Reef World Heritage Area (GBRWHA), which includes Magnetic Island, is listed as a world heritage property. The values of the GBRWHA incorporate EPBC Act-listed threatened species and ecological communities. The reef covers an area of more than 348 000 km<sup>2</sup> and spans<sup>4</sup> more than 2000 km.

The GBRWHA was inscribed on the World Heritage List in 1981 for its outstanding universal value, meeting four of the 10 selection criteria. These criteria were revised in 2005:

- Criterion (vii): to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.
- Criterion (viii): to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.
- Criterion (ix): to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.
- Criterion (x): to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

### What is 'exceptional natural beauty'?

World heritage listing of the Great Barrier Reef recognised values that contribute to the exceptional natural beauty of the area including 'a rich variety of landscapes and seascapes, including rugged mountains with dense and diverse vegetation and adjacent fringing reefs'. Magnetic Island exhibits many of these values (see Appendix).

### Where is it?

Exceptional natural beauty is located where it is able to be viewed from the air, surrounding waters, the mainland, lowlands and beaches or from high points on the island. Many areas on the island display the exceptional natural beauty of the Great Barrier Reef, but in areas containing existing development these values have been somewhat diminished. Nevertheless, some actions taken in these areas of existing development can still have a significant impact on the appreciation of 'exceptional natural beauty' on or around the rest of the island.

Many natural heritage values of the GBRWHA are present on Magnetic Island, including:

- a diversity of environmental assets such as forests, coral reefs, seagrass beds and mangroves
- habitat for a number of rare, threatened and endemic species (for example, aggregations of over-wintering butterflies)
- island expression of continental flora, and
- exceptional natural beauty.

<sup>4</sup>The boundaries of the GBRWHA are described in schedule 1, page 9 of the World Heritage nomination request found on the website: [www.gbrmpa.gov.au/\\_\\_data/assets/pdf\\_file/0009/2070/mp\\_009\\_full.pdf](http://www.gbrmpa.gov.au/__data/assets/pdf_file/0009/2070/mp_009_full.pdf)



## National heritage place

The National Heritage List contains places or groups of places with outstanding heritage value to Australia, whether natural, indigenous, historic or a combination of these. As no assessment of the Great Barrier Reef World Heritage Area against the National Heritage List criteria has been undertaken by the Australian Heritage Council, it has been included in the National Heritage List for those world heritage values that the World Heritage Committee has identified the property as having.

A more extensive description of the world heritage and national heritage values of the Great Barrier Reef, particularly those found on Magnetic Island, are described in Appendix.

## Great Barrier Reef Marine Park

The Great Barrier Reef Marine Park (the marine park) was established under the *Great Barrier Reef Marine Park Act 1975*. The marine park includes the marine portion of the GBRWHA to the mean low-tide mark, and includes both state and Commonwealth waters. The Great Barrier Reef Marine Park Authority (GBRMPA) and the Queensland Parks and Wildlife Service are jointly responsible for the day-to-day management of the marine park. The marine park boundary surrounding Magnetic Island is shown in Figure 2 (page 13).

If an action is taken within or near the marine park and has, will have, or is likely to have a significant impact on the environment of the marine park, then it will require assessment under the EPBC Act.

### What is the environment in relation to the marine park?

Environment is defined in the EPBC Act as:

- (a) ecosystems and their constituent parts including people and communities
- (b) natural and physical resources
- (c) qualities and characteristics of locations, place and areas
- (d) heritage values of places
- (e) the social, economic and cultural aspects of a thing mentioned in paragraphs (a), (b) or (c).

Actions and activities within the marine park must be done in accordance with marine park regulations, GBRMPA zoning, plans of management, approvals, and permits, as described in the *Great Barrier Reef Marine Park Act 1975*.

Recent changes have been made to streamline the application processes for environmental assessment under the EPBC Act and the *Great Barrier Reef Marine Park Act 1975*. For further information go to: [www.environment.gov.au/epbc/about/better-protection-for-gbrmp.html](http://www.environment.gov.au/epbc/about/better-protection-for-gbrmp.html)





# GUIDELINES TO DETERMINE THE SIGNIFICANCE OF IMPACTS

If your proposed action has an impact on any matters of national environmental significance you will need to determine whether these impacts are, will be or are likely to be significant, and whether referral to the department is needed under the EPBC Act. It is essential to consider:

- the characteristics of the surrounding environment (any matters of national environmental significance or otherwise unique attributes of the environment)
- the nature of the impacts on natural environments and unique attributes (for example, permanent or temporary, offsite and indirect, large or small scale)
- the degree to which the impacts of the action are understood, and
- avoidance, reduction or mitigation measures.

You should think about your action in its broadest scope when considering its impacts. All potential adverse impacts on matters of national environmental significance must be considered, regardless of whether these are within the control of the person proposing to take the action. If your action consists of

a number of parts, the impact from each part and the cumulative impact of these need to be considered. Impacts can occur at any stage of the action, including site preparation, construction, ongoing operation, decommissioning and any related actions. Impacts can be onsite or offsite, direct or indirect.

## Examples of indirect and off-site impacts.

- **Downstream** impacts, such as impacts on wetlands or ocean reefs from sediment washed or discharged into drainage lines, or disturbance of fauna by offsite noise or lighting or visual presence of infrastructure (for example, lighting affecting turtle nesting).
- **Upstream** impacts, such as those associated with the production of energy or the extraction of raw materials that are used to carry out the action.
- **Facilitated** impacts that result from further actions that are made possible or facilitated by the action, such as more boat traffic in an area resulting from the construction of a new marina.





## Heritage

In relation to the heritage listings of the Great Barrier Reef, the EPBC Act is triggered if a significant impact is likely on a part, element or feature of the heritage area that embodies, manifests, shows or contributes to the natural heritage values recognised as contributing to its world or national heritage listing. An action does not need to have an impact upon the whole of the GBRWHA, nor all of the values, or even a whole value, to be considered to have a significant impact.

Further guidance on determining the significance of an impact on world or national heritage values can be obtained from the *Significant impact guidelines 1.1—Matters of national environmental significance*. These guidelines include a method to assess the likely significance of actions on heritage values.

## Measures to avoid or reduce impacts

It is important to consider the environmental impacts of the action early in the planning of the proposal. Careful planning of the action can avoid, or reduce, the likelihood of a significant impact on matters of national environmental significance. Where possible and practicable it is best to avoid impacts. If impacts cannot be avoided then they should be minimised or mitigated as much as possible. New developments (or substantial alterations to existing developments) planned and implemented to avoid significant impacts on matters of national environmental significance do not require a referral or approval by the department. State, local government or GBRMPA approval may still be necessary.

Measures should be incorporated into the design of the action at its conceptual and planning stages to:

- identify and avoid impacts on matters of national environmental significance as far as possible
- reduce the level of the impact to below significant by following relevant Australian, state and local government best-practice guidelines and standards
- monitor the performance of the mitigation measures, and
- incorporate findings from the monitoring into an adaptive management plan to address unforeseen impacts.

You should only conclude that a referral is not required if the effectiveness of mitigation measures is well established (for example, through demonstrated application, standards, studies or surveys) and there is a high degree of certainty about the avoidance of impacts or the extent to which impacts will be reduced. Where such assurance cannot be demonstrated, the action should be referred. Examples of measures to avoid or reduce significant impacts relevant to Magnetic Island are outlined in Table 2 (page 18). In addition, Table 3 (page 22) outlines actions unlikely to have a significant impact.

If you would like to discuss significance or an EPBC Act compliance issue with the department, or have reason to believe that the EPBC Act has been or is likely to be breached, you can contact the department by:

- email: [compliance@environment.gov.au](mailto:compliance@environment.gov.au)
- telephone: 02 6274 1372 or 1800 110 395 (free call).

When reporting information on a breach, you can remain anonymous.

**Table 2: Examples of actions with the potential to have significant impacts on matters of national environmental significance and possible avoidance, reduction and mitigation measures**

Matters of national environmental significance	Examples of actions that may have significant impacts	Examples of avoidance, reduction or mitigation measures <sup>5</sup>
<ul style="list-style-type: none"> <li>Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions (SEVT)—listed ecological community</li> </ul>	<ul style="list-style-type: none"> <li>Activities such as clearing that reduce the extent, connectivity, quality, integrity, species composition and ability of SEVT to recover.</li> <li>Removal of canopy trees.</li> <li>Activities resulting in changes to light levels, moisture or edge effects affecting SEVT.</li> <li>Activities adversely affecting habitat critical to the survival of SEVT.</li> <li>Activities introducing disease that cause SEVT to decline.</li> <li>Activities interfering with the recovery of SEVT.</li> <li>Activities resulting in invasive species, which are harmful to SEVT becoming established.</li> </ul>	<ul style="list-style-type: none"> <li>Protect and avoid SEVT through adequate buffers.</li> <li>No reduction of the area or quality of SEVT.</li> <li>Protect canopy trees.</li> <li>Minimise development in areas with potential for SEVT regrowth.</li> <li>No fragmentation or reduction in width, quality or number of links between SEVT patches.</li> <li>Avoid unnecessary access, fragmentation and disturbance to remnant SEVT patches to minimise weed invasion.</li> <li>Screen all off-island landscape material for pests and weeds to avoid the introduction of invasive species harmful to SEVT.</li> <li>Manage activities to avoid introduction of invasive grasses and shrubs.</li> <li>Minimise mechanical disturbance and access within SEVT habitat and adjoining buffers.</li> <li>Maintain natural drainage lines and hydrological regimes.</li> </ul>



<sup>5</sup> Using more than one mitigation measure will often achieve the best result. These examples should not be taken as exhaustive or conclusive. They are provided as a guide only.

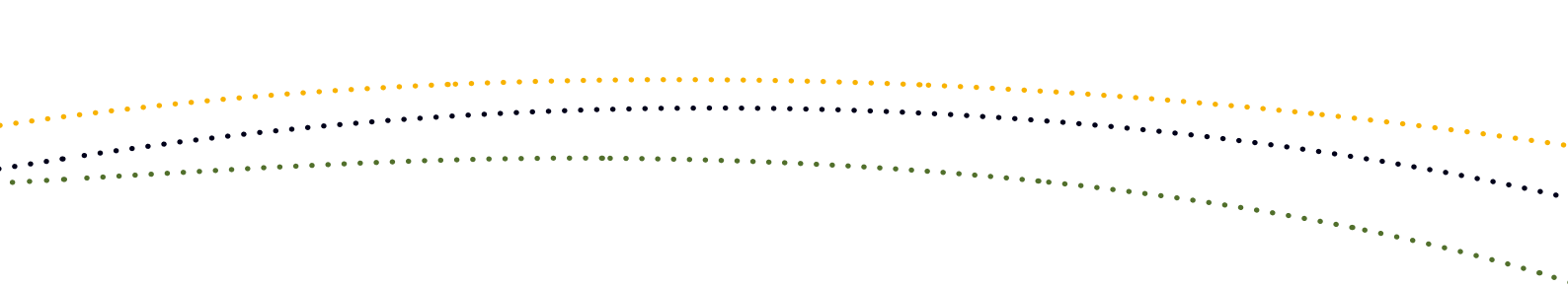


Matters of national environmental significance	Examples of actions that may have significant impacts	Examples of avoidance, reduction or mitigation measures <sup>5</sup>
<ul style="list-style-type: none"> <li>Listed threatened species and ecological communities</li> </ul>	<ul style="list-style-type: none"> <li>Changes to the connectivity, extent and numbers of threatened species and communities through actions that:               <ul style="list-style-type: none"> <li>lead to a long-term decrease in the size of a population</li> <li>reduce the area of occupancy of the species</li> <li>fragment an existing population into two or more populations</li> <li>adversely affect habitat critical to the survival of a species</li> <li>disrupt the breeding cycle of a population</li> <li>modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</li> <li>result in invasive species that are harmful to a critically endangered or endangered species becoming established in their habitat</li> <li>introduce disease that may cause the species to decline, or</li> <li>interfere with the recovery of the species.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Restrict development to existing cleared areas.</li> <li>No development within or near (no closer than 100 m) any threatened species population (including breeding, roosting or foraging areas).</li> <li>No removal of any habitat links or corridors.</li> <li>Put in place risk management strategies for invasive species.</li> <li>Avoid breeding, nesting, feeding and roosting sites.</li> </ul>
<ul style="list-style-type: none"> <li>Listed migratory species</li> </ul>	<ul style="list-style-type: none"> <li>Substantial disturbance to migratory species from:               <ul style="list-style-type: none"> <li>vessel strikes</li> <li>change to lighting regimes</li> <li>change to acoustic regimes</li> <li>change to fire regimes</li> <li>introduction of weeds or feral species</li> <li>altering nutrient cycles, or</li> <li>altering hydrological cycles.</li> </ul> </li> <li>Destruction or isolation of an area of important habitat for a migratory species.</li> <li>Establishment of invasive species harmful to the migratory species in an area of important habitat.</li> <li>Serious disruption to the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</li> </ul>	<ul style="list-style-type: none"> <li>All boat and vehicle traffic to avoid breeding areas/times, migratory routes and foraging areas.</li> <li>Boat speeds to be limited in seagrass feeding areas in dugong protected areas.</li> <li>Provide public information and interpretive sites for sensitive terrestrial and marine habitats.</li> <li>Pedestrian traffic to be controlled through formed pathways.</li> <li>Vehicle traffic to be controlled through formed access roads and trails.</li> <li>Development maintains pre-development fire regimes.</li> <li>Developments to minimise external lighting that disrupts wildlife movements (such as turtle nesting).</li> <li>Screen all off-island landscape material for pests and weeds.</li> <li>Introduced animals (including cats and dogs) to be controlled.</li> <li>Time potentially disruptive activities to periods when migratory species are not present.</li> </ul>

Matters of national environmental significance	Examples of actions that may have significant impacts	Examples of avoidance, reduction or mitigation measures <sup>5</sup>
<ul style="list-style-type: none"> <li>Great Barrier Reef Marine Park</li> <li>Great Barrier Reef World Heritage Area</li> <li>Great Barrier Reef National Heritage place</li> </ul>	<ul style="list-style-type: none"> <li>Actions that have a significant impact on the world heritage values of the Great Barrier Reef. These values are listed in Appendix. Also see the discussion of exceptional natural beauty on page 14.</li> </ul>	<ul style="list-style-type: none"> <li>Plan the action to avoid, or reduce, the likelihood of a significant impact on the values in Appendix through site selection and consideration of scale, design and implementation to best integrate structures into the natural landscape.</li> </ul>
	<ul style="list-style-type: none"> <li>Changes to visual amenity that notably diminish aesthetic value. See Appendix for a list of values.</li> </ul>	<ul style="list-style-type: none"> <li>Developments are consistent with existing neighbourhood scale, bulk and form.</li> <li>New developments do not notably alter the island's natural visual profile (preferably below surrounding canopy height).</li> <li>All development to have a minimum landscape space ratio of 0.25.</li> <li>All development to use colours, textures, shapes and form consistent with the island's natural visual character.</li> <li>All development to be screened from key viewpoints.</li> </ul>
	<ul style="list-style-type: none"> <li>Water pollution (including temperature pollution) likely to result in long-term degradation of the marine environment including through uncontrolled hull cleaning, herbicide runoff or the release of persistent organic chemicals and heavy metals.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with the ANZECC <i>Code of practice for antifouling and in-water hull cleaning and maintenance (1997)</i>. GBRMPA must provide permission to discharge waste.</li> <li>No uncontrolled release of pollutants into the terrestrial and marine environments (for example, through regular mobilisation or drift of fertilisers, herbicides, chemicals or other pollutants).</li> </ul>
	<ul style="list-style-type: none"> <li>Pollution of aquatic environments by discharge of sewage and wastewater likely to result in long-term degradation of the marine environment.</li> </ul>	<ul style="list-style-type: none"> <li>No discharge of untreated waste.</li> <li>Management of waste streams to avoid significant impacts on terrestrial and marine ecosystems.</li> <li>Boat sewage to be discharged to onshore facilities connected to waste transfer or treatment plants.</li> <li>Septic systems to comply with best practice standards.</li> </ul>







Matters of national environmental significance	Examples of actions that may have significant impacts	Examples of avoidance, reduction or mitigation measures <sup>5</sup>
<ul style="list-style-type: none"> <li>• Great Barrier Reef Marine Park</li> <li>• Great Barrier Reef World Heritage Area</li> <li>• Great Barrier Reef National Heritage place</li> </ul>	<ul style="list-style-type: none"> <li>• New tourism developments, including resorts, marinas and floating hotels.</li> <li>• Major expansion or significant upgrades of existing infrastructure.</li> <li>• Construction of a major pontoon, jetty, port developments or aquaculture facilities.</li> <li>• New coastal roads and subdivisions with potential runoff affecting the marine park.</li> <li>• Coastal infill or spoil dumping.</li> <li>• Activities that may result in a known or potential pest species becoming established in the marine environment.</li> <li>• A building located in a non-urban environment or where the proposal would obstruct or detract from viewing the world or national heritage values of the area (see Appendix).</li> <li>• Irreversible loss or clearing of habitat areas supporting nationally listed threatened species or listed migratory species.</li> <li>• Clearing of a listed ecological community, such as SEVT.</li> <li>• New industry with significant marine discharges.</li> <li>• Pollution of aquatic environment by sediments or changed drainage regimes likely to result in increased turbidity, smothering or altering of natural ecological processes.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimise occurrences of exposed soils especially during the wet season.</li> <li>• Avoid disturbance to riparian zones and buffer vegetation. If this cannot be avoided, ensure protection of exposed soils using mulch, sheeting and revegetation.</li> <li>• Avoid development on steep slopes (greater than 20 per cent).</li> <li>• Comply with best-practice construction standards where development on steep slopes is unavoidable.</li> <li>• Implement mitigation measures in Table C of <i>EPBC Act policy statement 2.2—Offshore aquaculture</i>. Aquaculture activities must have a permit from GBRMPA.</li> <li>• Use endemic plants for landscaping and planting.</li> <li>• Use best-practice management of potential acid sulphate soils/known acid sulphate soils for subsurface excavation.</li> <li>• No uncontrolled sediment release from development sites.</li> <li>• No groundwater or surface water extraction that may have an impact on ecosystems.</li> <li>• No net loss of aquifer recharge areas.</li> <li>• Control offsite runoff to pre-development volumes, flows and water quality.</li> </ul>



**Table 3: Activities on Magnetic Island unlikely to have a significant impact<sup>6</sup>**

- Building a house in an existing subdivision, in keeping with subdivision scale, bulk and form.
- Repairing, maintaining or making alterations to commercial and domestic buildings and properties.
- Repairing and maintaining existing public infrastructure for power, roads, telecommunication, water and sewage, unless there is a substantial expansion or modification of these utilities.
- Maintaining existing national park and tourist facilities such as visitor centres, roadside facilities, walking tracks and signage.
- Managing roadside vegetation done regularly by local government (for example, spraying, removal of individual trees for safety, mowing, slashing, under-scrubbing).
- Building and other activities that do not have an impact on remnant or undisturbed native vegetation and are not likely to result in uncontrolled sediment releases to drainage lines.

<sup>6</sup> These examples are provided as a guide only and should not be taken as exhaustive or conclusive.



## FURTHER INFORMATION

Other EPBC Act policy statements are available to help you determine whether your project is likely to have a significant impact on a matter of national environmental significance. EPBC Act policy statements can be obtained from the department's community information unit on 1800 803 772 or can be downloaded from:

[www.environment.gov.au/epbc/guidelines-policies.html](http://www.environment.gov.au/epbc/guidelines-policies.html)

The referral form can be found at:

[www.environment.gov.au/epbc/assessments/referral-form.html](http://www.environment.gov.au/epbc/assessments/referral-form.html)

Information on threatened species and ecological communities including ecology, status, threat abatement plans and recovery plans can be found at:

[www.environment.gov.au/biodiversity/threatened](http://www.environment.gov.au/biodiversity/threatened)

Information about Australia's heritage properties and places can be found at:

[www.environment.gov.au/heritage](http://www.environment.gov.au/heritage)

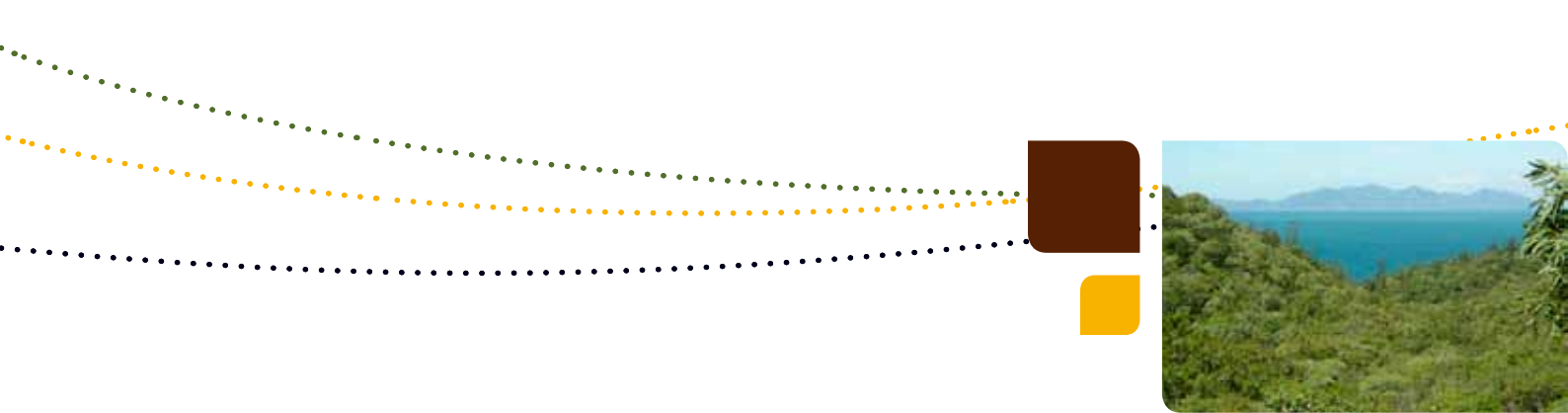
The environmental reporting tool can provide maps and information about matters of national environmental significance on Magnetic Island and can be found at:

[www.environment.gov.au/erin/ert](http://www.environment.gov.au/erin/ert)

The Great Barrier Reef Marine Park Authority website ([www.gbrmpa.gov.au](http://www.gbrmpa.gov.au)) can provide information on:

- commercial jet ski operations around Magnetic Island
- zoning
- marine park management
- water quality and coastal development, and
- dugong protection areas.

Note that the department does not hold all of the information that may be required to assess the impacts of your action. State and territory government agencies also have information that may be useful, including geographic information.



# APPENDIX

## World heritage values of the Great Barrier Reef and the contribution of Magnetic Island

Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
Criteria vii — Contains unique, rare and superlative natural phenomena, formations and features and areas of exceptional natural beauty <sup>8</sup>		
The vast extent of the reef and island systems produces an unparalleled aerial vista.	Y	The GBR is the largest coral reef in the world, covering an area of more than 348 000 km <sup>2</sup> and spanning a length greater than 2000 km. The ‘unparalleled aerial vista’ of the GBR is such that it is the only living thing on Earth that can be seen with the naked eye from space. The ‘unparalleled aerial vista’ includes natural landforms and habitats, and excludes man-made structures and disturbance. Due to its size (5184 ha), Magnetic Island contributes a certain extent to this value. Magnetic Island is highly accessible, and provides a snapshot of the ‘unparalleled aerial vista’ of the GBR to a large proportion of visitors and residents. Therefore views of Magnetic Island (from the mainland, air and sea) are important in this context.
Islands ranging from towering forested continental islands complete with freshwater streams, to small coral cays with rainforest and unvegetated sand cays.	Y	Magnetic Island is one of a small number of towering and forested continental islands complete with freshwater streams within the GBRWHA.
Coastal and adjacent islands with mangrove systems of exceptional beauty.	Y	Magnetic Island provides an example of mangrove systems of exceptional beauty within the GBRWHA.

<sup>7</sup> These criteria are from the original listing of the GBR. Thus they are slightly different from those on page 14.

<sup>8</sup> See the discussion of exceptional natural beauty on page 14.



Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criteria vii — Contains unique, rare and superlative natural phenomena, formations and features and areas of exceptional natural beauty<sup>8</sup> (continued)</b>		
The rich variety of landscapes and seascapes including rugged mountains with dense and diverse vegetation and adjacent fringing reefs.	Y	Magnetic Island contributes to the rich variety of landscapes and seascapes located throughout the GBRWHA. Magnetic Island is a large, prominent island with rugged mountains, dense and diverse vegetation and adjacent fringing reefs.
The abundance and diversity of shape, size and colour of marine fauna and flora in the coral reefs.	Y	Although relatively small, Magnetic Island contributes considerably to this value of the GBRWHA. The fringing coral reefs in the waters around Magnetic Island provide habitats that support abundant and diverse marine fauna and flora. For example, these reefs contain more than 100 species of corals (equal to more than 25 per cent of all coral species recorded in the entire GBR), and one of the most extensive stands of orange velvet fingers coral in the GBR.
Spectacular breeding colonies of seabirds and great aggregations of over-wintering butterflies.	Y	Magnetic Island supports great aggregations of over-wintering butterflies. The aggregations can remain on Magnetic Island between the early and late dry season. Most of the species that aggregate in numbers on Magnetic Island are from the family <i>Nymphalidae</i> . This includes the blue tiger butterfly ( <i>Tirumala hamatta</i> ), the relatively rare purple beak butterfly ( <i>Libythea geoffroy nicevillei</i> ), and one of the skipper butterflies ( <i>Hesperilla malindeva dagoomga</i> ) which is one of only two subspecies endemic to the GBRWHA and so far, has only been recorded on Magnetic Island.
Migrating whales, dolphins, dugong, whale sharks, sea turtles, seabirds and concentrations of large fish.	Y	The near-shore waters around Magnetic Island provide important seagrass beds and coral reef habitat that support large numbers of dugongs, green turtles and two species of dolphins in the GBRWHA.

Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criterion viii — As an outstanding example representing a major stage in the earth's evolutionary history</b>		
2904 coral reefs covering about 20 055 km <sup>2</sup> .	Y	Magnetic Island's coastline is about 40 km in length and contains a variety of conditions that support a diversity of coral reefs. More than 100 species of hard corals have been recorded from the fringing reefs around Magnetic Island. This represents more than one-quarter of the total number of coral species recorded throughout the GBR.
300 coral cays and 600 continental islands.	Y	Magnetic Island is one of 600 continental islands within the GBRWHA. It is the seventh largest (5184 ha) and the fourth highest (495 m) continental island within the GBRWHA.
Reef morphologies reflecting historical and ongoing geomorphic and oceanographic processes.	Y	Magnetic Island contains fringing reef systems. Due to the nature of coral reefs, they are likely to reflect historical and ongoing geomorphic and oceanographic processes.
Processes of geological evolution linking islands, cays, reefs and changing sea levels, together with sand barriers, deltaic and associated sand dunes.	Y	As a large continental island containing a diversity of near-shore ecosystems, Magnetic Island forms part of the processes of geological evolution linking islands, cays, reefs and changing sea levels, together with sand barriers, deltaic and associated sand dunes.
Record of sea level changes and the complete history of the reef's evolution are recorded in the reef structure.	Y	Magnetic Island contains a relatively small number of reef systems within the GBRWHA, which contribute to this value.
Record of climate history, environmental conditions and processes extending back over several hundred years within old massive corals.	Y	The coral reefs around the island include one of the most extensive stands of <i>Montipora digitata</i> recorded in the GBR, and diverse coral communities containing several massive coral colonies that are hundreds of years old.
Formations such as serpentine rocks of South Percy Island, intact and active dune systems, undisturbed tidal sediments and 'blue holes'.	N	Magnetic Island does not contain formations such as serpentine rocks of South Percy island, intact and active dune systems, undisturbed tidal sediments and 'blue holes'.
Record of sea level changes reflected in distribution of continental island flora and fauna.	Y	Magnetic Island supports a rich assemblage of terrestrial flora and fauna and has been identified as having the 5th highest floral diversity of the islands within the GBR. It also supports some endemic fauna such as the skipper butterfly ( <i>Hesperilla malindeva dagoomba</i> ), and may also support a number of endemic flora and lizards (for example, <i>Menetia sadlieri</i> ). Today, a shallow sea separates the island from the mainland. However, before the sea level rose about 7500 years ago, Magnetic Island was connected to the mainland between Cape Pallarenda and Kissing Point.



Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criterion ix — As an outstanding example representing significant ongoing geological processes, biological evolution and human interaction with the natural environment</b>		
<p>Biologically the GBR supports the most diverse ecosystem known to man. Its enormous diversity is thought to reflect the maturity of an ecosystem, which has evolved over millions of years on the northeast Continental Shelf of Australia. The World heritage values include:</p> <ul style="list-style-type: none"> <li>• The heterogeneity and interconnectivity of the reef assemblage.</li> </ul>	Y	<p>Magnetic Island contains a variety of near-shore environments including coral reefs. These reef systems form a small, inter-connected part of the larger GBR system, which is valued for its heterogeneity and interconnectivity.</p>
<ul style="list-style-type: none"> <li>• Size and morphological diversity (elevation ranging from the sea bed to 1142 m at Mt Bowen and a large cross-shelf extent encompass the fullest possible representation of marine environmental processes).</li> </ul>	Y	<p>Continental islands such as Magnetic Island contribute greatly to the total morphological diversity of the GBRWHA.</p>
<ul style="list-style-type: none"> <li>• Ongoing processes of accretion and erosion of coral reefs, sand banks and coral cays, erosion and deposition processes along the coastline, river deltas/estuaries and continental islands.</li> </ul>	Y	<p>Ongoing processes within the GBRWHA that are present on Magnetic Island are those associated with accretion and erosion of coral reefs, and erosion and deposition processes along continental islands. When compared with the total GBRWHA, Magnetic Island contains a small amount of coral. However, since it is one of the largest and tallest continental islands within the GBRWHA, Magnetic Island represents a high proportion of erosion and deposition processes that occur on continental islands within the GBRWHA.</p>
<ul style="list-style-type: none"> <li>• Extensive Halimeda beds representing active calcification and sediment accretion for more than 10 000 years.</li> </ul>	N	<p>Magnetic Island's near-shore waters (for example, Cockle Bay) contain old coral colonies and some <i>Halimeda</i> beds. However, the age of these <i>Halimeda</i> beds is unknown.</p>
<ul style="list-style-type: none"> <li>• Evidence of the dispersion and evolution of hard corals and associated flora and fauna from the 'Indo-West Pacific centre of diversity' along the north-south extent of the reef.</li> </ul>	Y	<p>Magnetic Island forms a small part of the GBRWHA that contributes to this value. Magnetic Island contains some hard corals and associated flora and fauna.</p>
<ul style="list-style-type: none"> <li>• Inter-connections with the Wet Tropics via the coastal interface and Lord Howe Island via the East Australia current.</li> </ul>	Y	<p>Magnetic Island forms a small part of the GBRWHA that contributes to this value.</p>
<ul style="list-style-type: none"> <li>• Indigenous temperate species derived from tropical species.</li> </ul>	Y	<p>Magnetic Island forms a small part of the GBRWHA that contributes to this value.</p>
<ul style="list-style-type: none"> <li>• Living coral colonies (including some of the world's oldest).</li> </ul>	Y	<p>The coral reefs around the island include one of the most extensive stands of orange velvet fingers recorded in the GBR, and diverse coral communities containing several massive coral colonies that are hundreds of years old.</p>
<ul style="list-style-type: none"> <li>• Inshore coral communities of southern reefs</li> </ul>	N	<p>Magnetic Island lies roughly within the middle portion of the length of the GBR.</p>



Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criterion ix — As an outstanding example representing significant ongoing geological processes, biological evolution and human interaction with the natural environment</b>		
<ul style="list-style-type: none"> <li>• Five floristic regions identified for continental islands and two for coral cays.</li> </ul>	Y	<p>Magnetic Island is one of two substantial continental islands that lie within the GBR Tropics region of far north Queensland (the second being Gloucester Island) floristic region. Both islands are also significantly different in ecological character.</p>
<ul style="list-style-type: none"> <li>• The diversity of flora and fauna, including:               <ul style="list-style-type: none"> <li>• Macroalgae (estimated 400–500 species).</li> <li>• Porifera (estimated 1500 species, some endemic, mostly undescribed).</li> <li>• Cnidaria: Corals—part of the global centre of coral diversity and including:                   <ul style="list-style-type: none"> <li>- hexacorals (70 genera and 350 species, including 10 endemic species).</li> <li>- octocorals (80 genera, number of species not yet estimated).</li> </ul> </li> <li>• Tunicata: Ascidiars (at least 330 species).</li> <li>• Bryozoa (an estimated 300–500 species, many undescribed).</li> <li>• Crustacea (at least 1330 species from three subclasses).</li> <li>• Worms:                   <ul style="list-style-type: none"> <li>- Polychaetes (estimated 500 species).</li> <li>- Platyhelminthes—include free-living Tubellaria (number of species not yet estimated), polyclad Tubellaria (up to 300 species) and parasitic helminthes (estimated thousands of species, most undescribed).</li> </ul> </li> <li>• Phytoplankton (a diverse group existing in two broad communities).</li> <li>• Mollusca (between 5000–8000 species).</li> <li>• Echinodermata (estimated 800 extant species, including many rare taxa and type specimens).</li> <li>• fishes (between 1200–2000 species from 130 families, with high species diversity and heterogeneity - includes the whale shark <i>Rhynchodon typus</i>).</li> <li>• seabirds (between 1.4 and 1.7 million seabirds breeding on islands).</li> <li>• marine reptiles (including six sea turtle species, 17 sea snake species, and one species of crocodile).</li> <li>• marine mammals (including one species of dugong (<i>Dugong dugon</i>), and 26 species of whales and dolphins).</li> </ul> </li> </ul>	Y	<p>Magnetic Island contributes to the overall biodiversity of the GBRWHA from both its terrestrial and aquatic habitats. In summary, it contains:</p> <ul style="list-style-type: none"> <li>• A diverse range of habitats and landscapes, including granite boulder fields, rocky shores, eucalypt woodlands, rainforest, freshwater waterways and wetlands, sand dunes and sandy beaches, salt marshes, mangroves, fringing reefs and seagrass beds.</li> <li>• A variety of marine ecosystems, including:               <ul style="list-style-type: none"> <li>- Diverse marine habitats (for example, seagrass, coral, algae and mangroves) which support diverse fauna.</li> <li>- Diverse reef communities: the species assemblages in the coral reefs around Magnetic Island vary depending on their location around the island, and are influenced by the prevalent conditions (for example, leeward side more protected, shallow and turbid; windward side more exposed, clearer and deeper). More than 100 species of hard corals have been recorded from the Magnetic Island fringing reefs, which represent more than one-quarter of the total known GBRWHA coral fauna.</li> <li>- Of the six species of marine turtle present in Australia and/or in the GBR (either during breeding, nesting, feeding or periods of migration), five of these occur in the waters surrounding Magnetic Island. Both green and flatback turtles have been recorded nesting on the beaches of the island.</li> <li>- An important foraging habitat for marine species—in particular the dugong, turtles and two species of dolphin.</li> </ul> </li> </ul>

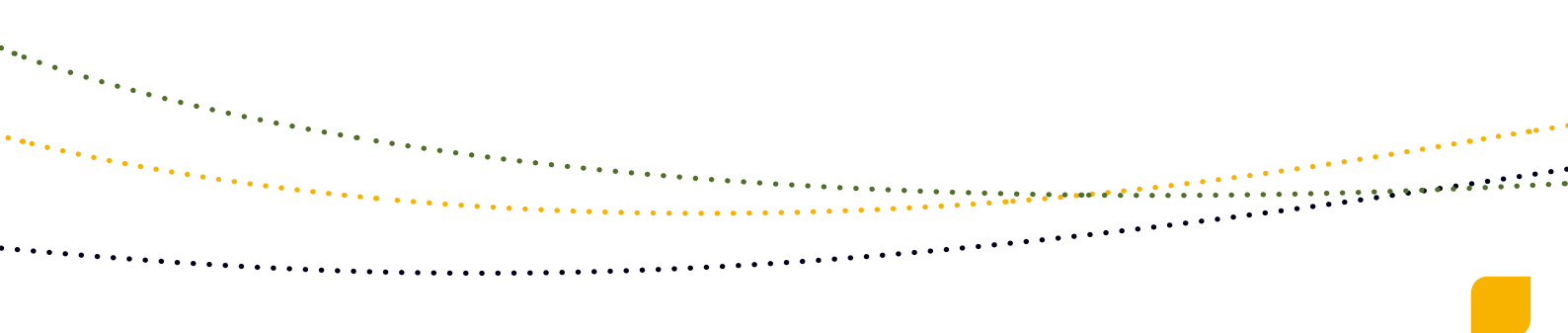


Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criterion ix — As an outstanding example representing significant ongoing geological processes, biological evolution and human interaction with the natural environment</b>		
<ul style="list-style-type: none"> <li>terrestrial fauna, including:               <ul style="list-style-type: none"> <li>invertebrates (pseudoscorpions, mites, ticks, spiders, centipedes, isopods, phalangids, millipedes, collembolans and 109 families of insects from 20 orders, and large over-wintering aggregations of butterflies)</li> <li>vertebrates (including seabirds (see above), reptiles: crocodiles and turtles, nine snakes and 31 lizards, mammals).</li> </ul> </li> </ul>	Y	<p>A variety of terrestrial ecosystems, including:</p> <ul style="list-style-type: none"> <li>One of the most diverse floral assemblages within the GBRWHA, with more than 600 flora species identified on the island.</li> <li>One of only two substantial continental islands within the region identified as the dry tropics region.</li> <li>Endemic fauna, including:               <ul style="list-style-type: none"> <li>invertebrates—large aggregations of over-wintering butterflies</li> <li>diverse bird fauna (resident and migrant): 180 bird species have been recorded on or around Magnetic Island, including seabirds, waders, resident and migratory species, those that use the inter-tidal zone and those that frequent the freshwater wetlands, and</li> <li>diverse reptile fauna: at least 15 species of small lizards.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>The integrity of the interconnections between reef and island networks in terms of dispersion, recruitment, and the subsequent gene flow of many taxa.</li> </ul>	Y	<p>Magnetic Island forms a small part of the GBRWHA, but it may play an important role in dispersion, recruitment, and the subsequent gene flow of many taxa, due to its large size and diverse terrestrial and marine habitats.</p>
<ul style="list-style-type: none"> <li>Processes of dispersal, colonisation and establishment of plant communities within the context of island biogeography (for example, dispersal of seeds by air, sea and vectors such as birds are examples of dispersion, colonisation and succession).</li> </ul>	Y	<p>Magnetic Island is the largest continental island within the dry tropics region of the GBRWHA. Studies have found that the diversity of flora species on islands increase linearly with island size up to about 5000 ha. So it is likely that Magnetic Island represents the largest, most diverse assemblage of flora in the dry tropics region of the reef, and contributes to the processes of dispersal, colonisation and establishment of flora communities within the GBRWHA as a whole.</p>
<ul style="list-style-type: none"> <li>The isolation of certain island populations (for example, recent speciation evident in two subspecies of the butterfly <i>Tirumala hamata</i> and the evolution of distinct races of the bird <i>Zosterops</i> spp).</li> </ul>	Y	<p>Magnetic Island is one island within the GBRWHA which provides evidence of isolation of certain island populations. Magnetic Island supports endemic fauna such as the skipper butterfly (<i>Hesperilla malindeva dagoomba</i>), and may also support a number of endemic flora and lizards (for example, <i>Menetia sadlieri</i>). It is also one of the few known locations of a relatively rare species of butterfly <i>Libythea geoffroy nicevillei</i>. The blue tiger butterfly occurs on Magnetic Island, but it is unknown whether or not those occurring on Magnetic Island are subspecies.</p>

Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criterion ix — As an outstanding example representing significant ongoing geological processes, biological evolution and human interaction with the natural environment</b>		
• Remnant vegetation types (hoop pines) and relic species (sponges) on islands.	Y	Remnant hoop pines are present on Magnetic Island. They are also present on many of the other islands in the GBR, such as Lizard, Brampton, South Molle, Hayman, South Long and Whitsunday Island.
• Evidence of morphological and genetic changes in mangrove and seagrass flora across regional scales.	Y	Magnetic Island contains mangrove and seagrass habitat which may help illustrating morphological and genetic changes.
• Feeding and/or breeding grounds for international migratory seabirds, cetaceans and sea turtles.	Y	Seagrass beds and coral reefs around Magnetic Island form important foraging habitat for two species of dolphin and the green turtle. Some migratory birds occur on Magnetic Island in significant numbers (see Table 1 page 8).
• Human interaction with the natural environment.	Y	The close proximity of Magnetic Island to the mainland coastline, particularly to the large north Queensland regional centre of Townsville, means that Magnetic Island is particularly important as a site for people to experience and appreciate the values of the GBRWHA. Magnetic Island has also been a monitoring site for seagrass since 1971.



Great Barrier Reef (GBR) world heritage values <sup>7</sup>	Value present on Magnetic Island?	How value is expressed on Magnetic Island
<b>Criterion x — Provides habitats where populations of rare and endangered species of plants and animals still survive</b>		
<p>Habitats for species of conservation significance within the 77 broad-scale bioregional associations that have been identified for the property and which include:</p> <ul style="list-style-type: none"> <li>• More than 2900 coral reefs (covering 20 055 km<sup>2</sup>) that are structurally and ecologically complex</li> </ul>	Y	Magnetic Island supports flora and fauna species, ecological communities, coral reefs, seagrass beds and mangroves. It has some threatened and migratory species of flora and fauna as well as an ecological community of conservation significance that are listed under the EPBC Act.
<ul style="list-style-type: none"> <li>• Large numbers of islands, including: <ul style="list-style-type: none"> <li>- 600 continental islands supporting 2195 plant species in five distinct floristic regions</li> <li>- 300 coral cays and sand cays</li> <li>- seabird and sea turtle rookeries, including breeding populations of green sea turtles and Hawksbill turtles</li> <li>- coral cays with 300–350 plant species in two distinct floristic regions</li> </ul> </li> </ul>	Y	Magnetic Island is one of the 600 continental islands within the GBRWHA. At 5184 ha, it is the seventh largest island within the GBRWHA and is also the fourth highest island, at 495 m above sea level. It is the largest continental island within the dry tropics region of the GBRWHA, and supports a high diversity of flora species. The near-shore waters around Magnetic Island provide important seagrass beds and coral reef habitat that support large numbers of dugongs, green turtles and two species of dolphins in the GBRWHA.
<ul style="list-style-type: none"> <li>• Seagrass beds (more than 5000 km<sup>2</sup>) comprising 15 species, two endemic</li> </ul>	Y	The near-shore waters around Magnetic Island provide important seagrass beds that support large numbers of dugong and turtles in the GBRWHA.
<ul style="list-style-type: none"> <li>• 37 species of mangrove trees (more than 2070 km<sup>2</sup>).</li> </ul>	Y	Magnetic Island contains a relatively small number of mangrove systems within the total GBRWHA. However, these mangrove systems are likely to be unique as the development of mangrove forests on continental islands of the GBR can be highly variable, even on the same island. Key factors influencing mangrove forest development on continental islands includes topography, substrate, shelter and the volume and persistence of freshwater runoff.
<ul style="list-style-type: none"> <li>• <i>Halimeda</i> banks in the northern region and the unique deep water bed in the central region.</li> </ul>	N	The near-shore waters around Magnetic Island support some <i>Halimeda</i> species, though not in extensive numbers.
<ul style="list-style-type: none"> <li>• Large areas of ecologically complex inter-reef and lagoonal benthos.</li> </ul>	N	The near-shore waters surrounding Magnetic Island include fringing reefs only.
<ul style="list-style-type: none"> <li>• Species of plants and animals of conservation significance.</li> </ul>	Y	Magnetic Island provides habitat that supports species of flora and fauna of conservation significance that are listed under the EPBC Act as threatened or migratory species. It also provides habitat that supports ecological communities, one of which is endangered under the EPBC Act.



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