

Yunbenun: World Heritage Magnetic Island



**Magnetic Island
Nature Care
Association Inc.**



Great Barrier
Reef Foundation



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The World Heritage Values project was led by Gethin Morgan, with co-ordination by Peter Hansen.

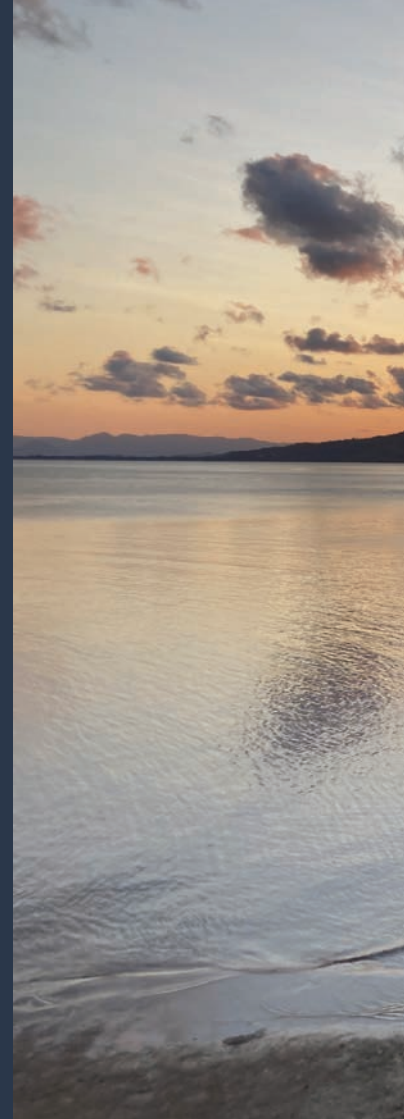
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The Wulgurukaba are the traditional custodians of Yunbenun and have continuing connection to its land and waters.

Our Island home

Hoop pines and
granite boulders
meeting the sea.



Introduction

This booklet is for those who love our beautiful Island. It is especially for those who want to know more about its natural values, and help protect them for future generations.

It is also for our new residents who are still discovering the Island's natural attractions, and for those to come.

The booklet begins with an outline of the special natural values that led to Magnetic Island being listed as part of the Great Barrier Reef World Heritage Area in 1981, followed by a look at where some of the more important natural areas remain in the main bays.

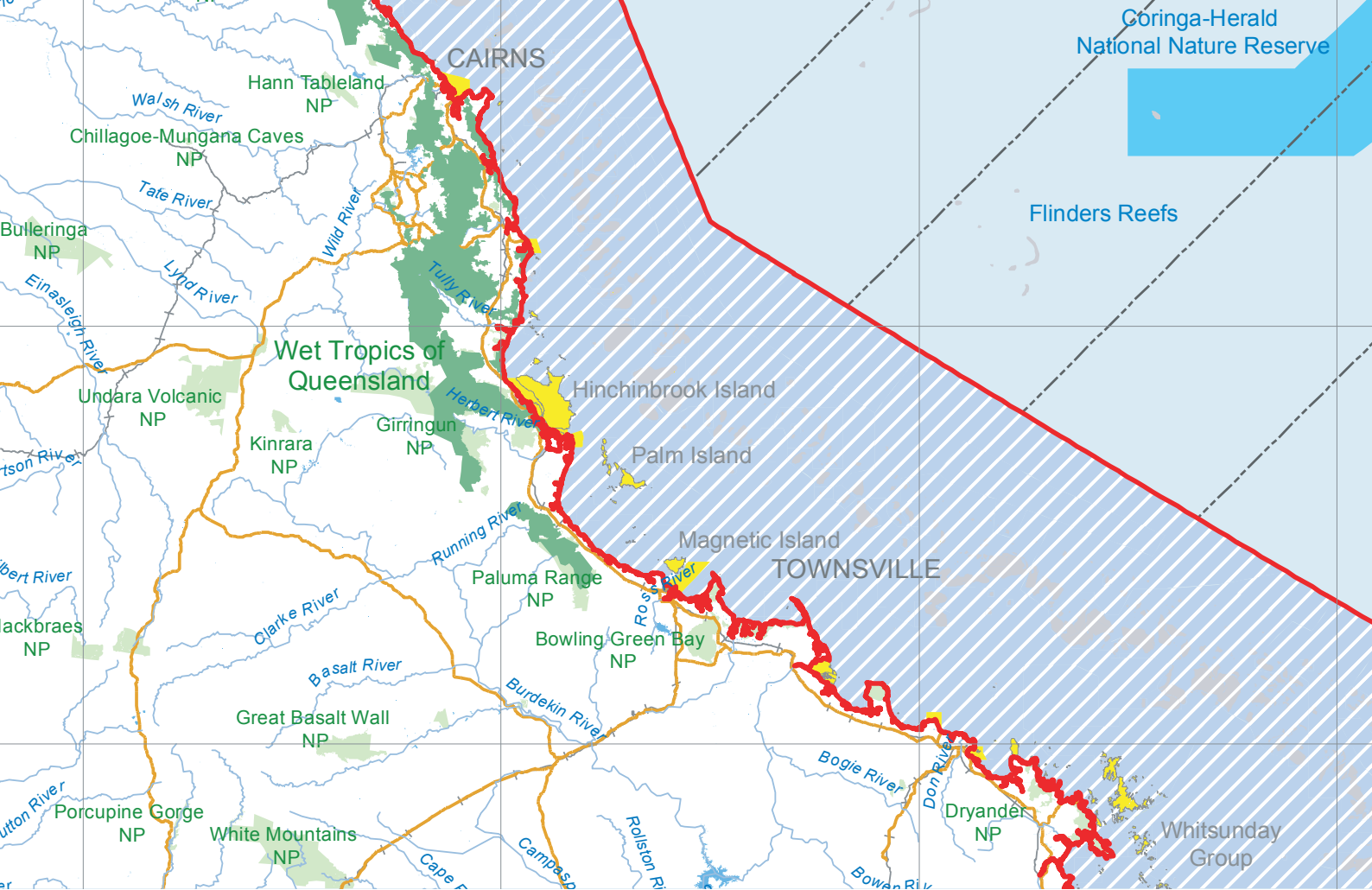
The Island's natural environment is under increasing pressure from many directions. The rest of the booklet discusses some of these threats, and what we as residents can do to help reduce them.

The Island's natural values, and what we can do as residents to support them, is the major focus of this booklet.



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1. Magnetic Island is World Heritage

In the late 1960's the Great Barrier Reef was being explored for oil, coral reef mining for fertiliser was proposed, and foreign vessels were trawling and collecting its marine life.

Public outcry forced the Queensland and Federal Governments to agree that the reef should be recognised and preserved as an important part of Queensland's and Australia's heritage.

The entire area was nominated by the Australian Government for listing in 1981 and placed on the World Heritage List that year.

"If only one coral reef site in the world were to be chosen for the World Heritage List, the Great Barrier Reef is the site to be chosen."

- IUCN Technical Evaluation 1981.

Left: The Great Barrier Reef World Heritage Area (GBRWHA) is defined by the red line. Everywhere within this boundary is part of the World Heritage Area, including Magnetic Island.



**Placed on
the World
Heritage
List in
1981**



United Nations
Educational, Scientific and
Cultural Organization



World Heritage
Convention



2. What are the Island's World Heritage Values?

All the islands are included in the GBRWHA. The reefs and their species are dependent on the land around and near them for their survival — it is one big ecosystem. Turtles nesting on beaches, fish larvae in estuaries, and water quality from island runoff are examples.

Over such a large area, different parts have different values. Magnetic Island's values were summarised for the Federal Government in 2005:

"In preparing this report we have been struck by the diversity of terrestrial and marine habitats represented in the relatively small area of Magnetic Island."

"...on its own, it makes a significant contribution to meeting World Heritage obligations".

- Kenchington and Hegerl (2005)

They list 20 natural and cultural values that are unique to Magnetic Island, or are highly significant for the entire GBRWHA.

Most of these values are based on the Island's diverse habitats and the wide variety of plant and animal species they support.



20
unique &
significant
natural &
cultural values

3. Why is Magnetic Island so special?



Above: Wet Tropic and Dry Tropic regions in North Queensland.

The climate is unique ...

The Island is within a dry zone, known as the Dry Tropics, between the high rainfall coastal regions of the Central Queensland Coast (south of Bowen), and the Wet Tropics and associated islands to the north.

The Dry Tropics, with its distinctive dry season, provides for a group of plants and animals different to that found in other parts of the GBRWHA.

Many plants are deciduous, dropping their leaves in the dry season to conserve water.

Magnetic Island is the only large island within the Dry Tropics.

... and there are many different environments

Magnetic Island is one of 599 continental islands in the World Heritage Area. These islands are hills and mountains on the submerged continental shelf.

Only 8 continental islands are larger than 3,000 hectares. Magnetic Island is the 7th largest at 5,184 hectares.

Magnetic Island is the fourth highest island at 495 metres. These higher areas are cooler, and receive more moisture by catching low clouds.

Most importantly, the Island is one of the three most ecologically diverse islands of the GBRWHA, mainly due to the extent and diversity of its lowland habitats and surrounding tidal and marine environments.



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1 of the
3
most ecologically
diverse islands of
the GBRWHA

These diverse terrestrial and marine environments support an unusually large number of species

To date, 690 native plant species have been recorded on Magnetic Island. Together with the much bigger and wetter Hinchinbrook Island, this is the highest number of plant species recorded of any of the GBRWHA islands.

Six of these plants are threatened, and at least one species occurs only on Magnetic Island, the Picnic Bay *Tephrosia* (see page 16). Many other plants on the Island are naturally restricted to the Townsville region, or rare across their range. **The Island is important for the long-term conservation of all these rare and threatened species.**

The Island also has a high diversity of native animals with 17 frog species, 14 bat species, 14 snakes, 27 lizards, and 194 native bird species recorded so far.

It is a nationally significant refuge for 5 threatened animal species (including the koala), and for a number of other animals whose populations are declining on the mainland.

The marine environments are similarly diverse. The reefs fringing the Island support over a quarter of the total number of hard coral species known from the GBRWHA, despite their relatively small size.



690
native plant
species



194
native bird
species



27
lizard species



17
frog species



14
bat species



14
snake species



6
threatened
plant species

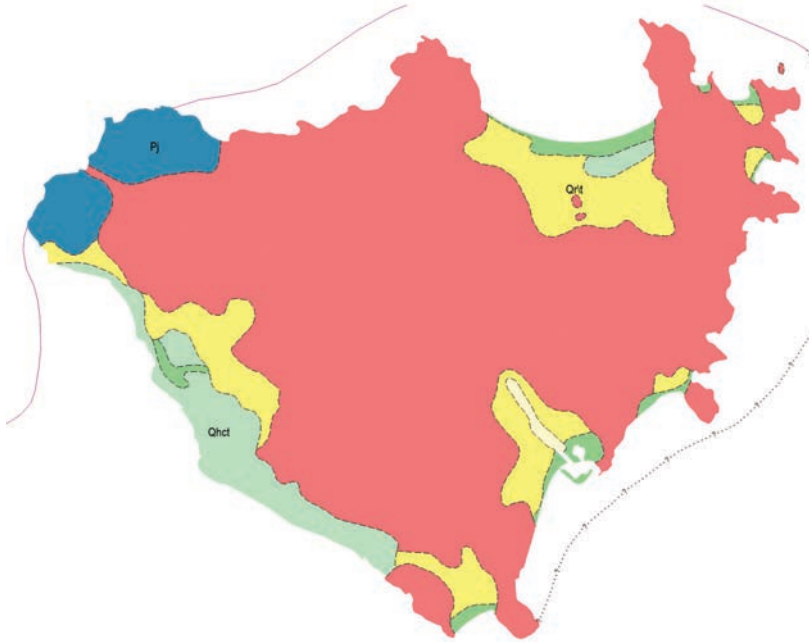


5
threatened
animal species



Fringing reefs support over
25%
of hard coral species
from the GBRWHA

4. Island environments ...



LEGEND:

Granite hills Volcanic hills Foot-slopes and alluvial plains Sand dunes and beaches Tidal areas

© The State of Queensland (Department of Resources) 2023.

So why does the Island have so many different environments?

Mainly because of the variety of landforms and geologies present.

The Island's environments can be broadly divided into two: the highlands and the lowlands.

Highlands: These are the rocky hills with mainly shallow soils. Granite hills dominate the Island. The blue in the north west shows low hills on fine-grained igneous rocks, the Julago Volcanics.

Lowlands: The rest of the colours are lowlands, younger, flatter landscapes with deeper soils.

The yellow areas show the gently sloping old red soils that have accumulated around the base of the hills, and the younger alluvial plains and wetlands.

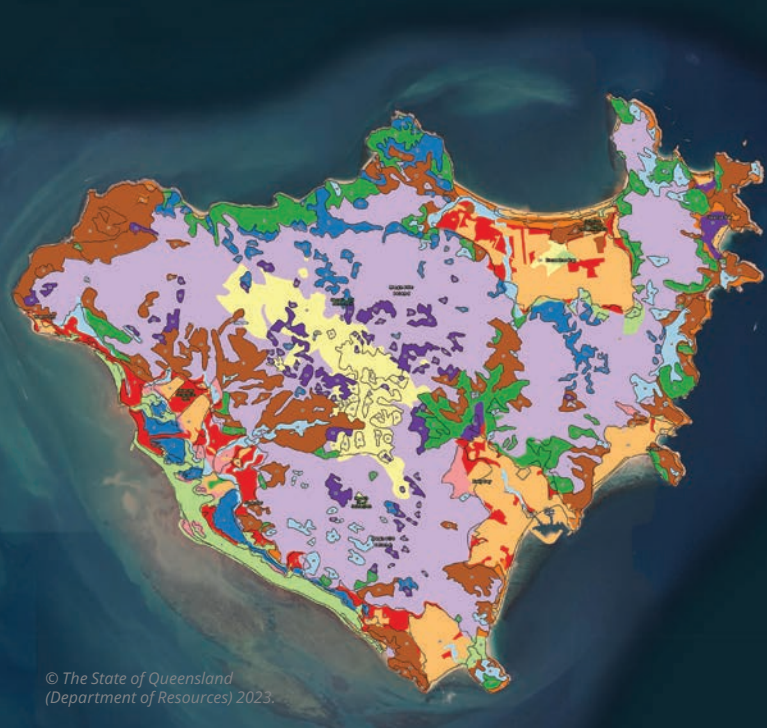
... and ecosystems

Ecosystems are finer variations of the environments shown on the previous map. Each ecosystem has a different landform, soil, and vegetation, and so provides different habitat for a greater variety of plants and animals.

Thirty-one different ecosystems have been recognised on the Island. The most extensive are shown on this map by different colours.

Pale orange shows cleared areas and areas that are growing back after past clearing.

The following pages show some of the main ecosystems, with a focus on the lowlands.



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31
different
ecosystems



The "Picnic Bay" Tephrosia only occurs on Magnetic Island. It has yet to be formally named.



Koalas are now Endangered in Queensland.

4.1 Highland ecosystems

The large rounded granite boulders that dominate the hills and headlands are one of the Island's most memorable features.

Ten different ecosystems have been recognised on the hills.

For example in the cooler, higher areas (over 340 metres above sea level) clouds provide extra moisture. The main ecosystem has organic rich sandy soils with a woodland of white mahogany and a lower tree story of hill she-oak. Grass trees are common.

At least 14 different fern species are known from these highest areas.

Above: Pollen gives the rusty colour to the male she-oaks in this picture looking towards Cleveland Bay.



At West Point the hills are formed on the Julago Volcanics, the original rock that the Magnetic Island granites pushed up into when the granites were still molten magma.

These shallow loamy soils have three ecosystems that are restricted to this area.

Right: Ironbark woodland on Julago Volcanics.



4.2 Lowland ecosystems

The lowlands are particularly important for maintaining the Island's natural World Heritage values.

Their deeper, more fertile soils support taller trees than the shallow soils of the rocky hills, and more trees live to a greater age, developing the numerous hollows so critical for shelter and nesting. This can take hundreds of years.

Over 300 Australian animals use hollows in old trees, including possums, bats, reptiles and birds. One hollow poplar gum that came down in Hideaway Estate had over 60 Endangered bare-rumped sheath-tail bats roosting inside it.

Many birds rely on the lowlands

including dollar birds, bee-eaters, drongos, curlews, emerald doves, Torres Strait pigeons and sunbirds, all of which breed on the island.

Other animals that largely depend on the lowlands include possums, rock wallabies and echidnas.



**Over
300
different animals
use hollows in old
trees**



The Island's lowlands have largely formed since sea levels stabilised about 6,000 years ago. The old red soils around the base of the hills are much older, possibly over 250,000 years old.

Four different ecosystems occur on the sand dunes, ten on the alluvial soils, and a single unique ecosystem on the old red soils.

This photo shows the bloodwood (left) and poplar gum (right) woodland on the old red soils around the base of the granite hills.

This ecosystem once supported the greatest density of old hollow trees on the Island. Being well drained, this is where most of the urban development has occurred and now less than 30% of their original extent remains.

This is why the remaining old trees in urban areas are so important.



4

**different ecosystems
on sand dunes**



10

**different ecosystems
on alluvial soils**

The alluvial ecosystems include poplar gum and melaleuca woodlands on flood plains, blue gum forest on larger watercourses, and a variety of wetlands, the largest of these being Horseshoe Bay Lagoon.

The rich flowerings of these more fertile and better watered areas are an important seasonal food resource for many birds, bats and insects.

The seasonal wetlands are particularly important for feeding and breeding water-birds and for island frog populations.



Ecosystems found on the coastal sand dunes include eucalypt woodlands, vine thickets, and the beach oak woodlands so loved by the black cockatoos.

The vine thickets are a nationally Endangered ecosystem.

Right: A gnarled old quinine tree, a common species in the semi-deciduous vine thicket on the high dunes in Horseshoe Bay.

Below: The Magnetic Island pygmy skink is another species that only occurs on the Island. No other island in the Great Barrier Reef has its own reptile.



The western side of the Island has an extensive area of mangrove, salt pan, samphire and salt couch ecosystems large enough to support mangrove dependent bird, reptile and mollusc species such as the shining flycatcher and the rusty monitor.

Four mangrove ecosystems are recognised, with different combinations of seventeen different mangrove species, reflecting different substrate, tidal and freshwater influences.

Top right: Mangrove forests at Cockle Bay.

Below right: Samphire communities, in this case dominated by red bead weed, occur on the upper fringes of the salt pans.



4
mangrove
ecosystems
with
17
mangrove
species

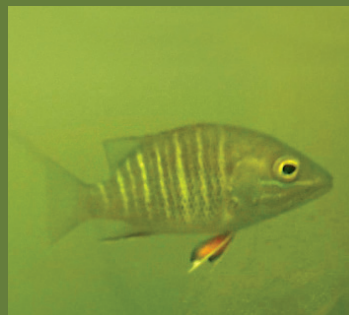




Most bays have small estuaries. These are beach barrier systems that are closed seasonally by sand build-up, and opened by wet season rains. These sheltered environments are an important nursery for fish spawning so they are best left to open naturally.

The beaches and sand dunes around the Island are used by nesting turtles. Flatback turtles prefer to nest on beaches on the southeast side of the island, while the more common green turtles prefer beaches on the northern side.

Above: Seasonal estuary, Habitat Reserve, Nelly Bay.



Mangrove jack fingerling.



Spanish flag snapper (left) and Goatfish fingerlings.

4.3 Protected areas

The extent of the rocky highlands is shown by the yellow dotted line.

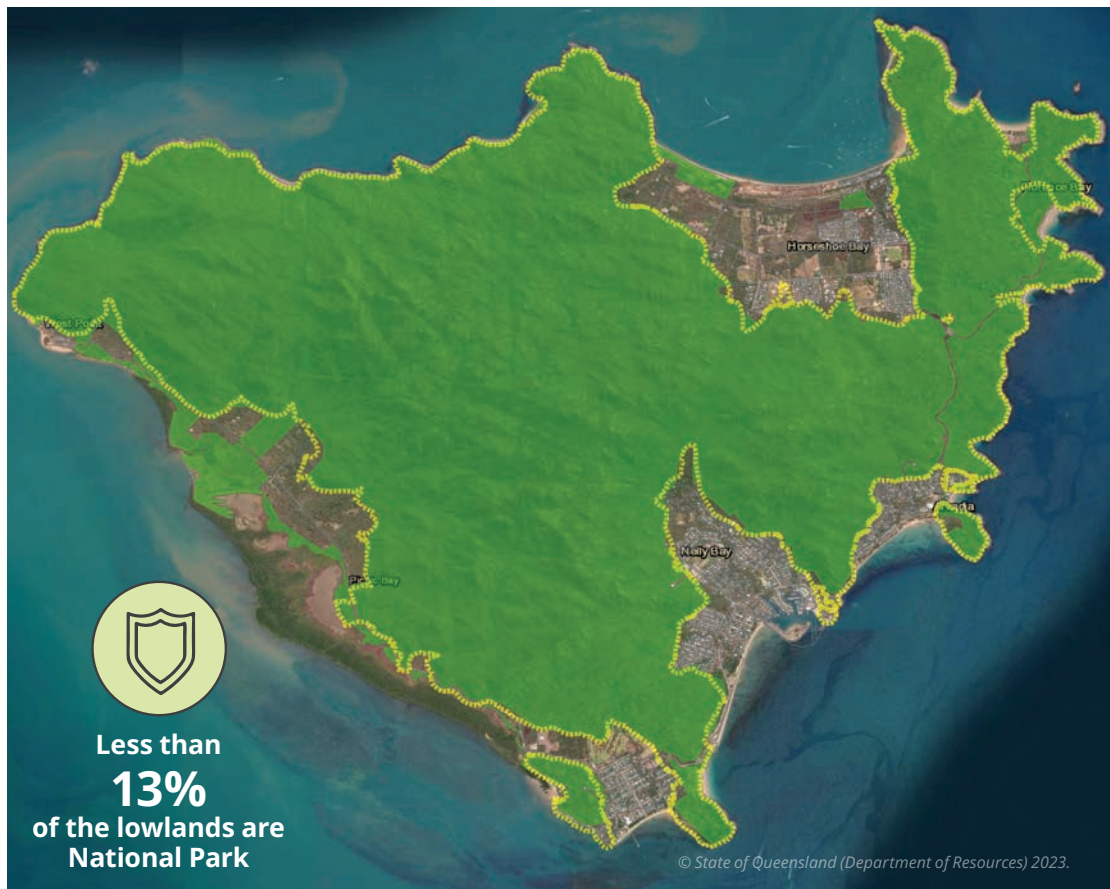
The National Park and Conservation Parks are shown in green, and largely coincide with the dotted line. The highlands are well protected!

However the lowland ecosystems have little protection, with less than 13% of the lowlands in National Park.

The lowlands are not only important for maintaining the Island's World Heritage Values. They are also where residents and visitors mostly spend their time, so they are particularly important for presenting and experiencing the World Heritage Area.

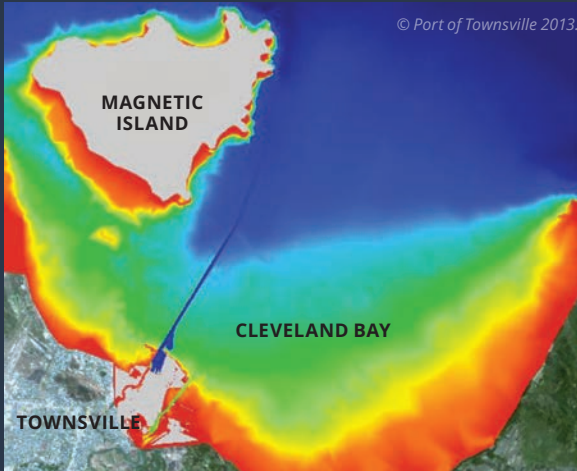
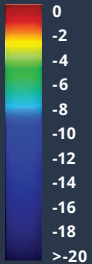


Less than
13%
of the lowlands are
National Park



5. Marine environments

LEGEND
Bathymetry
(mAHD)



Why are there so many different marine environments around the Island?

Its triangular shape and sheltered western side provide a wide range of depths, substrates, and exposures to winds, waves and currents.

This has provided perfect conditions for the development of a wide range of reefs, sea grass meadows, and other marine habitats.

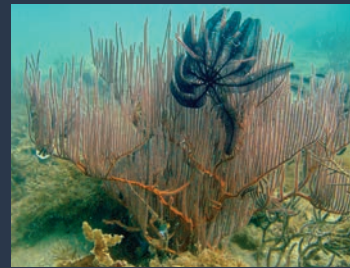
The Island's habitats significantly boost the overall habitat diversity of Cleveland Bay.



Coral reef.



Burrowing giant clam.



Soft coral and brittle star.



Red hermit crab.

5.1 Cleveland Bay



Cleveland Bay is a biodiversity “hotspot”: its extensive sheltered shallows and wide habitat diversity make it a regionally significant refuge for many marine species.

Cleveland Bay and the waters around Magnetic Island support a very high diversity of sharks and rays, as well as green sawfish and a tiger shark nursery.

Whales that have been recorded include pilot, false killer, pygmy blue, and humpbacks. There are also important local populations of the Vulnerable snub fin and humpback dolphins.

The extensive sea grass beds are crucial habitat for the southern population of dugong, significant feeding habitat for the green turtle, and provide important nursery habitat for many fish and invertebrate species.



Tiger shark.



Dugong.



Green turtle.



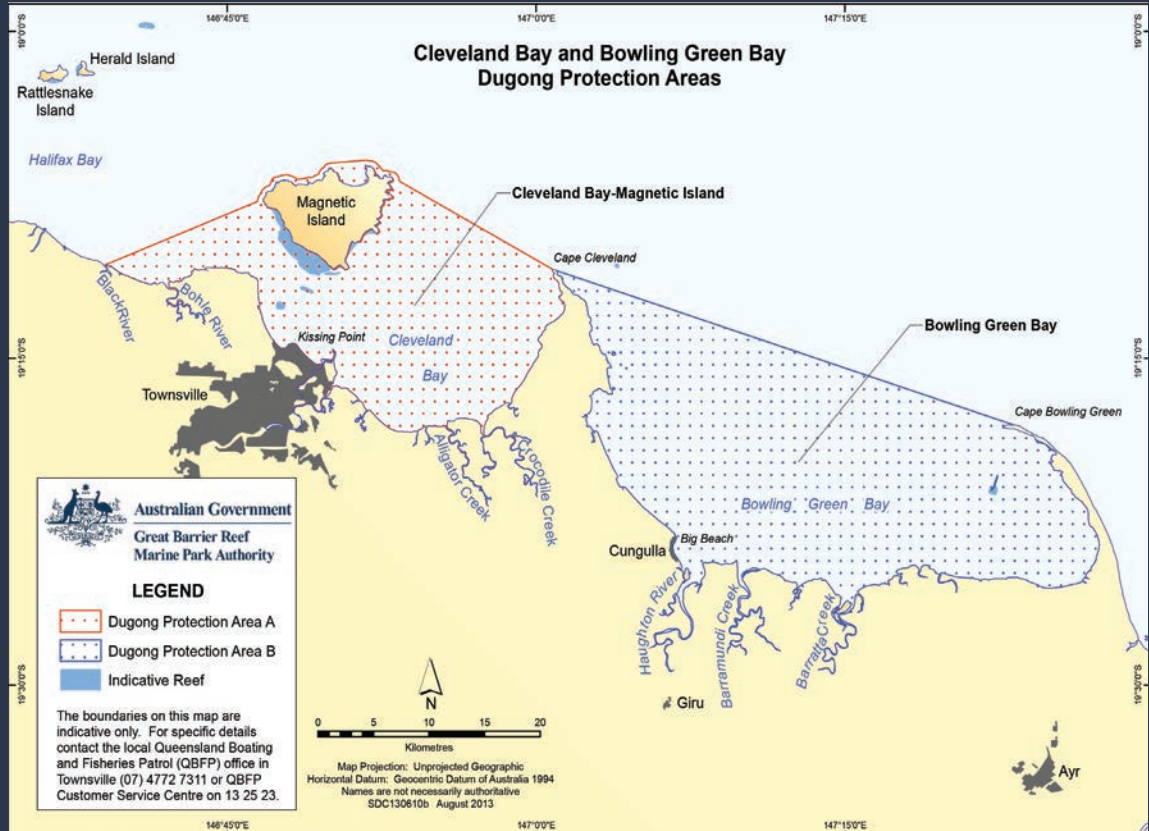
Green sawfish.



Dugong Protection Area

Cleveland Bay and most of the waters around Magnetic Island are Dugong Protection Areas, and trawling is no longer permitted.

This is allowing the recovery of the numerous benthic (bottom) communities as well as the crucial sea grass beds. It has also benefited many of the other marine plants and animals that live in this part of the World Heritage Area.



5.2 Fringing coral reefs



The Island's best known marine environments are its fringing reefs. The larger ones are indicated here. They are unique in the dry tropics for their wide variety and their ease of access.

Reefs on the south-eastern side are the best developed platform reefs. The less silty conditions means some corals on the reef slopes extend to depths greater than 10 metres.

On the north-western side the water is less clear and the corals on the rocky shoreline only extend to a depth of about 4 metres. This area is still relatively poorly known.

The south-western channel, between the Island and the mainland, supports the largest reef flats in this region. They still show the lingering impacts of past dredge spoil dumping. Their reef slopes are in better condition than the flats due to the cleansing effect of tidal currents.



The fringing reef at Geoffrey Bay.



Nudibranch.



Blue spotted ray.



Beaked coralfish.

5.3 Seagrass ecosystems

Thirteen unique combinations of seagrass species and substrate have been mapped, shown by the different colours on the map.

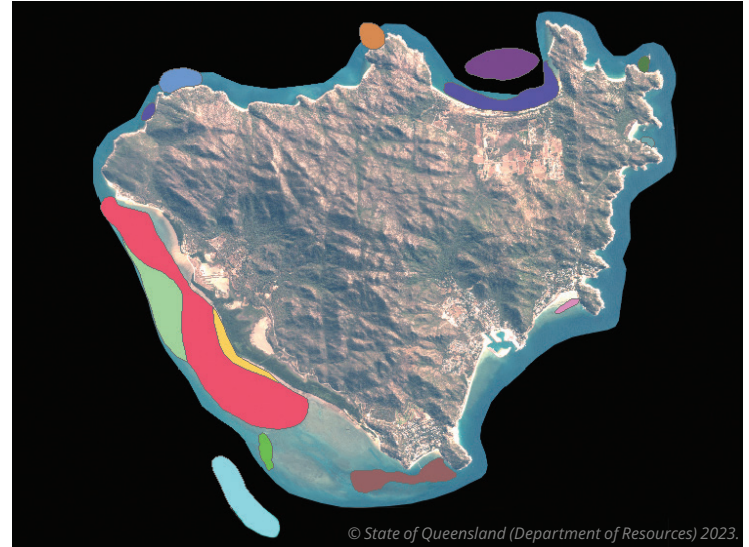
The Island's seagrass ecosystems support the third highest number of seagrass species found anywhere in the World Heritage Area, with eleven species known.



3rd
highest number
of seagrass
species in WHA



11
known
seagrass
species



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Seagrass meadows near Cockle Bay.



Seagrasses are critical dugong food.



The tidal flats on the western side are critically important summer feeding habitat for migratory waders, including the Endangered eastern curlew.

The reclusive and Vulnerable beach curlew finds refuge here and along other beaches **where it is not disturbed by the presence of people or dogs**, as do many other shore birds such as pied oystercatchers and red capped plovers.



Bar-tailed godwit.



Pied oystercatcher.



Beach stone curlew..



Eastern curlew.

With such a diversity of marine environments, and over 40km of shoreline, the Island is also important for marine associated birds of prey such as the sea eagle, brahminy kite, and osprey. There is a high density of nesting for these species.

The Island is also a refuge for rocky shore birds such as the sooty oyster catcher and reef egrets.

*TOP Left: Brahminy kite. Right: Sea eagle.
BOTTOM Left: Osprey. Right: Sooty oystercatcher.*



Over
40km
of shoreline



16
species of
shorebirds
are summer
migrants to the
Island



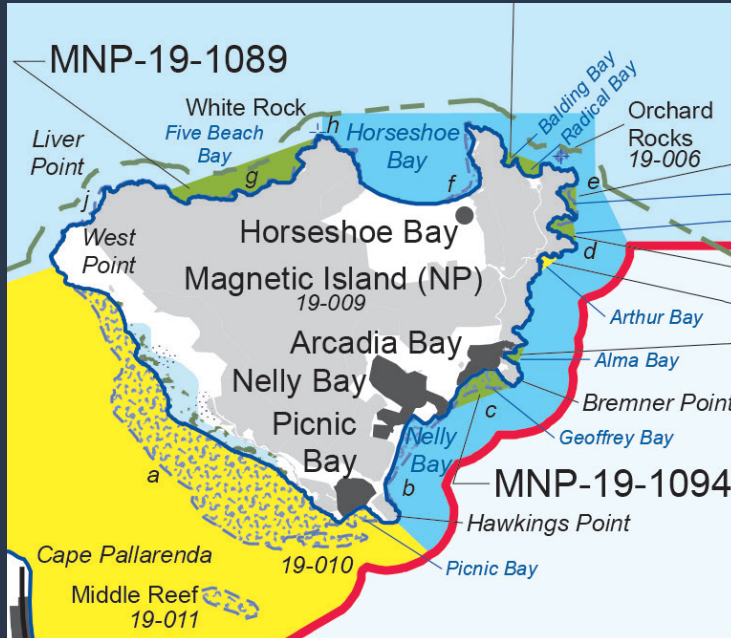
5.4 Protected marine areas

Except for the Cackle Bay reefs and those in Horseshoe Bay, the best developed reefs on the Island are in Marine National Park (Green Zone).

These “no-take” zones allow fish and other species to increase and replenish other areas.



Fines up to
\$2,200
apply for fishing
in Green Zones







6. The Residential Bays of Magnetic Island

The small size of islands, and their isolation, means that many of their plants and animals have relatively small populations, so they are vulnerable to extinction.

On Magnetic Island, for plants and animals whose stronghold is the lowlands, this vulnerability is increased by the relative isolation of the different bays from each other, especially for animals that are less mobile, and plants whose seeds are not spread by wind or animals.

Each bay has a contribution to make to the maintenance of the Island's World Heritage values.

The following sections indicate the broad changes that have happened in the settled bays and some of the more important areas for maintaining the Island's natural values for future generations.

6.1 Cockle Bay to West Point



1979

The western side of the Island retains a rich aboriginal heritage, with numerous middens showing old living sites, and trees that still bear scars of bark collection for various purposes.

The lowlands were surveyed and leased from 1915. West Point was surveyed and offered to auction in 1923.

Access was difficult and mostly by water until the late 1980's so clearing was largely limited to small areas for market gardens and small orchards.

In the late 1960's CSIRO leased and cleared two large areas for tick and cattle research. There has been little clearing since then.



2019

The western side still has the most extensive and least disturbed areas of lowland ecosystems remaining on the Island. It also has a very high diversity of both plants and animals.

It has the highest proportion of lowlands protected under the Queensland Nature Conservation Act (green).

The tidal and sand dune ecosystems are largely protected within Marine Conservation Park (see map on page 33) or Conservation Park (green). About half of the ecosystems on alluvials and old red soils are protected by landholders in permanent Nature Refuges and on land purchased by Magnetic Island Nature Care Association for nature conservation.

The large blocks and limited development ensures clean runoff and good water quality for the extensive tidal and marine environments that lie off-shore.

The western side also provides the visual integrity of the Island from the mainland.

6.2 Picnic Bay



1961

Picnic Bay was settled early for residences and tourism rather than agriculture. Many of the original trees were kept in back yards and as street trees.



LEGEND: Freehold Lands lease National Park Reserve and State Land

2019

The golf course is on the old red soils and has strips of mature trees with high conservation value.

The council land between the golf course and the Transfer Station is one of the largest areas of the old red soils remaining on the Island, and forms an important habitat corridor between two sections of the National Park. It is the recharge area for a significant wetland — its deep soils absorbing heavy rain and slowly discharging it to the wetland.

The old schoolyard retains a significant patch of bush, while the adjoining Butler Creek largely retains its fringing band of paperbark trees.



6.3 Nelly Bay

1961

Although parts of Nelly Bay were cleared for farming, extensive areas were left largely undeveloped due to flooding or poor soils. Several of these areas remain, including what is now the Nelly Bay Habitat Reserve, the land between Kelly Street and Compass Crescent, and parts of the headwaters of Gustav Creek.

The beautiful beach, estuary and tidal flats associated with the mouth of Gustav Creek, and most of Bright Point, were lost for the canal estate, marina and port complex.



LEGEND: Freehold Lands lease National Park Reserve and State Land

2019

The upper part of Gustav Creek has the largest area of lowland vine thicket on the Island, an Endangered ecosystem with a number of rare and threatened plants.

Other important areas in these upper parts are small patches of woodland on old red soils.

The area between Compass Crescent and Kelly Street is the largest area of eucalypt woodland on alluvial plains remaining in Nelly Bay. It includes a broad drainage depression running into a swamp near Sooning Street. This is a significant recharge area for the bay. Downstream drainage from here through the dunes is being increasingly disrupted by the filling of low-lying areas such as the drainage depressions between the dunes.

The Habitat Reserve and the adjoining National Park on the dunes towards Nomads include a large area of vine thicket on dunes and a well-developed estuary. Turtles regularly nest on this stretch of beach.

6.4 Arcadia

THE GARDEN CITY OF ARCADIA
 THE MANLY OF THE NORTH
 MAGNETIC ISLAND

A PLAYGROUND FOR THE YOUNG
 A SANATORIUM FOR THE OLD
 A SOUND INVESTMENT FOR ALL WHO BUY

COSTS FROM £40
 Superior in 5%
 TO THE DEVELOPER

HEALTH & PROFITS
 To the INVESTOR
 To the HOME BUYER
 To the CHILDREN
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WHAT WILL THE PRICE BE 5 YEARS HENCE?

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 £5 DOWN,
 Balance £2 Monthly.
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 Buy as many Blocks in ARCADIA
 as you can **NOW, & HOLD THEM.**
 You are buying ahead of Development.

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LOCALITY
 Arcadia is finely situated overlooking Corbridge and Alva Bays. All the elements of amenity with health advantages are here. The climate provides permanent open views across the Pacific, and during the summer months the Ocean breezes will cheer and cool the young and old alike. Every square in the City is Regularly Watered (Horticultural Dept.)

BUYERS OF ARCADIA
 No one can afford to neglect this opportunity.
FIRST - The Garden City of the West (Australia) is the only one of its kind in the world.
NEVER can be replicated.
SECOND - There is only one place in the world where you can get a better view of the world than from the top of the world.
THIRD - You will have the best of both worlds.
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 It is the only one of its kind in the world.
 It is the only one of its kind in the world.

MANAGER & Subdivision Expert
J. SIDNEY BARTLETT
 PHONE 1108 PO BOX 289

1928

Arcadia was originally subdivided as a “garden estate”, so although the blocks were relatively small, many street trees were kept, as were areas of parkland and a generous coastal esplanade.

Left: Promotional flyer for subdivision 1928 (Courtesy Qld State Archives).



LEGEND: Freehold Lands lease National Park Reserve and State Land

2019

The coastal esplanade and the estuary of Petersen Creek are now a major part of the remaining natural heritage of Arcadia.

The tidal flats of Geoffrey Bay became even more important for threatened and migratory shore birds following the loss of the Nelly Bay sand flats. Most of these waders are now rarely seen due to the number of unleashed dogs running in the intertidal zone.

The "rare vine thicket" is a nationally Endangered ecosystem. It still has a tenuous connection to other natural areas.

6.5 Horseshoe Bay



1961

Large areas of Horseshoe Bay were cleared for agriculture, with pineapples the most grown crop. Several mango plantations were also established.

The clearing occurred mostly on the better drained soils around the margins of the bay and few mature trees remain in these areas.

The central wetland areas were left largely undeveloped.

Endeavour Creek mostly ran behind the dunes all the way to the eastern end of the bay.



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LEGEND: Freehold Lands lease National Park Reserve and State Land

2019

Horseshoe Bay still retains many areas of undeveloped land and regenerating cleared land. Significant areas are in Council reserves (bright green) and protected in privately owned Nature Refuges.

The three areas of greatest value are the coastal zone, the central floodplain complex feeding into the Horseshoe Bay Lagoon Conservation Park, and the woodlands to the west of Swensen Street.

Natural drainage in the coastal zone has been disrupted by a number of small dams and an undersized culvert under Horseshoe Bay Road.

After Bolger Bay, Horseshoe Bay is the most significant bay for maintaining lowland World Heritage Values.



7. Looking after our World Heritage Island

Most of the islands in the Great Barrier Reef World Heritage Area are entirely National Park.

Magnetic Island is unusual in having large areas of privately owned land, and a relatively large urban population. This makes the protection of its natural values complicated, but especially important!

7.1 Magnetic Island residents

If you're fortunate enough to own or rent property on Magnetic Island, your property is part of the World Heritage Area too. It may seem that some of the privately owned and cleared blocks on Magnetic Island have little World Heritage Value, but all parts make a contribution to the whole.

Is there an old poplar gum or bloodwood in your garden? Do curlews rest under the shade of your trees? Do possums and bats eat the fruit growing in your garden? Does water flow from your yard? Your yard may be influencing the Island's biodiversity more than you think.

Can you help protect, enhance or restore World Heritage Values on Magnetic Island? Yes, you can!

The following pages outline some of the threats to the Islands values, and some simple solutions.

7.2 Island threats and solutions

Threat: Tree loss

The bays of Magnetic island, seen from the sea, seem have an almost continuous tree canopy. It is part the island's beauty. Trees can cool a suburb by 5 degrees, and they help break strong winds. Trees not only shade the ground, they provide long lasting habitat. Some trees in our bays are older than European settlement, and their hollows are critical shelter for many animals.

Removing trees not only removes food, shelter and homes, it opens bigger gaps in the canopy. This makes the surrounding habitat more exposed to the drying sun and winds, increasing the impact of the loss.

Solutions:

1. Keep as many native trees on your land as possible, particularly taller trees and especially trees with hollows.

Hollows are crucial for many animals that depend on them for nesting or shelter, but take hundreds of years to form. Once lost they are unlikely to be replaced. Large trees feed many species, and tall trees are important for birds keeping an eye and an ear on their territories. The most important lowland trees are poplar gums, bloodwoods, Moreton Bay ash and paperbarks. If you need help identifying your trees contact one of the groups on the back page.

2. Plant local trees, and help increase habitat connectivity.

Native species need less water and fertiliser, and provide better habitat. Use seed or seedlings from Island plants if possible. Native species retained, self-seeded or planted across adjoining yards make a big patch of habitat. Encourage friends to appreciate how important trees are.



Threat: Habitat loss

This booklet highlights the importance of our precious lowland habitat for supporting many of our island plants and animals. However Island blocks are frequently cleared before being sold, or cleared immediately by the new owner prior to building.

It's not just the loss of trees, it's the loss of all the understory plants and the creatures that depend on them.

Solutions:

- 1. If your block was cleared, or, like many, has been significantly modified, it has great potential to be shaped into a shady nook, rich with habitat and island animals. There are many beautiful, dry-tolerant, fertiliser-free natives that are waiting to return to your garden!**

Many island natives are also self seeding and will regenerate naturally if protected. By keeping them and taking out the weeds, new habitat is easily created. If you need help identifying young seedlings that pop up, there are useful contacts and information sources on the back page.

- 2. Small trees and shrubs protect little birds from currawongs and other predators.**

While Island native seed stock is best, other natives are also available from the Dry Tropics Nursery at Rowes Bay. Shrubs with small tubular flowers, such as grevilleas, are excellent for honeyeaters and provide good refuge. Thicken up young shrubs by tip pruning them for the first 6 months. Place

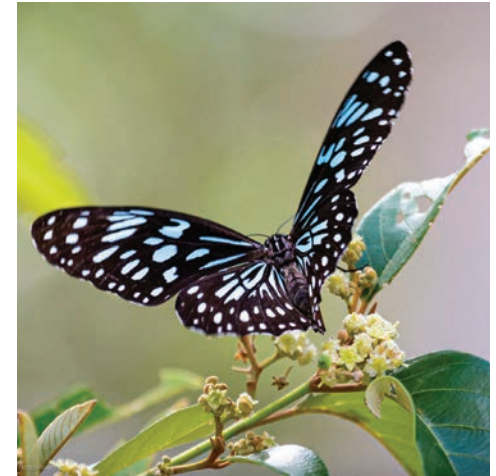


bird baths nearby so the shy birds can easily escape for cover. Make sure you keep the container clean and change the water daily.

3. Create ground habitat for lizards by leaving leaf litter and old branches in patches.

An old log provides habitat, and a place for lizards to sun themselves while watching their domain.

4. Keeping leaf litter and prunings as mulch helps keep the ground moister and cooler and is an important part of soil health.



Threat: Weed invasion

Unless controlled, weeds will take over our lowland habitats and spread into the National Park.

Solution: Control weeds at their source

1. Learn to recognise the worst weeds so you can remove them before they cause problems.

Early detection and treatment of invasive weeds, before they go to seed and spread further, is critical.

2. Ensure garden plants do not spread from your garden into surrounding areas to become weeds.

Plants with windblown seeds, or with fruit that is spread by birds, are the greatest threat. Their seeds can be spread anywhere.

3. Compost your cuttings, don't throw them over the fence into the bush.

Seeds germinate, and succulents and vines can take root and spread. Put the worst weeds in the garbage, not the green tip!

4. Join a local weeding group to help manage weeds, learn more about our island, and make new friends. See the back page for details.

Above right: Blue thunbergia is strangling and smothering old bloodwoods, while snakeweed covers the ground.

Bottom right: MINCA and Magnetic Island National Park Volunteers removing weeds along the West Point track through Bolger Bay Conservation Park.



Threat: Alterations to natural water flows

Natural flow paths slow water down so allow more infiltration to the ground water.

When natural flow paths are blocked for development, or partly filled to level the site, there is less storage capacity for runoff, and flow is concentrated.

Solution: Maintain or restore creek lines, wetlands and natural flow paths

Creek lines are a critical feature in each bay: they provide habitat corridors, and they flow directly into the Marine Park.

They are an important refuge for plants and animals that need shelter, shade and moisture, and they provide abundant seasonal food resources. They also need a little room to change course. Disturbance at one point will almost invariably affect downstream areas.

There are less obvious flow paths, that may only flow for a short time in the wet season. Usually it is easier to live with these short flows than fight them.

For new builds, ask your neighbours what happens in a bad wet season. Try to accommodate your design to live with the inevitable.



Threat: Chemicals

Pesticides, herbicides and fertilisers are easily leached into the ground water and out into the surrounding marine environments.

Corals and seagrasses are highly sensitive to these pollutants, even very dilute traces of herbicides can damage them. Fertilisers cause blooms of seaweed in amongst the corals.

Rat poison can kill owls and other birds of prey if they feed on a rat carcass.

Solution: Reduce chemical use and use alternatives

Avoid toxic chemicals, and use natural based fertilisers such as Dynamic Lifter sparingly, especially in the wet season.

A healthy garden needs insects as predators and for pollination. Chemical pesticides don't distinguish between a butterfly and an aphid.

Alternative pesticides include those based on plant oils such as citrus and neem tree oil, or plant extracts such as pyrethrums and hotpepper based sprays. These will help kill unwanted insects, but they still need to be used carefully.

For more information on environmentally friendly gardening visit the ABC Gardening Australia website at abc.net.au/gardening. Get local information, and share your knowledge via the Maggie Island Gardeners Facebook page.



Threat: Unnecessary feeding of birds

Feeding advantages some animals to the disadvantage of others. Seagulls deter other shore birds. Currawongs eat small birds, their eggs and their babies. Cockatoos dominate the scarce tree hollows.

Encouraging bird gatherings can also spread diseases such as the highly infectious psittacine or beak and feather disease. Mince and bread can cause malnutrition and poor health.

Solution: Please don't feed the wildlife

Create a native garden! This will provide long lasting food and shelter for birds and other animals. If you can't resist feeding our native birds find out what is safe to feed them and follow Urban Ecologist Darryl Jones' golden rules for bird feeding:

- **Cleanliness.** Sweep up any left overs and spray the feeding surface with a mix of water and vinegar. Dry and then place new feed. **Do this daily as the spread of disease is a significant risk.**
- **Provide a Snack.** Not a meal. Just a little bit of food goes a long, long, way.
- **Enjoy – because really, you're feeding the birds for yourself,** not for their benefit

Put out fresh water daily: Keep the containers clean.



Threat: Road kill from speeding, especially at night

Our Island's iconic native animals give us much pleasure, and are among our most precious assets for drawing visitors. But do we properly appreciate their value? Each year hundreds are killed, or are badly injured and left to die a painful death. Speed is usually the cause.

Killed and injured animals on the island include koalas, wallabies, echidnas and possums. There are often young in their pouches. Snakes, monitors, blue-tongues and birds are also vulnerable.

Solution: Drive with care

It is particularly important to drive slowly and carefully at night when many animals are active. Reptiles and night birds often rest on the road at night to absorb warmth.

If you see a fresh road death please check the pouch. Island wildlife carers may be able to save the joey or pug. (Carer phone numbers are on the back page).

- **The speed limit on Island roads is 50 kph unless otherwise signposted.**
- **The West Point Road has a 40 kph speed limit.**

RIGHT: (Top) This jumble of feathers is the remains of a large-tailed nightjar on the West Point Road. (Bottom). The Island is a refuge for rock wallabies.



Threat: Unconfined cats and unleashed dogs

While pet cats may not seem to be as destructive of our native animals as feral cats, their higher numbers means their impact can be just as great, especially on lizards and birds. Cats can also be carriers of *toxoplasmosis*, a parasite deadly to many of our native animals and that can cause serious health problems in pregnant women and people with compromised immune systems.

Loose dogs are a danger to wildlife, other dogs, and people. Many koalas have been attacked and killed by dogs on the island.

When dogs chase birds it discourages them from coming to the Island, and diminishes the Island's biodiversity.

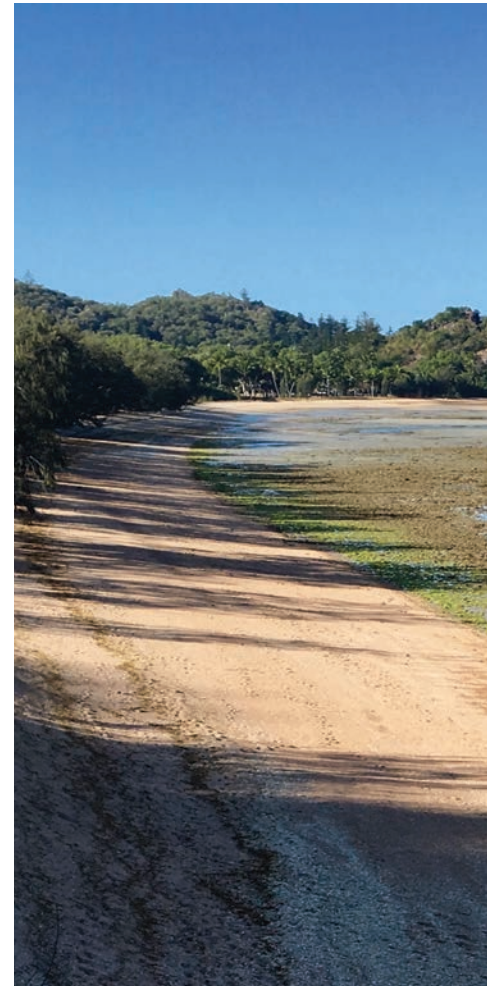
Solution: Be a responsible pet owner!

Cats: Must be, by law, confined to the owner's property, or on a leash. It is safest for them if they are kept inside at all times.

Dogs: There are no off-leash areas on the Island, so dogs must be on a leash when you leave your property. Dogs are NOT permitted to enter any part of the Island's National Park, even on a leash.

Dogs on beaches: Migratory birds rest and feed on our beaches, and there is a narrow window for feeding when the tide is low. Chasing birds may be fun for your dog, but it stops them feeding and puts these already vulnerable birds at greater risk.

Right: Geoffrey Bay was once a haven for threatened and migratory shore birds. They are now rarely seen due to the number of unleashed dogs running in the intertidal zone.



Threat: Fire

During the annual dry season, the Island dries out and heats up and fire becomes an increasing risk for our plants, animals, people and property.

Beach fires come with a risk and a cost. With a strong sea breeze, sparks can get away and cause a dangerous bushfire. The hot ashes of a beach fire remains a fire risk the next day, and a hazard to the beach users.

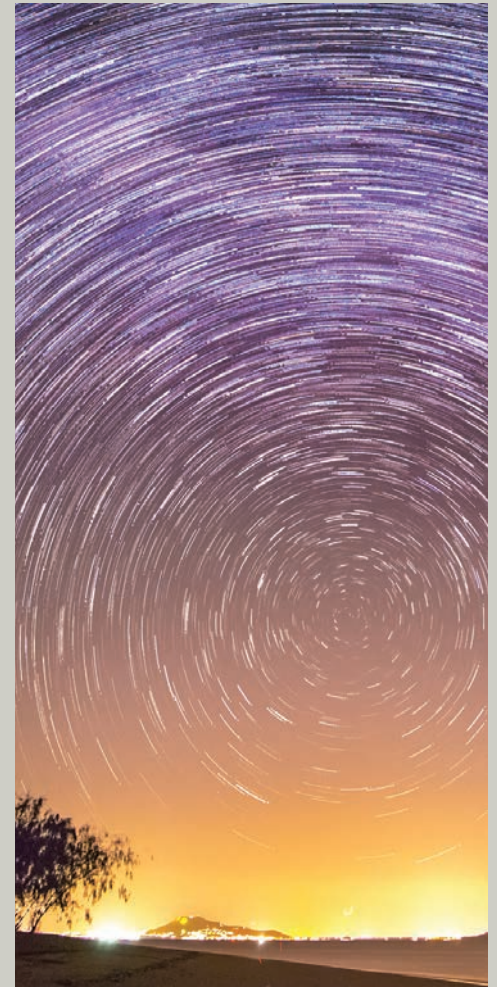
Our native plants are the foundation of the island's food web. Even when dead they provide shelter and habitat.

Firewood collection, including driftwood, is not permitted in the National Park or on any other public land.

Solution: Enjoy the night sky

Choose not to have a fire, and enjoy the night sky without a fire's glare. You're more likely to glimpse a meteor!

Fires can be reported to 000



7.4 Marine threats and solutions

The consequences of global warming for marine environments is now well known, including coral bleaching and the insidious effects of increasing ocean acidity.

There are other pressures too, but these other pressures are more easily solved. They include:

- Increased sediment and nutrient loads from the Burdekin River
- Dredge spoil associated with the Port of Townsville
- Contaminated groundwater and stream flows discharging from the Island into its bays
- Overfishing
- Poorly managed nets and crab pots
- Fishing and fish feeding in Green Zones
- Drum lines set to catch sharks, and
- General pressures from increasing levels of human use.



Threat: Pollution from island runoff and contaminated ground water

In the wet season, runoff from heavy rain can carry all sorts of material into the marine environment, including rubbish, fertiliser, garden chemicals and soil.

While the marine environment can recover from excessive freshwater, the pollutants stress and can damage marine plants and the filter feeders that dominate the reefs.

Solution:

- Maintain good ground cover to prevent soil erosion
- Use sediment barriers to trap erosion from construction sites
- Avoid herbicides and pesticides in your gardens, especially near waterways and especially in the wet season
- Connect to the sewerage system if possible.

Top: Water flows clean into the bays from the National Park. Bottom: In the wet season high water tables and urban runoff can have a significant impact on the water quality of the creeks.



Threat: Unsustainable practices on and in the water

Our surrounding waters, reefs and sea grass areas are precious dugong, sea turtle and snub-fin dolphin habitat. They are also calving and nursery grounds for humpback whales.

The Island Marine Park Green Zones in our most popular bays provide safe habitats for fish to grow and spread to surrounding areas. These fringing coral reefs and their inhabitants are vulnerable to damage when we go boating, fishing, diving or snorkelling.

Solutions:

- Be careful driving boats and keep an eye out for dugongs, turtles and whales. Many dugong and turtle suffer from, or are killed by propeller strikes.
- Fish responsibly and respect the zoning rules and bag limits.
- Respect the Green Marine Park Zones - these are no-take areas, so no fishing, collecting or feeding fish (fines up to \$2,220 apply).
- Carefully manage nets and crab pots: If you can't check them regularly, remove them so young turtles and other air breathers are not trapped and drown.
- Wear stinger suits for sun protection instead of sun creams, and avoid insect repellents before swimming. Both are harmful to marine species.
- Be careful not to anchor on coral. Use a mooring buoy if you can, or find a patch of sand.
- When snorkelling avoid walking on coral or kicking it with your fins.



Threat: Maintenance dredge spoil

The most widespread and pervasive threat however is the continuing impact of maintenance dredge spoil. The impacts of this dumping, and a solution, are outlined in the following pages.

Capital dredging is where sea bed is removed to deepen or widen the shipping channel or port. This spoil is solid and used for fill in the port expansion.

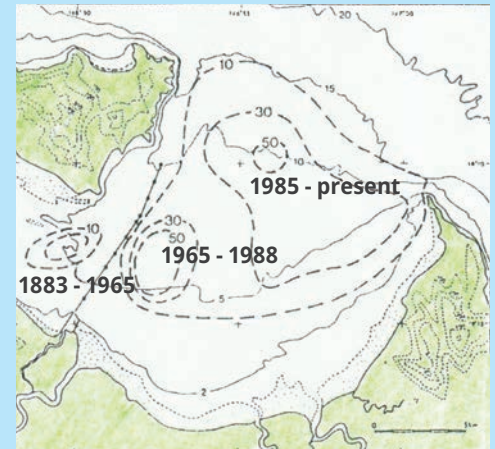
Maintenance dredging happens every year to remove the fresh silt that accumulates in existing channel and port areas. This spoil is largely liquid and is dumped at sea.

The first dump site near Middle Reef (used between 1883 and 1965), and the subsequent site on the other side of the shipping channel (1965 to 1988), show as discrete mounds of recent sediment over the original bay bottom.

The current dump site for spoil from maintenance dredging lies between the island and Cape Cleveland, in waters 12 to 14m deep. Being so shallow, the dumped spoil is re-suspended by wind every two or three days (on average) and redistributed by currents. This remobilised spoil has a significant influence on the health of Magnetic Island's marine environments.

The mound associated with the current dump site has spread to cover most of Cleveland Bay.

Top: Maintenance dredging. Bottom: This map shows the way past and present dump sites can be identified by their low mounds of accumulated spoil (contours are height in centimetres). Reference: Pringle, A.W. (1989) A History of Dredging in Cleveland Bay, Queensland and its effect on sediment movement and on the growth of mangroves, coral and seagrass. Townsville Port Authority and GBRMPA.



Dredge spoil impacts: Cockle Bay



1930

By 1930 silt from the dredge spoil dump on nearby Middle Reef was building up along the western side of the island, but a string of sandy beaches still stretched north from Cockle Bay beach.

Left: c1930 City of Adelaide at Cockle Bay and fenced enclosure off the beach. (Courtesy Magnetic Island History and Craft Centre - Gift of Rhonda Smith).



2016

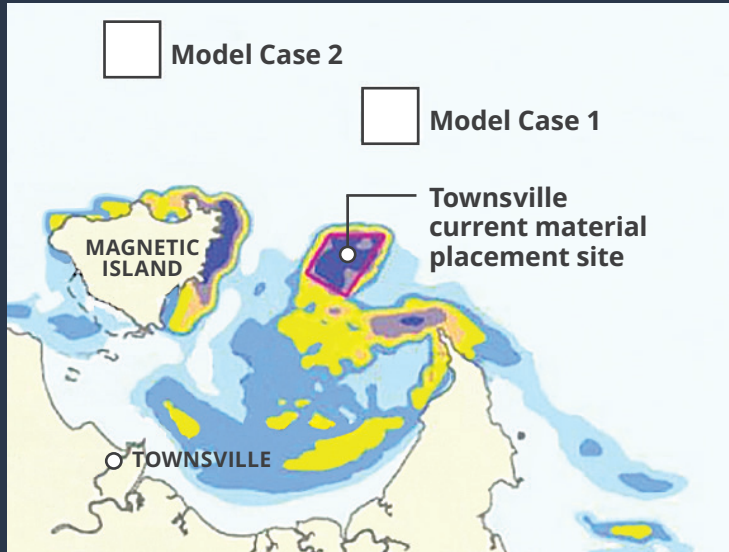
By 2016 the silt had built up sufficiently to support a broad band of mangroves and the string of sandy beaches had disappeared.

When the dredge spoil is resuspended it moves around the bay, and the island waters, coating and smothering the marine environments with a fine layer of silt.

The cloudy water caused by the silt reduces the amount of sunlight reaching reef and seagrass communities. This slows their recovery from natural disturbances such as cyclones and floods.

Dredge spoil impacts: Movement from current dump site

The darker colours show where most of the dumped maintenance dredge spoil is likely to end up 45 days after the completion of the annual maintenance dredging program, following its redistribution by waves and currents around Cleveland Bay. Each year up to 450,000 cubic metres of spoil is dredged from the channel and dumped at the entrance to the bay.



The modelling clearly shows that the major impact from the current dump site is on the Marine Park Green Zones of the eastern bays of Magnetic Island, including the most accessible and popular reefs, and the most loved beaches.

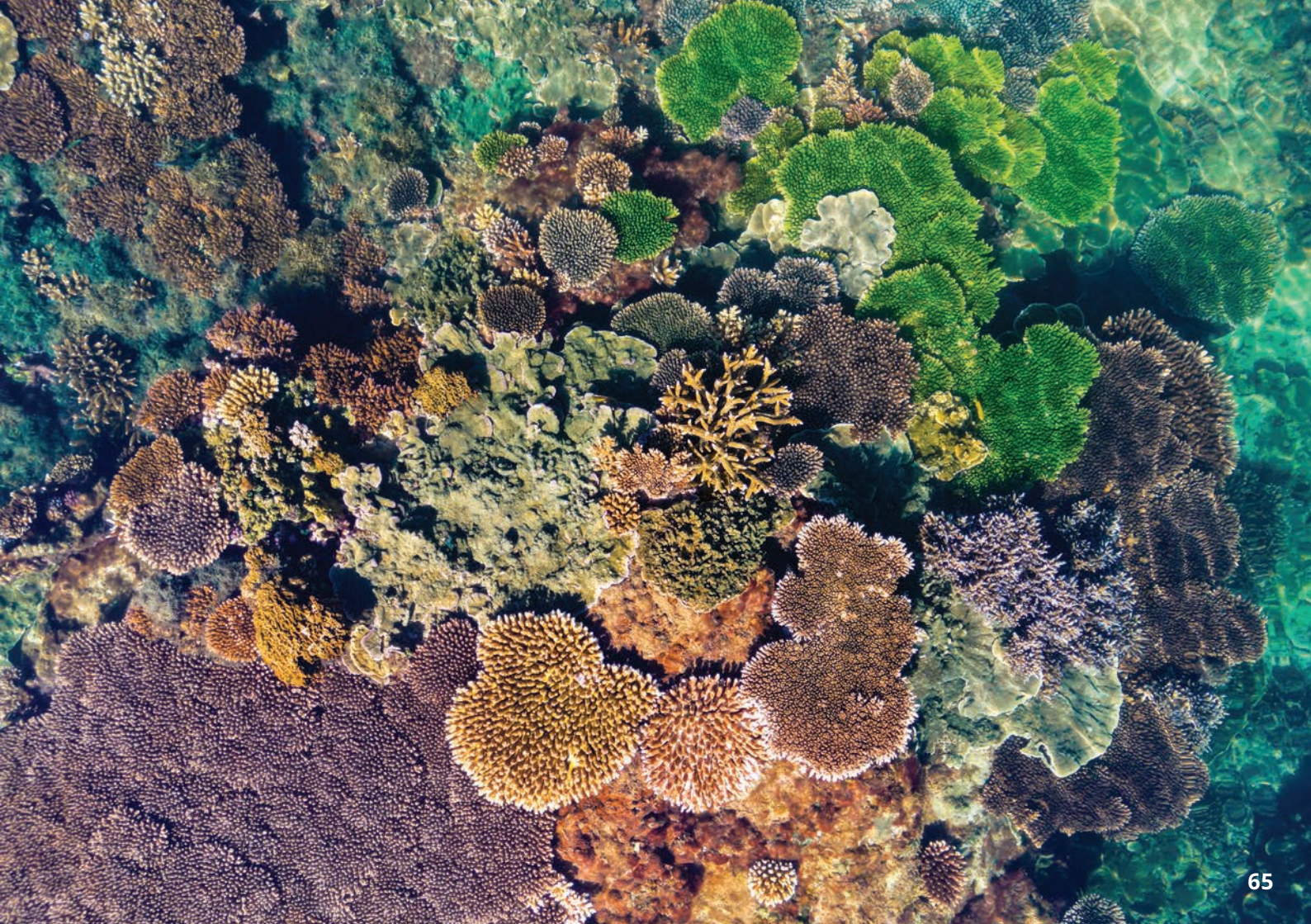
Solution:

Moving the maintenance dredge spoil dump into deeper water where the spoil will not be disturbed and redistributed is the most effective management action that can be taken to increase the health and resilience of the island's reefs and other marine environments.

The "Model Case 1" site, with a depth of approximately 24 metres, is one site that should be investigated as soon as possible so that impacts on the island's World Heritage Values can be minimised.

Left: Dredging period 45 days: Showing predicted total bottom thickness of silt (SKM 2013 Appendix E Fig. 116).

Reference: SKM 2013, Improved dredge material management for the Great Barrier Reef Region, Great Barrier Reef Marine Park Authority, Townsville.



8. Governments have a large role to play



The Australian (Federal) Government is the signatory to the World Heritage Convention and is ultimately responsible for the protection and conservation of the Great Barrier Reef World Heritage Area.

The waters around the Island are mostly in the Great Barrier Reef Marine Park and are the responsibility of the Great Barrier Reef Marine Park Authority. Day to day management is done for the Authority by the Queensland Parks and Wildlife Service.

The largest land manager on the island is the Queensland Parks and Wildlife Service. They have overarching responsibility for Magnetic Island National Park and the lowland Conservation Parks such as Horseshoe Bay Lagoon Conservation Park.

The second largest land manager is the Townsville City Council. It is the decision maker for most development proposals on freehold land, and manages road and other reserves for the State Government. It has the major influence over the protection of the World Heritage values that remain in Magnetic Island's urban areas.

Individual landholders, and the community in general, also have an important role, particularly in minimising their day-to-day impacts on the World Heritage Values and contributing to the restoration of degraded areas.

9. Working together

Protecting our Island's World Heritage Values is possible but it will need the community, business and all levels of government working together.

Agreeing that these values need protection is the first step.



Above: Watching the tide: a pair of Pied oystercatchers at Cockle Bay.

10. Further information

For further information:

- Magnetic Island Nature Care Association Inc.: minca.org
- Arcadia Coastcare: arcadiacoastcare.com.au
- Magnetic Island Weeds Guide: minca.org/weeds
- Some Magnetic Island Plants: sOMEMagneticIslandPlants.com.au

References:

Jacks, B. R. (2010) Plants of Magnetic Island. James Cook University
<https://researchonline.jcu.edu.au/18043/>

Kenchington, R. and Hegerl, E. (2005) World Heritage Attributes and Values Identified for Magnetic Island and the Surrounding Marine Environment. Report prepared for the Australian Government.

Magnetic Island, Environment Protection and Biodiversity Conservation Act policy statement 5.1: dcceew.gov.au/environment/epbc/publications/magnetic-island-queensland-region-epbc-act-policy-statement-51

Wieneke, J. (1996) Birds of Magnetic Island.

World Heritage Convention: Great Barrier Reef: <https://whc.unesco.org/en/list/154/>



**Magnetic Island
Nature Care
Association Inc.**
minca.org

Weeding groups

Magnetic Island Nature Care
president@minca.org

Arcadia Coastcare
arcadiacoastcare@gmail.com

**Magnetic Island National Park
Volunteers:**
dixonbailey@icloud.com

Useful phone numbers

Magnetic Island Fauna Care Org
0457 634 732

Wallaby Refuge
0400 243 842

Magnetic Island Koala Hospital
0428 785 488

Marine Strandings
1300 130 372

Pollution Hotline
1300 130 372 (then select option 2)

Illegal dumping
1300 878 001