

## Lord Howe Island Marine Park: summary of natural values

### Introduction

NSW marine parks aim to conserve marine biodiversity, maintain ecosystem processes and support sustainable uses of the marine environment. Lord Howe Island Marine Park, one of six marine parks in NSW, is located 600 kilometres off the NSW north coast and 700 kilometres north-east of Sydney. The park covers an area of approximately 46,000 hectares of predominantly marine habitats, with additional small estuarine areas.

The marine environment is internationally significant, and contains the world's southernmost coral reef and the only fringing coral reef lagoon in NSW. The convergence of the warm East Australia Current with the cool waters of the southern temperate Tasman Current off Lord Howe Island results in a unique mix of temperate and tropical species, many of which are endemic to the area.

In 1982, Lord Howe Island and the surrounding waters were declared a World Heritage site, the first in NSW. To complement the island's World Heritage status, the NSW Government gazetted the Lord Howe Island Marine Park in February 1999. The Lord Howe Island Marine Park (Commonwealth Waters) was proclaimed in June 2000.



Lord Howe Island lagoon  
Photo: G. Kelly



Admiralty Islands  
Photo: M. Legge-Wilkinson



Australian Government

Department of the Environment, Water, Heritage and the Arts

Director of National Parks

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Lord Howe Island Marine Park supports a wide variety of uses, including:

- diving and snorkelling, sea kayaking, windsurfing, underwater photography, surfing, boating, beach activities and nature appreciation, all of which rely on the park's aesthetic and biodiversity values
- recreational and charter fishing, which rely on the provision of habitat for harvested fish and the maintenance of ecological processes.

The marine park contains important natural values that result in a rich and diverse marine environment. This document provides a summary of these values.

## Marine and coastal ecosystems

The marine park contains a wide range of habitats including the coral reef and associated sheltered lagoon, fringing reefs, sandy beaches, intertidal and subtidal rocky reefs, seagrass beds, mangroves, shelf habitats, deep seamount slopes and open waters, all of which support distinct groups of plants and animals.

### Subtidal reef habitats

Subtidal reef habitats dominate the coastline of Lord Howe Island, Balls Pyramid and associated smaller islands and islets. Reefs in the marine park can be separated into four main groups based on their general structure, depth and dominant benthic communities.



Linkia sea star  
Photo: J. Gilligan



Erscotts Reef  
Photo: S. Gudge

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**Sheltered inshore (lagoon) reefs** are located in the lagoon on the western side of Lord Howe Island at depths of less than 10 metres. They include shallow reef platforms, cemented rubble, gravel sheets, deep trenches and isolated depressions ('lagoon holes' which are up to 10 metres deep), and scattered patch reefs.

- The adjacent fringing reef shelters the lagoon reefs from ocean waves, allowing some species that are rare or absent on the open coast to thrive.
- Coral and seaweed communities exist close together, creating a rarely found habitat.
- Surveys of lagoon reef sites have identified 148 species of fish.
- A range of crabs and hermit crabs, shrimps, sea cucumbers, sea stars, feather stars and sea urchins occur on the lagoon's reefs.

**Open coast and nearshore fringing reefs** are located outside the lagoon, along the coastline of Lord Howe Island, as well as round Balls Pyramid, the Admiralty Islands and additional smaller islands and islets. They extend out to a depth of around 30 metres.

- Over 167 fish species and 48 mobile benthic invertebrates occur on nearshore fringing reefs.
- Around 83 species of coral grow on rocky substrate and form diverse fringing reefs.
- Many of the tropical coral species are at the southernmost extent of their distribution.

**Mid-shelf reefs** are located at depths of around 30–100 metres on the Lord Howe Island and Balls Pyramid shelves.

- Species found on the mid-shelf reefs include solitary hard corals, soft corals, starfish, sea urchins, crustaceans and often a dense cover of algae.
- Deeper waters support communities dominated by gorgonians.
- More than 78 species of fish, crab and squid have been recorded using baited underwater video surveys.



Beautiful sea urchin  
Photo: Marine Parks Authority



*Tripneustes gratilla* urchin aggregation  
Photo: J. Valentine, Aquenal

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**Seamount slopes** include reefs located at depths from 100 metres to the maximum depth of park waters at 1,800 metres.

- Suspension feeders dominate the fauna in this type of habitat.
- Many species found here are endemic due to the relatively small size of the seamounts and the large distance from other areas of similar habitat.

### **Subtidal soft-sediment habitats**

Soft-sediment habitats are extensive throughout the lagoon and occur on limited sections of the east coast of Lord Howe Island. They are also extensive on the shelf, where the habitat is dominated by sand and sparse rubble, and contains sand waves of varying sizes.

- Approximately 500 hectares or 65% of the lagoon floor consists of bare sand.
- Surveys from 13 soft-sediment lagoon sites recorded 68 species of fauna including 31 species of polychaete worms (segmented marine worms with bristles along the body), 16 species of molluscs and 16 species of crustaceans.
- Fish species associated with open, sandy floors on the shelf include the Galapagos whaler shark, large stingrays and silver toadfish.
- Ten fish species were identified as only occurring on the sandy, open seafloor.



Galapagos whaler shark  
Photo: S. Lindfield



Meyens stingray  
Photo: J. Gilligan

### **Intertidal rocky shores**

Intertidal rocky shores occupy a zone of transition between marine and terrestrial environments. In the rocky shore environment different habitat types include rock pools, channels and crevices. These habitats are quite complex with high levels of species diversity. The sheer cliffs around the coastline of Balls Pyramid result in an intertidal zone consisting of a fairly uniform band of exposed vertical rock wall.

- Many herbivorous fish and invertebrates are found low on the rocky shore due to a dense cover of algae.
- Rocky shores are important roosting and feeding habitat for many seabirds such as noddies and terns, and other protected seabird species.

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## Ocean and lagoon beaches

Sandy beaches on Lord Howe Island occur along the western lagoon shore and in three limited sections along the eastern side of the Island. The lagoon beaches are protected from the ocean swell by the fringing barrier reef located about one kilometre offshore. The beaches in the lagoon are composed almost entirely of carbonate sand with some basalt-derived 'black' sand at the southern end.

Sandy beach shallows are important nursery and feeding areas for a variety of fish and invertebrate species, and provide key feeding and roosting sites for seabirds and migratory wading birds.

## Seagrasses

Seagrasses occupy sheltered intertidal and shallow subtidal areas of the Lord Howe Island lagoon (to depths of at least 5 metres) and are not common on areas of the coast exposed to waves.

- The two most common seagrass species found in the marine park are eelgrass and paddleweed.
- Four hectares of seagrass occur in Hunter and North Bays at the northern end of the lagoon with other small seagrass beds found in sheltered waters around the island.
- Seagrass beds provide important habitat for a range of invertebrate species such as bivalve and gastropod molluscs, crabs, shrimps and polychaete worms. They are also important nursery areas for juvenile fish, such as garfish.
- Seagrass beds are important foraging grounds for green and hawksbill sea turtles and migratory shorebirds.



*Halophila ovalis* seagrass  
Photo: G. Kelly



Green turtle  
Photo: J. Gilligan

## Pelagic ecosystems

The convergence of the East Australia Current and the Tasman Current (see Introduction) results in a rare mix of temperate and tropical pelagic species.

The open ocean habitats are inhabited by a wide diversity of marine organisms including whales and dolphins; large pelagic fish such as marlin, sharks, sailfish tuna and dolphin fish, jellyfish and smaller invertebrates.

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## Estuarine ecosystems

Three small estuaries exist on the western side of Lord Howe Island, all of which border the lagoon and have small catchment areas. Soldiers Creek is the largest creek, while Cobbys Creek and Old Settlement Creek are much smaller and are infrequently open to the sea.

- Estuarine habitats are characterised by lower average salinity, lower dissolved oxygen concentration and pH levels, and more elevated levels of turbidity than the nearby lagoon.
- Two species of mangrove – the grey mangrove and the river mangrove – occur in the estuaries.
- Small stands of saltmarsh species, consisting of grasses, rushes and reeds, have also been recorded at limited sites on the island.

## Plants and animals

The waters of the marine park contain tropical, subtropical and temperate marine fauna and flora, many of which are endemic to the Lord Howe Island area.

- More than 1,500 species of snails and shellfish are likely to occur in the park, in addition to at least 70 species of crustaceans and 110 species of echinoderms (marine invertebrates, such as starfish or sea urchins, with an internal calcareous skeleton, and often spines).
- A total of 86 species of hard corals has been recorded, which is significant given the latitude of the park, the small size of the reef and the reef's isolation from other major coral communities.
- A total of 318 species of marine algae have been recorded, including 174 species of red algae, 68 of brown algae and 76 of green algae. Of these, 47 species (15%) are considered endemic.
- More than 500 species of fishes have been recorded, with approximately 440 documented in coastal inshore habitats.
- Approximately 16 endemic reef fishes have been identified. The most commonly seen are McCulloch's anemone fish, three-striped butterfly fish, double-header wrasse and the Lord Howe butterfly fish.



Three-striped butterfly fish *Chaetodon tricinctus*. Photo: G. Kelly



Juliana sea hare *Aplysia Juliana*  
Photo J. Gilligan

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- At least 12 species of sharks and rays are known from shallow inshore and shelf waters. Of these, the Galapagos whaler shark is by far the most common.
  - The most common marine mammals in the park are bottlenose dolphins, with humpback whales occurring seasonally. Occasionally, seals and sea lions also visit the island.
  - At least four species of turtle reside in or periodically migrate through the park's waters – green and hawksbill turtles are the most common.
  - Lord Howe Island supports the highest diversity and density of breeding seabirds in Australia, with at least 168 bird species being recorded since settlement.
  - The island is one of only two known breeding grounds in Australia for the providence petrel and kermadec petrel, and is the only known breeding location within Australia for the white-bellied storm petrel.

### Threatened and protected species

While the marine park aims to conserve all marine species occurring naturally in the region, particular emphasis is given to conserving species that are threatened, protected or endemic to the area.

- Of the species that have been recorded in the park, three are listed as endangered and 27 species are listed as vulnerable under NSW or Commonwealth threatened species legislation.
- Saltmarsh habitat has been listed as an endangered ecological community under NSW threatened species legislation.
- Three individual fish species and all syngnathids (seahorses and pipefishes) in the park are listed as protected marine species under NSW fisheries legislation.
- Threatened seabird species occurring in the marine park include several species of albatross and petrels, pied oystercatchers, black-tailed godwits, sooty terns and white terns.



Sooty tern  
Photo: G. Kelly



Bar tailed godwit  
Photo: G. Kelly

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## More information

For more information:

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- visit [www.mpa.nsw.gov.au](http://www.mpa.nsw.gov.au).

The full report, *Natural values of Lord Howe Island Marine Park*, is available from [www.mpa.nsw.gov.au](http://www.mpa.nsw.gov.au).

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