



Natural Heritage Trust

Helping Communities Helping Australia

A Commonwealth Government Initiative



Department of the Environment and Heritage

Lord Howe Island Marine Park (Commonwealth Waters)



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*This is the first management plan prepared for the
Lord Howe Island Marine Park (Commonwealth Waters)*

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COVER IMAGES (LEFT TO RIGHT)

Dolphins – Howea Divers

Lord Howe Island – M.Brouwer & AHC Collection

Boat going to Lord Howe Island – B. Malcolm, NSW National Parks and Wildlife Service

Red-tailed tropicbird – AHC Collection

MAIN IMAGE

Kingfish – NSW National Parks and Wildlife Service

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Glossary

AFMA

Australian Fisheries Management Authority

AGSO

Australian Geological Survey Organisation (Geoscience Australia)

ANZECC

Australian and New Zealand Environment and Conservation Council (replaced in 2001 by the Natural Resource Management Ministerial Council)

Australian Territorial Sea

The area of sea adjacent to Australia which extends beyond its land territory and internal waters. Australia's territorial sea extends to 12 nautical miles from the territorial sea baselines established under the *Seas and Submerged Lands Act 1973*.

Australia's Oceans Policy

Australia's Oceans Policy aims to develop an integrated ecosystem-based approach to planning and management for all ocean uses in areas under Australia's jurisdiction (Commonwealth of Australia 1998)

Benthic

Refers to marine organisms that live on or near the ocean floor.

Biodiversity

As defined under s528 of the EPBC Act, 'biodiversity' means the variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part) and includes diversity within species and between species and diversity of ecosystems.

Biodiversity Convention

Convention on Biological Diversity (Rio de Janeiro, 5 June 1992). The Convention requires parties to pursue the conservation of biological diversity and the sustainable use of its components. A key feature of the Convention is the establishment of a system of protected areas

where special measures need to be taken to conserve biological diversity.

By-catch

Non-target species taken incidentally during fishing activities.

Coastwatch

Coastwatch provides a civil maritime surveillance and response service to a range of government agencies.

Commonwealth marine area

As defined by section 24 of the EPBC Act.

Commonwealth waters

Waters of the sea that are generally between 3 and 200 nautical miles of the territorial sea baselines established under the *Seas and Submerged Lands Act 1973*. More particularly they are waters of the sea inside the seaward boundary of the Exclusive Economic Zone or over the continental shelf, except waters, rights in respect of which have been vested in a State by section 4 of the *Coastal Waters (State Title) Act 1980* or in the Northern Territory by section 4 of the *Coastal Waters (Northern Territory Title) Act 1980*, and waters within the limits of a State or the Northern Territory.

Convention on the Prevention of Marine Pollution from Dumping of Wastes and Other Matter 1972 (London Convention)

The objective of the Convention is to promote the effective control of all sources of marine pollution. Contracting Parties shall take effective measures to prevent pollution of the marine environment caused by dumping at sea. The *Environment Protection (Sea Dumping) Act 1981* gives effect to this convention by controlling, regulating and monitoring sea dumping operations.

Convention Concerning the Protection of the World Cultural and Natural Heritage 1972 (World Heritage Convention)

The objective of the convention is to protect natural and cultural properties of outstanding universal value against the threat of damage in a rapidly developing world.

Convention on the Conservation of Migratory Species of Wild Animals 1979 (Bonn Convention or CMS)

The objective of the convention is to protect those species of wild animals that migrate across or outside national boundaries.

Convention for the Conservation of Southern Bluefin Tuna 1993 (CCSBT)

The objective of the convention is to ensure, through appropriate management, the conservation and optimum utilisation of southern bluefin tuna stocks.

Director

The Director of National Parks.

Demersal

Found on or near the bottom of a lake, sea or ocean.

Demersal longlines (see also droplines)

Horizontally set or 'demersal' or 'bottom-set' longlines – have the mainline laying on the ocean floor with a large weight attached to each end point. Both ends of the mainline are attached to hauling lines with floats and buoys attached at the surface. Branch lines with up to 400 baited hooks are attached to the mainline.

Demersal trawling

A large net is drawn along the sea bottom to scoop up fish or prawns on or near the bottom. A weighted ground rope is used with bobbins or discs to assist its passage over rough seafloors.

Droplining (or vertical set longlines)

A form of setlining used to fish steep drop-offs where a conventional bottom set longline would snag. The mainline is lowered over the side with a large weight attached to one end. Baited hooks on up to 60 short branch lines are clipped to the bottom section of the mainline at between 1 and 2 metre intervals. Floats and a buoy are attached to the top of the mainline that is set vertically in the water before release from the boat.

Environment Australia

Department of the Environment and Heritage (or any Department that succeeds to the functions of the Department).

Endemism

Refers to organisms whose distribution is restricted to a particular locality.

EPBC Act

Environment Protection and Biodiversity Conservation Act 1999
(Commonwealth)

EPBC Regulations

Regulations made under the EPBC Act.

Exclusive Economic Zone (EEZ)

Declared under the *Seas and Submerged Lands Act 1973* in relation to Australia and its external territories in accordance with the United Nations Convention on the Law of the Sea. The EEZ comprises the area that extends from 12 nm to 200 nm seaward of the territorial sea baselines established under the *Seas and Submerged Lands Act 1973*, except where it has been pulled back to take account of maritime delimitations (or potential delimitations) with other countries. Australia has sovereign rights under the convention for the purposes of exploring, exploiting, conserving and managing the natural resources, and with regard to other activities for the economic exploitation and exploration of the EEZ.

International Convention for the Regulation of Whaling 1946 (IWC)

The purpose of this convention is to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry.

IUCN

World Conservation Union (previously International Union for the Conservation of Nature and Natural Resources).

Handlining

Handlining involves the use of a fishing line attached to a rod and or a reel. It is distinct from droplining (see above) in that the line is not released from the boat. The line can be set at different lengths to find fish. Chum or burley may be used to attract fish to the line.

Longlines – suspended or ‘mid-water’ set

Are similar to bottom set longlines except that the mainline is suspended at various distances off the bottom. Baited snoods are attached to the mainline at regular intervals with randomly placed floats. This effectively places baited snoods at random depths.

Longlines – surface or pelagic longlines

The mainline, with branch lines attached, is held near the surface by evenly spaced floats. These lines can be as long as 45 km and contain up to 880 hooks.

Lord Howe Island Board

Lord Howe Island and its associated islands are under the care, control and management of the Lord Howe Island Board.

‘National Environmental Significance’

As described in Division 1 of Part 3 of the EPBC Act.

National Strategy for Ecologically Sustainable Development

The National Strategy for Ecologically Sustainable Development aims to find better ways to integrate environmental, economic and social concerns in decision-making. The aim of the strategy is to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations.

NSW Fisheries

New South Wales’ principal aquatic resource conservation agency.

NSW MPA

New South Wales Marine Parks Authority. The NSW MPA manages marine parks for conservation of marine biodiversity and to maintain ecological processes.

National Representative System of Marine Protected Areas (NRSMPA)

The NRSMPA aims to establish and manage a comprehensive, adequate and representative system of marine protected areas and to contribute to the long-term ecological viability of marine systems, to maintain ecological processes and to protect Australia’s biological diversity at all levels (ANZECC 1999). Marine protected areas within the NRSMPA have been established especially for the conservation of biological diversity and have a secure status.

Offshore Constitutional Settlement (OCS)

The Commonwealth and the States came to a series of arrangements in 1979 collectively known as the Offshore Constitutional Settlement. The purpose of the OCS was to give the States a greater legal and administrative role in offshore areas. The legislation implementing the OCS came into effect in February 1983, being the *Coastal Waters (State Title) Act 1980*, *Coastal Waters (Northern Territory Title) Act 1980*, *Coastal Waters (State Powers) Act 1980* and *Coastal Waters (Northern Territory Powers) Act 1980*.

Pelagic

Associated with the surface (epi-pelagic), middle (meso-pelagic) or deeper (bathy-pelagic) depths of a body of water.

Register of the National Estate

The Register is established and maintained by the Australian Heritage Commission, under the *Australian Heritage Commission Act 1975*. There are now more than 12,000 places of natural, historic and indigenous significance listed.

State waters

Waters of the sea within 3 nautical miles of the territorial sea baselines established under the *Seas and Submerged Lands Act 1973*. More particularly they are waters, rights in respect of which have been vested in the State of New South Wales by section 4 of the *Coastal Waters (State Title) Act 1980*.

Threat Abatement Plan

As described in Division 5 of Part 14 of the EPBC Act.

Trolling

The vessel tows a number of lines on the surface or at various depths using artificial lures or bait to attract the fish.

United Nations Convention on the Law of the Sea 1982 (UNCLOS)

This convention lays down a comprehensive regime of law and order in the world's oceans and seas, establishing rules governing all uses of the oceans and their resources

VMS

Vessel Monitoring System

World Heritage Property

Properties inscribed on the World Heritage list. The Lord Howe Island Group World Heritage Property includes all the marine and terrestrial components in the area shown as the World Heritage Property on Figure 1 and as listed on the World Heritage list in 1982.



1. Introduction

Lying at 31°30'S latitude, some 700 km north-east of Sydney (Figure 1), Lord Howe Island and Ball's Pyramid are part of a chain of seamounts that are the remnants of a once-extensive volcanic system active in the late Miocene (McDougall et al. 1981). The waters of Lord Howe Island are renowned for their clarity, relatively high coral and algae cover and high biodiversity due to the combination of tropical and sub-tropical fauna. The conservation significance of the region is recognised by its inclusion on Australia's *Register of the National Estate in 1978* and the UNESCO World Heritage List in 1982. Examples of World Heritage values of the Lord Howe Island group specific to the marine environment include:

- the unusual combination of tropical and temperate taxa of marine flora and fauna, including many species at their distributional limits, reflecting the extreme latitude of the coral reef ecosystems which comprise the southernmost true coral reef in the world;
- the diversity of marine benthic algae species, including at least 235 species of which 12 per cent are endemic (species not found elsewhere);
- the diversity of marine fish species, including at least 500 species of which 400 are inshore species and 15 are endemic; and
- the diversity of marine invertebrate species, including more than 83 species of corals and 65 species of echinoderms of which 70 per cent are tropical, 24 per cent are temperate and 6 per cent are endemic (Nomination of the Lord Howe Island Group 1981).

1.1 Declaration of the Park

Complementary to its status as a World Heritage Area, the Commonwealth waters between 3 and 12 nautical miles (nm) around Lord Howe Island and Ball's Pyramid were proclaimed a Marine Park on 21 June 2000 under the *National Parks and Wildlife Conservation Act 1975* (Commonwealth) (Attachment 1). The Park surrounds the

NSW Lord Howe Island Marine Park that comprises the State waters around Lord Howe Island and Ball's Pyramid (ie to 3 nms). The combined area encompasses most of the marine environs of the World Heritage Property and forms the largest marine protected area off the NSW coast (Environment Australia 2000) (Figure 1).

The perimeter of the Park roughly corresponds to the 1800-metre depth contour that follows the base of the seamounts that underlie the Island and Ball's Pyramid. The sea area of the Park is estimated to be 300,510 hectares and includes the sea-bed to a depth of 100 metres.

The primary objective of the Park is to protect the seamount system and its conservation values associated with marine biodiversity, habitats and ecological processes. Such protection will also ensure the long-term maintenance of the high quality marine environment important to the Island's tourism industry, as well as the traditions and lifestyle of the local community.

The *National Parks and Wildlife Conservation Act 1975* was replaced by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 16 July 2000. The proclamation of the Park is continued in force by the *Environmental Reform (Consequential Provisions) Act 1999* as if it had been made under the EPBC Act.

1.2 Structure of the Management Plan

The Plan is in five sections. The first section outlines the conservation values of the Park (section 1.4), including biological diversity and abiotic and cultural heritage values. The pressures and uses are discussed (section 2) to establish the activities that need to be managed to conserve biodiversity. The management framework and legal context are then highlighted (section 3) before the management prescriptions, including strategic objectives and management goals (section 4), are presented. These prescriptions are activity-based, to help users to easily identify what activities are or are not allowed within the Park, and goal-focused, to identify what is to be achieved by marine park management. Finally, the process and framework for assessing the performance of the Plan is outlined (section 5).

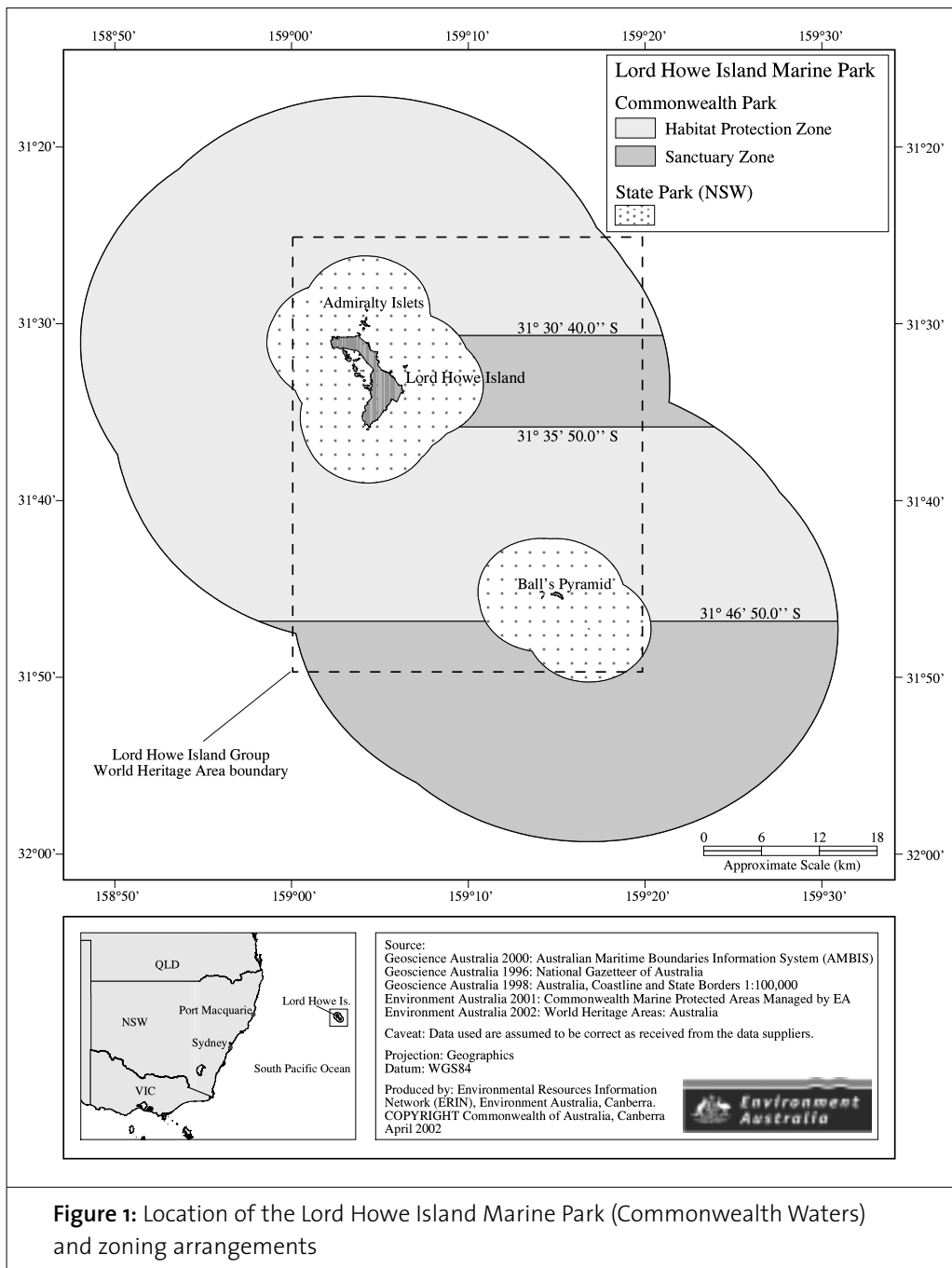


Figure 1: Location of the Lord Howe Island Marine Park (Commonwealth Waters) and zoning arrangements

This Management Plan will come into operation on the day on which it is notified in the Commonwealth Gazette. In accordance with section 373 of the EPBC Act, the Plan will cease to have effect seven years after it takes effect, unless sooner revoked by another Management Plan for the Park.

1.3 Description of Conservation Values

Due to its distance from any large landmass, the Island's marine ecosystem is largely in an undisturbed, natural state (Australian Heritage Commission 2001). The alternating influences of warm and cool currents create a transition zone between temperate and tropical regions that contributes to an unusual mix of tropical, sub-tropical and temperate marine fauna and flora and a high level of endemism.

The movement of tropical and temperate water around the Island has contributed to the development of a coral reef ecosystem, which is one of few known examples of a transitional algal and coral reef. While sparse coral growth may be present at other areas farther south, Lord Howe Island is regarded as the world's southernmost locality exhibiting a well-developed barrier coral reef community and associated lagoon (Allen et al. 1976).

The boundary of the Park was designed to protect the submerged seamount system above 1800–2000 metres depth. The area of the Park also incorporates the majority of the marine component of the World Heritage Property that is under the jurisdiction of the Commonwealth Government. The Park is known to contain an important range of biodiversity values, especially those associated with geological and geomorphological processes and geodiversity, including the process of reef building at the southern limits of reef formation (Biosis Research 1998). The 12 nm boundary provides a sound ecological, geological and administrative unit for protection and management (Pichon 1995).

1.3.1 Abiotic values

CLIMATE

Lord Howe Island is particularly exposed to weather extremes. During summer, winds are predominantly from the east and north-east, while winter winds are normally from the south-west. Wind speeds are less during summer, although wind speeds exceeding 30 kilometres per hour (km/h) (17 knots) are not uncommon. Winter wind speeds exceeding 40 km/h (22 knots) are a common occurrence. Gales, with winds in excess of 34 knots, can be expected on an average of 3 days per month during winter. Other strong winds occur, on average, between 4 and 7 days per month throughout the year (Lord Howe Island Board 1985). Lord Howe Island and surrounding waters are also subject to major storm events and occasional cyclonic activity.

The maritime setting ensures little diurnal or annual variation in temperature, with summer temperatures ranging from 17–25°C and winter temperatures from 14–18°C. Water temperatures vary from 17°C in winter to 25°C in late summer (Hutton 1986). The average rainfall is 1586 mm, most of which falls in winter. The average number of rain days for the year is 190. Humidity is moderate to high at about 70–77 per cent.

GEOMORPHOLOGY

The Lord Howe Island and Ball's Pyramid seamounts are the youngest and southernmost of a chain of nine such seamounts, mostly below sea level, that extend over 1,000 km north along the Lord Howe Rise. This chain includes the Elizabeth and Middleton Reefs, also protected by a National Nature Reserve, that lie 150 km north of Lord Howe Island. The rise is 18–29 km thick, and is probably a drowned section of continental crust left behind when the Tasman and New Caledonian Basins opened up in Cretaceous times (Sutherland and Ritchie 1977).

Lord Howe Island is regarded as an excellent example of the evolution of a volcanic island (guyot) formed on an oceanic ridge. The volcano is believed to have been active approximately 6 or 7 million years ago on the western margin of the Lord Howe Rise over a period of roughly 500,000 years (McDougall et al. 1981). The seamount

system marks the successive movements of the Australian tectonic plate over a 'hot spot' within the upper mantle of the earth's crust, in a similar way to how the Hawaiian chain of shield volcanos and seamounts evolved (Hill et al. 2000b).

The area contains a remarkably diverse range of on-going geological processes and provides the only accessible outcrop of a wide range of volcanic rocks with oceanic affinities in the Tasman Sea. Sediment supply and removal patterns are influenced by changes in surface water productivity, seamount depth, calcium carbonate dissolution rates and current flow (Smith et al. 1989). The most common type of sediment found on seamounts above the carbonate compensation depth is biogenic ooze composed of calcareous and siliceous microfossils and sponge spicules (Kennett 1982).

The main structure of the seamount is contained within 12 nm of the shoreline of Lord Howe Island (Pichon 1995). The Park encompasses a large proportion of the shelf area (approximately 3–6 nm wide) and extends well beyond the drop-off zone that, at about 200 metres, falls off very steeply to depths greater than 2000 metres. The drop-off represents a major topographic discontinuity between the shallow inshore and shelf environments and the deep sea environment. The Park contains graduate and steep intermediate and deep slopes facing in all directions. This unique topography maximises exposure to ocean currents from all directions and thus the potential for high biodiversity (Pichon 1995).

The Park lies over the Lord Howe Rise, a major physiographic feature in the Tasman Sea, which has been partially studied by *Rig Seismic* and vessels from French and German institutes. Most recently, the area in the vicinity of Lord Howe Island has been surveyed by the RV *L'Atalante*, using multi-beam swath mapping techniques to provide high quality images of the sea floor.

These surveys have indicated a high degree of benthic complexity within Commonwealth waters (Hill et al. 2000a). The data show the submarine shelf of the islands to be rugged and steep: commonly 10–20°, and steeper in places, with thick pelagic sediments and volcanic outcrops. The shelf terrain includes down-slope flow structures (probably old lava flows or coarse sediment debris flows), canyons and numerous volcanic cones and pinnacles,

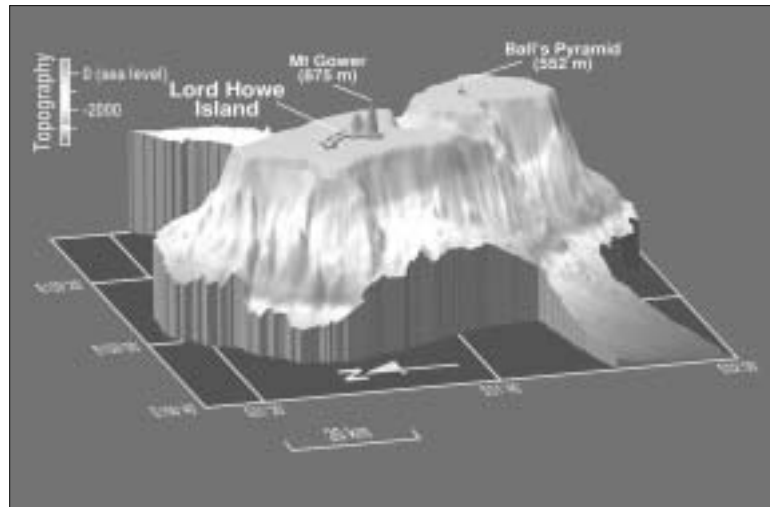


Figure 2: Volcanic edifice of Lord Howe Island and Ball's Pyramid
Source: Hill et al. 2000a

many 150–300 metres high (Hill et al. 2000a). Over 20 parasitic cones were also found, with a cluster of several cones in south-west region of the deep channel between Lord Howe Island and Ball's Pyramid (Figure 2). The submarine slopes appear to be mostly rocky volcanic outcrops with thin patches of sediment, while the shallow channel between the two islands exhibited some very coarse sediments (Hill et al. 2000a). These researchers have stated that such a complex substrate indicates the existence of diverse ecosystems, perhaps similar to those found on the Tasmanian seamounts (Hill et al. 2000b).

OCEANOGRAPHY

The hydrological regime of Lord Howe Island is on a boundary between tropical (Coral Sea) and temperate (Tasman Sea) water masses, commonly referred to as the Tasman Front. The Island lies in the path of the East Australian Current, which first flows from the north along the eastern seaboard of the Australian continent and then swings offshore in pulses from about September to December before either returning north or dissipating after shedding warm

core eddies (Nilsson and Cresswell 1980; Harriott 1995). The Tasman Front undulates in a north-south direction, and contributes to alternating cooler (19°C) and warmer waters (25°C) around the Lord Howe Island Group.

Seamounts modify the large-scale dynamics of oceanic currents and the stratification of water column density. Geographic location, water depth and the intensity of the flow field near the seamount govern the interactions between seamounts and oceanic currents. The intensity of this flow field generally decreases with increasing water depth and distance from continental margins (Smith et al. 1989).

Smith et al. (1989) reports that currents are usually enhanced over seamounts and may have a range of temporal and spatial scales, manifested as eddies, tides, trapped waves and freely propagating internal waves. All these processes generate currents that enhance mixing in the benthic boundary layer over the summit and flanks. The eddies created around seamounts sweep small planktonic organisms and small mesopelagic (species that inhabit the water column around half way between the seafloor and the surface) and bathypelagic (species that inhabit the water column below approximately 1000 metres) fish, squids and prawns from a large area past the seamount. The planktonic organisms are fed upon by the corals and other suspension feeders, and the small fish, squid and prawns are eaten by fish living on or near the seamount (Koslow and Gowlett-Holmes 1998; Koslow et al. 1998). The perturbations created by seamounts in a flow field are believed to directly influence both the pelagic and benthic communities associated with these structures.

In general, these processes enhance productivity over seamounts; for example, local upwelling of nutrients, evidence of enrichment of bottom-associated communities and high abundances of demersal fishes have all been reported over seamounts. Some seamounts in higher latitudes function as spawning and mating areas of far-ranging pelagic species (Hyrenbach et al. 2000), but this has not yet been recorded on the Lord Howe Rise. For all these reasons, seamounts are regarded as representing 'hot spots' of high productivity and biodiversity, and are excellent natural laboratories for examining the influence of flow on sedimentation processes and biological community dynamics.

1.3.2 Biological diversity

As the majority of information on the marine biology of the Lord Howe area is limited to the shallower inshore areas, no formal assessment can be made of the productivity and ecological importance of the flora, fauna or communities of the deeper shelf waters other than to note that they are clearly unique (Ponder et al. 2000). Based on more detailed studies of other seamounts in the region, seamounts are known to comprise a unique deep-sea environment characterised by substantially enhanced currents and high species diversity. Seamounts provide important habitat for endemic, rare and endangered species of plants and animals and *in-situ* conservation of biological diversity (Roberts et al. 2002; Richer de Forges et al. 2000; Smith et al. 1989; CSIRO 1994).

Samples taken from four seamounts on the Lord Howe Island Rise revealed 108 species of fish and macroinvertebrates, of which 31 per cent were new to science and potential seamount endemics (Richer de Forges et al. 2000). Four new genera were also identified. The benthic fauna is dominated by suspension feeders, such as corals. Some species appear to be relicts of groups believed to have disappeared in the Mesozoic age (225–65 million years ago). The study revealed that these seamounts appear to be isolated marine systems and that low species overlap between different seamounts in the region leads to highly localised species distributions that are exceptional for the deep sea.

For example, only a limited number of species are common to the Lord Howe Rise and the Norfolk Ridge, and none are common to that area and the seamounts south of Hobart. This is in contrast to soft-sediment fauna at similar depths, where there is considerable overlap between the fauna of south-east Australia and that of the Lord Howe Rise. The authors consider that the seamounts in the Lord Howe Island region provide an exceptional opportunity to examine evolution and speciation in the deep sea and that additional sampling is likely to reveal more previously-unknown species (Richer de Forges et al. 2000; Smith et al. 1989). In fact, several studies point to the exceptionally high diversity in the south-west Pacific, and not only on the seamounts (Poore and Wilson 1993; Poore et al. 1994).

Within the Lord Howe Island region, over 305 species of algae, at least 83 species of coral, more than 65 species of echinoderms (sea stars and urchins) and over 400 species of fish have been identified. An Australian Museum review (Ponder et al. 2000) of samples taken from waters more than 40 metres deep shows relatively high endemism (13.1 per cent overall) of the rather rich shelf fauna, the majority of these endemics (9.8 per cent) being restricted to the shelf. This would suggest that the shelf fauna may have even higher endemism than the shallow water fauna, which has already been determined to have high conservation values (see World Heritage Nomination 1981; Harriott et al. 1993; Pichon 1995). Attachment 2 contains a list of protected marine species under the EPBC Act found in or in the vicinity of the Park.

FISH

Fish fauna of the region have been well-described. Extensive collections and surveys by the Australian Museum and fish donated by the Islanders have contributed to the number of deep-water species listed. The current collection confirms a diverse fish fauna, with 447 species and 107 families recorded around Lord Howe Island. There are 47 species of wrasse, 25 of damselfish, 23 gobies and 22 coralfish. Butterfly cod, parrot fish, painted morwong and the doubleheader *Coris cyanea* are commonly found in the lagoon. Snapper (*Paracaesio pedleyi*), blue knife fish (*Labracoglossa nitida*) and *Pseudanthias* sp. occur here in large schools. Brown puller (*Chromis hypsilepis*) and orange wrasse (*Pseudolabrus luculentus*) were among the most common species at depths below 35 metres. Black cod (*Epinephilus damelii*) is also found in the Park and is protected from commercial fishing under s15 of the *Fisheries Management Act 1991* (Commonwealth). This species is currently being considered for inclusion in the vulnerable category of the listed threatened species under the EPBC Act.

The deep-water pelagics known through fishing activities include marlin (blue and striped), sharks (Galapagos, whalers, some tigers, whites and makos), sailfish, dolphin fish, yellowfin tuna, wahoo, trevally, bonito, yellow-tail kingfish and spangled emperor fish (Edgecombe 1987). Similarly, the demersal fauna of the very steep slopes of the seamounts is mostly known through fish species

Table 1: Fish species endemic to the waters of Lord Howe Island, Norfolk Island, and Tasman Sea region

SCIENTIFIC NAME	COMMON NAME
<i>Amphiprion mccullochi</i>	McCulloch's anemone fish
<i>Bathygobius aeolosoma</i>	frill goby
<i>Cantherhines longipinnis</i>	longfinned leather jacket
<i>Cirrhitus splendens</i>	splendid hawkfish
<i>Enigmapercis</i> sp	sand fish
<i>Genicanthus semicinctus</i>	half-banded angel fish
<i>Insopiscis altipinnis</i>	unknown
<i>Navodon analis</i>	unknown
<i>Syngnathus howensis</i>	Lord Howe Island pipefish

Source: Allen et al. 1976; pers. comm. NSW MPA 2001

caught on set droplines with deep-sea trevally, rosy jobfish and large-sized kingfish being the main targets. Unfortunately there is no record or analysis of the by-catch (Pichon 1995).

While most of these are wide-ranging tropical forms, 15 species (4 per cent) are endemic to the island group (including Norfolk Island) and around 40 (10 per cent) species are endemic to the Tasman Sea region (Table 1). Other endemics continue to be described (Pollard and Burchmore 1985; Francis 1993; Francis and Randall 1993). The Australian Museum (1998) identified three fish species of possible conservation significance in depths greater than 40 metres around Lord Howe Island and Ball's Pyramid. These species are the half-banded angelfish *Genicanthus semicinctus*, the Ballina angelfish *Chaetodontoplus ballinae*, and a species of bullseye or sweeper, *Pempheris adspersus*.

There are no known surveys of bathypelagic species. Koslow (1997) notes that, to help maintain a neutral buoyancy, these species generally have greatly reduced bone and musculature. Many bathypelagic fish are eel-like or blob-like, with a reduced metabolism thought to be due to a lack of ambient light at these depths. Some species associated with the seamounts are very different, being

strong swimmers that aggregate to spawn above the seamounts. It is only since the 1980s, with the development of the orange roughy and oreo fisheries on seamounts around New Zealand and south-eastern Australia, that the commercial value of these unusual deep-water species has been exploited. However, current indications are that they are long-lived and slow growing with only sporadically successful recruitment, and so are unable to sustain heavy fishing. Some experimental fishing for orange roughy in waters around Lord Howe Island has been conducted (see section 2.1.2).

The principal species fished in Commonwealth waters around Lord Howe Island is yellowtail kingfish (*Seriola lalandi*) (pers. comm. CSIRO 2001). There is, however, no information on the status of this stock around Lord Howe Island and Ball's Pyramid. Anecdotal evidence suggests a decline in recent years (Pichon 1995). It is not certain whether kingfish form a separate population around Lord Howe. Smith et al. (1991) and Gillanders et al. (2000) noted that some mixing of kingfish does occur off eastern Australia (even though juvenile fish do not move long distances) but that there could be a temporal sub-population structure in Lord Howe Island waters.

Compared to other coral reef localities, the lower water temperatures at Lord Howe Island are considered to be limiting for fish as they are likely to be limiting for corals. The vagaries of the southern currents and the annual fluctuations in water temperature tend to result in a change in faunal composition throughout the year. The largest category of fish is composed of reef species that are widely distributed in the tropical Indian Ocean and western Pacific.

SEABIRDS

The Lord Howe Island group is a major seabird breeding area (Manidis Roberts 2000). The largest numbers are present in spring and summer, but there is activity all year round (Hutton 1991). Fourteen species of seabirds breed on the islands, including masked boobys, grey ternlets, sooty terns, white terns, common noddys, black noddys, red-tailed tropic birds, little shearwaters, wedge-tailed shearwaters, flesh-footed shearwaters, black-winged petrels, white-bellied storm petrels, Kermadec petrels and Providence petrels (Hutton 1991). Of these, 11 are listed as vulnerable under the NSW *Threatened Species Conservation Act 1995* (Manidis Roberts 2000).

and all are listed marine species under the EPBC Act. Ball's Pyramid is the only known Australian breeding ground of the Kermadec petrel (Hutton 1991). None of these species are currently threatened on the islands, but all are vulnerable to impacts on their oceanic feeding grounds as well as at their breeding grounds (Manidīs Roberts 2000). Five other vulnerable species occur as occasional visitors to Lord Howe Island (Attachment 2).

CORALS AND ECHINODERMS

While most of the coral and echinoderm (sea star and urchin) species found at Lord Howe Island are common and widespread tropical forms which also occur on the Great Barrier Reef, their biogeographic significance arises from the unique association of tropical species at their southern limits of distribution and sub-tropical species which are rare or absent from the Great Barrier Reef (Harriott et al. 1993).

The coral reef community is of moderate coral diversity but relatively high cover where corals and macroalgae co-exist. There are at least 83 species from 33 genera in 11 families; this represents relatively high diversity considering the Islands' latitude and isolation from other major coral communities (Harriott et al. 1993). More than 65 species of echinoderms, made up of 70 per cent tropical species, 24 per cent temperate species and 6 per cent endemic species, have also been recorded (Pollard and Burchmore 1985).

Most of the coral communities are dominated by a few abundant species, including *Acropora palifera*, *A. glauca*, *Porites* spp. and *Pocillopora damiconis*. Many of the species that have been recorded from the Island are extremely rare in that area, and may have resulted from chance recruitment of only a few larvae which did not establish a self-seeding population (Harriott et al. 1993). There is some debate as to whether Lord Howe Island reefs are reliant on replenishment of larvae from the Great Barrier Reef or from local brooding corals (Veron and Done 1979; Harriott 1992). This research also suggested that, given the limited recruitment of broadcast spawning coral species, the southern dispersal of coral larvae from more northern sites might be a rare or sporadic event.

Although there was an increase in crown-of-thorns starfish numbers (see below) and some coral bleaching in the late 1990s, the impacts have been minimal and the coral communities appear to be in good condition (Maniwavie et al. 2000). However, recovery from such threats is constrained by the slow process of reef formation at this high latitude. Controls on the growth of coral reefs systems in sub-tropical areas are believed to include water temperature, competition with macro-algae and high nutrient levels (Hariott et al. 1993).

ALGAE

One of the more striking features of the marine habitat within the Lord Howe Island area is the lush growth of marine algae. The algae are mainly of tropical and subtropical genera, such as *Padina* and *Dictyota*, but in luxuriant thalli not seen in the Great Barrier Reef (Allen et al. 1976). Researchers have noted that the decline in coral abundance with increasing latitudes is negatively correlated with the increasing abundance of macroalgae in the benthic communities (Harriott et al. 1993). This may be brought about by the small number of herbivorous fish schools, which keep algae on tropical reefs grazed to a stubble (Allen et al. 1976). It is also thought that the increasingly-common fleshy macroalgae in cooler waters possibly out-compete coral species or are a factor in reducing coral recruitment.

Algae are usually present, to some degree, from the highest intertidal areas to the greatest depths accessible to dredging or scuba diving. There are more than 305 species of benthic algae, including 47 (15 per cent) endemic species (Millar and Kraft 1993; 1994a; 1994b). For its size, the Island is one of the richest localities for green macroalgae. Lord Howe Island is also particularly important because it sits at the extreme latitudinal limit of many green algal species and genera. It holds the world's highest latitude populations for the genera *Neomeris*, *Boodlea*, *Valoniopsis*, *Ventricaria* and *Trichosolen*, and is also the site of the highest latitude populations of particular species in such genera as *Halimeda*, *Polyphysa*, *Caulerpa*, *Chaetomorpha*, *Chlorodesmis*, *Codium*, *Avrainvillea*, *Struvea* and *Dictyosphaeria*.

DEEP-WATER INVERTEBRATES

There is limited information available on deep-water invertebrates offshore from the Lord Howe Island group. The Australian Museum (Ponder et al. 2000) analysis of samples dredged in 1960 and 1976 offshore Lord Howe Island and Ball's Pyramid found the following species within 30 nm of the islands in waters deeper than 40 metres: 3 crustaceans; 16 annelids; 12 echinoderms; 1 sipunculid; 1 bryozoan; 360 molluscs; and 7 brachiopods. The one deep-water sample, from a depth of 2738 metres, beyond the 12 nm boundary, consisted of very fine foram ooze and clay. The sample contained only 8 molluscs, of which only 1 could be placed in an existing species. Nothing can be said about endemism in the deep-water sample because of the small amount of data available and the lack of comparable material from the Tasman Sea.

The Australian Museum assessment was that the shelves had a high conservation value due to the relatively pristine state of the (believed to be untrawled) shelves compared to other Australian shelves and the high endemism of the Island's fauna (Ponder et al. 2000).

MARINE MAMMALS AND OTHER LISTED SPECIES

Of particular interest in the Park are those species listed under the EPBC Act as threatened or subject to international and national agreements. Under the EPBC Act, all cetaceans (whales, dolphins and porpoises), listed marine species and listed migratory species are protected in Commonwealth waters. A list of the species likely to occur within the Park is provided in Attachment 2.

Whales are rarely sighted. The bottlenose dolphin *Tursiops truncatus* is common. Migratory dolphins, such as the spinner dolphin, the dusky dolphin and pan tropical spotted dolphin, may pass through Lord Howe Island waters.

1.3.3 Cultural heritage values

The Island was first settled in 1834 by a small group of settlers who earned a livelihood through trade with passing whale ships. While the marine environment has remained central to the traditions and lifestyle of the Island community to the present day, structures and places of cultural significance relate mainly to the residences, outhouses, wells and gardens of the Island settlement.

All shipwrecks over 75 years of age are automatically classified as historic shipwrecks under the Commonwealth *Historic Shipwrecks Act 1976*. A number of such shipwrecks are likely to be found in either the State or Commonwealth sections of the Park. Of the 12 shipwrecks believed to be in the Lord Howe area, 6 are believed to have been lost in the vicinity of Lord Howe Island outside the 3 nm mark. These include the *Wolf*, wrecked in 1837, the *Zeno*, wrecked in 1895, *Maelgyn*, lost in 1907, and the *Laura*, wrecked in 1913. No specific positions are available for these wrecks as they have not yet been located (pers. comm. NSW Heritage Office 2001). Seabed habitat mapping research may be able to detect the presence of these shipwrecks.



2. Uses and Potential Pressures

Any natural area is exposed to real or potential pressures from human impacts. These include pressures from external sources and global phenomena such as pollution and changes in seawater temperatures.

Most of the marine activities undertaken by Island residents and visitors are in waters close to shore. Direct use of Commonwealth waters by Island residents and tourists is generally limited by distance from the Island and the frequent rough weather. The main activities in Commonwealth waters are charter and recreational fishing, including big game billfish fishing, and some sailing. In recent years, unregulated fishing by Islanders for on-Island sale and consumption has increased in Commonwealth waters as catch rates in the more accessible shallow waters have declined (pers. comm. Lord Howe Island Board). Access to waters between 3–12 nm for commercial fishing is currently limited to one mainland operator by an Australian Fisheries Management Authority (AFMA) permit.

The existing and potential pressures outlined in this paper focus on those associated with human activities that can be influenced by management of the Park. A summary of pressures and a qualitative assessment of associated risk is presented in Table 2.

2.1 Commonwealth Fisheries

AFMA manages four Commonwealth fisheries in Commonwealth waters adjacent to the Island under the *Fisheries Management Act 1991* (Commonwealth). In the South-East Non-Trawl Fishery (SENTF), the Eastern Tuna and Billfish Fishery (ETBF), and the Southern Squid Jig Fishery (SSJF), AFMA permits operators to fish outside 12 nm around the Island (ie beyond the outer boundary of the Park). AFMA also licenses operators in the South East Trawl Fishery (SETF), with an additional permit issued for the East Coast Deep Water Trawl (ECDT) sector to fish outside 25 nm around the Island. The exclusion zones for trawling and other fishing around Lord Howe Island and

Ball's Pyramid were implemented in 1993, largely in response to concerns about the potential impacts of large-scale commercial fishing on local fish stocks (Senate Standing Committee 1993). Fishing by Japanese longliners is also currently prohibited in Australian waters.

An exemption to the closures applies to one mainland-based company operating in the ETBF. One Island-based operator holds an AFMA ETBF permit for Pelagic Longline and Minor Line fishing which allows fishing in waters outside 12 nm around the Island (pers. comm. AFMA 2001). Further information on these fisheries is in Attachment 3.

2.1.1 Indirect impacts

While these fishery closures remain in force, threats to fish stocks and biodiversity are mostly limited to indirect impacts from fishing in the vicinity of the Park. For example, while trawling is not permitted within 13 nm of the outer boundary of the Park, there is a low risk that sediment from trawling operations may drift into the Park. Overseas research has shown that the resulting increase in turbidity and sedimentation may impact on the benthic communities (Collie et al. 1997). The sensitivity of the Lord Howe seamount communities to sediment drift is unknown.

Table 2: Summary of existing and potential pressures on the Park

* risk assessment is prior to implementation of the Plan

ACTIVITY	PRESSURES	Risk*
Commercial longlining	<ul style="list-style-type: none"> • Accidental or deliberate encroachment of longlines into the Park • Incidental capture or entanglement of seabirds and cetaceans in hooks or lines • Reduction in size and abundance of fish • Pollution from boats including fishing gear and light sticks • Damage to seafloor, slope habitats and shipwrecks • Discard of by-catch • Taking of undersized fish • Illegal fishing 	<ul style="list-style-type: none"> • Medium (AFMA restrictions apply – only one mainland operator active in the Park) • Potential indirect impacts may arise from longline activity outside Park boundary
Islander commercial fishing	<ul style="list-style-type: none"> • Reduction in size and abundance of fish • Pollution from boats including fishing gear and light sticks • Discard of by-catch • Taking of undersized fish • Illegal fishing 	<ul style="list-style-type: none"> • Low-Medium – Island commercial fishing unlicensed
Commercial trawling	<ul style="list-style-type: none"> • Removal of benthic fauna and other habitat disturbance • Damage to slow growing corals • Reduction on size, diversity and abundance of fish • Pollution from boats • Discard of by-catch • Sediment drift into the Park may result in increased turbidity and sedimentation and impact on benthos • Illegal fishing 	<ul style="list-style-type: none"> • High (AFMA restrictions apply to exclude trawling within 25 nm of Lord Howe Island) • Potential indirect impacts may arise from trawling activity outside Park boundary
Recreational fishing	<ul style="list-style-type: none"> • Taking of undersized fish • Over-harvest of high-value species • Reduction in size, diversity and abundance of fish • Pollution from boats • Discard of by-catch 	<ul style="list-style-type: none"> • Low-Medium
Charter fishing	<ul style="list-style-type: none"> • Taking of undersized fish • Reduction in size, diversity and abundance of fish • Impact on predator-prey relationships • Pollution from boats • Discard of by-catch 	<ul style="list-style-type: none"> • Medium
Diving/Swimming with dolphins	<ul style="list-style-type: none"> • Pollution from associated boating, fuel and oil spills, and debris • Disturbance to cetaceans, sensitive marine species and habitats • Damage from anchoring 	<ul style="list-style-type: none"> • Low

Table 2: Summary of existing and potential pressures on the Park *continued*

* risk assessment is prior to implementation of the Plan

ACTIVITY	PRESSURES	Risk*
Yachting, boating and shipping	<ul style="list-style-type: none"> • Introduced marine species • Marine pollution including fuel and oil spills, and debris • Anchoring impacts on seafloor habitats and shipwrecks 	• Low
Land-based sources of marine pollution	<ul style="list-style-type: none"> • Increased sediments and nutrients • Dumping of waste 	• Low
Mining operations (including petroleum and mineral exploration and recovery)	<ul style="list-style-type: none"> • Pollution from associated shipping, including fuel, oil spills and debris • Disturbance to migratory species • Disturbance from seismic surveys • Pollution associated with potential extraction activities 	• Not applicable
Scientific research	<ul style="list-style-type: none"> • Damage and disturbance to species and habitat • Pollution from boats • Disturbance to native species from geoscientific seismic surveys • Collection of marine species • Loss or dumping of scientific equipment 	• Medium-High (depends on nature of research activity)

Similarly, some domestic tuna longlining occurs in waters outside the 12 nm boundary which may impact on Park values through longline drift and the incidental capture of seabirds.

AFMA is developing a statutory management plan for the ETBF under the *Fisheries Management Act 1991* to formalise and regulate fishing activity in this area (pers. comm. AFMA 2001). As part of these arrangements, vessel monitoring systems (VMS) are likely to be introduced to this sector of the ETBF in the future. Pelagic longline operators fishing south of 30°S, including the waters around Lord Howe Island, are also subject to the *Threat Abatement Plan for the Incidental Catch (or by-catch) of Seabirds During Oceanic Longline Fishing Operations* (Commonwealth of Australia 1998a). As part of the Threat Abatement Plan, observers have been placed on a number of longlining vessels operating in the Lord Howe region to assess the effectiveness of measures aimed at reducing the incidental capture

of seabirds. Under the Commonwealth Fisheries Management regulations, pelagic longline operators fishing south of 30°S, including the waters around Lord Howe Island, must use tori poles, set lines at night and manage offal discharge to minimise seabird by-catch on longlines. Other potential mitigation measures are also being considered.

2.1.2 Potential fisheries

In addition to the existing managed fisheries, experimental fishing in Commonwealth waters around the Island has been conducted in the past, with at least one significant catch of orange roughy (*Hoplostethus atlanticus*) reported (Richer de Forges 1990; Australian Fisherman 1993). Other fish of commercial significance known from seamounts on the Norfolk Ridge and likely to be found within the Park include deep-water snapper (*Etelis coruscans*), alfonsino (*Beryx splendens*) (for which there has been an intermittent commercial fishery in the region) and the pelagic armourhead (*Pseudopentaceros richardsoni*) (Richer de Forges 1990).

While the rugged terrain of the seamount slopes constrains trawling interest in this area, this activity, through possible advances in fishing technology, remains one of the most significant potential threats to the marine invertebrate communities of Lord Howe Island (Allen et al. 1996). While the life history of most seamount species is not known, the limited studies so far completed, such as those for corals, indicate that seamount species are generally long-lived, slow-growing and easily depleted (Rogers 1994). Consequently, these fauna should be considered exceptionally vulnerable to trawling, due to their limited distribution and life-history characteristics (Koslow and Gowlett-Holmes 1998). The impacts of trawling on seamounts are well documented and are known to include severe impacts on both the composition and structure of shelf communities (Koslow and Gowlett-Holmes 1998). AFMA has prohibited trawling by commercial Commonwealth vessels within 25 nm of the Island to minimise impacts of trawling on the area.

Given the highly localised distributions of seamount species, these communities are extremely vulnerable to the impacts of fishing and this compounds the uncertainty of their ability to recover from

benthic trawling (Richer de Forges et al. 2000). An analysis of threats to the area by Biosis Research (1998) determined that there were no known threats to the deep-sea ecosystem posed by commercial fishing, as it was highly restricted, but commercial fishing could become a threat if trawling were permitted or if the fish take were to be increased.

2.2 Islander 'Commercial' Fishing

While none of the Island residents fish 'commercially' on a full-time basis, some fish, especially excess catch from charter operations, are sold to the Island restaurant trade. Community fishing provides an important source of protein for Island residents and some income. While most of the local catch comes from within State waters, fishing by Island residents in Commonwealth waters using handlining methods targets mainly the yellowtail kingfish (*Seriola lalandi*) and yellowfin tuna (*Thunnus albacares*). Other significant targets include rosy jobfish (*Pristopomoides seiboldi* and *Pristopomoides filamentosus*), nannygai (*Centroberyx affinis*) and white trevally (*Pseudocaranx dentex*). Pichon (1995) reports that two residents are believed to have used set droplines in Commonwealth waters with up to 40 hooks in depths not exceeding 200 metres. No traps or nets are used.

While this fishing activity is currently unlicensed, the Island community have informally regulated their fishing effort with agreements not to export catch and to only supply fish to a small and limited Island tourist and resident population (estimated at 400 and 320 people respectively). Although in the past some fish were exported to the mainland, it is now customary practice not to do so. The Islanders estimate that less than 20 tonnes of fish are caught in the vicinity of the Island by Islanders each year (Senate Standing Committee 1993).

Despite these initiatives, some concern has been expressed as to the sustainability of kingfish (*Seriola lalandi*) fishing in Lord Howe Island waters. In particular, it is alleged that the continuous pressure on this species has led, over a period of 20–30 years, to a reduction in the average size of the individuals caught (Pichon 1995). In the

absence of any fisheries statistics, it is suggested that appropriate steps be taken to ascertain the status of the Lord Howe Island kingfish population (Pichon 1995). There is also concern about the impact of droplining on black cod and the habitats of the shelf and slope environments (pers.comm. Lord Howe Island Marine Park Advisory Committee 2001).

NSW Fisheries will shortly be implementing a 'Class 4' licensing arrangement under the *Fisheries Management Act 1994* for Island fishers in State waters (ie out to 3 nm). AFMA is in the process of developing more formal management arrangements for commercial fishing in Commonwealth waters.

2.3 Recreational Fishing

Recreational fishing by Island residents is a major leisure activity and an important source of fresh fish for Island residents. Most recreational fishing occurs in State waters, where participants require a salt water recreational fishing licence under the State *Fisheries Management Act 1994*. In recent years the number of trailer boats has increased to approximately 100, increasing fishing effort within inshore State waters.

In Commonwealth waters, a limited amount of recreational fishing, targeting mostly the larger kingfish (greenbacks), takes place in the vicinity of the submarine drop-off, notably 3–5 nm off the northern and southern ends of the Lord Howe Island plateau. No formal arrangements apply in Commonwealth waters to regulate this fishing. Informal agreements have been established to ensure any fish caught are not exported from the Island.

Species caught include the rosy jobfish (*Pristipomoides filamentosus*), lavender jobfish (*Pristipomoides seiboldi*), and the deep sea travella or blue eye (*Hyperoglyphe antarctica*). Recreational game fishers target yellowfin tuna, wahoo, dolphin fish, yellowtail kingfish, marlin, sailfish and sharks. Other species taken include rainbow runners and mackerel tuna.

2.4 Charter Fishing

There are currently 7 charter fishing boats operating in waters surrounding the Island. Of these, 5 are surveyed to operate beyond 3 nm. These 5 vessels have a combined total capacity of 93 passengers and also operate sightseeing tours around Lord Howe Island. The method of fishing is trolling for game fish (billfish, tuna, marlin) and set droplines for rosy jobfish. It is estimated that 30 per cent of charter activities occur in Commonwealth waters and these activities are mainly constrained by weather and seasonal tourism demand. There is an annual fishing competition rewarding the greatest diversity of catch and the greatest size of any one species. Fishing charters and fishing competitions place pressure on marine ecosystems by depleting populations of large predatory fish.

2.5 Diving

Diving expeditions outside the reef are dependent on good weather and calm seas. Operators estimate that most of their activity is within State waters. There are currently two commercial diving companies operating within the Lord Howe Island lagoon and local waters. Charters occasionally undertake dive trips to Ball's Pyramid. These trips may also involve dolphin watching and swimming with dolphins.

2.6 Yachting, Boating and Shipping

During 1999–2000, 125 yachts and other small craft visited the Island. This included 24 yachts competing in the annual Gosford to Lord Howe Island Yacht Race held each October (Lord Howe Island Board 2000).

Most of the vessels using the Park are engaged in recreational or fishing activities. Two small trading vessels regularly visit the Island from the port of Yamba. These vessels are capable of entering the lagoon and unloading directly onto the jetty. They transport waste and recyclable materials off the Island for free (Lord Howe Island Board 2000).

As no major shipping routes for tankers or bulk carriers are in the vicinity of the Island, the risk of collision is very low, as is the chance of any accidental discharge of harmful substances such as fuel or cargo. The Law of the Sea Convention allows vessels the right of innocent passage through Australia's Territorial Sea. The right of innocent passage is subject to various provisions under the Convention and vessels exercising the right of innocent passage are required to comply with all such provisions.

No passenger ship services are available to the Island. Cruise ships occasionally visit the Island but, due to shallow inshore waters, are required to drop anchor offshore and transport passengers in by launch.

While anchor damage is more common in near-shore waters, some physical damage may also occur to coral communities on the shelf area of the Park. Anchors dropped on fragile reef organisms, such as corals and sponges, can result in damage to or removal of species.

2.7 Australian Defence Force Activities

The Australian Defence Force (ADF) is involved in a number of marine activities that may occur within the Lord Howe Island region. Such activities include:

- maritime surveillance and response;
- fisheries law enforcement;
- search and rescue; and
- hydrographic services.

While the ADF do not currently engage in operational activities within the Park, the ADF may directly and indirectly contribute to a range of tasks important to managing marine reserves by providing a visible patrol presence and logistical support for enforcement in remote areas and more generally, in terms of protecting Australia's sovereignty and sovereign rights.

2.8 Cultural Heritage

If, in the future, one of the six shipwrecks believed to occur within or in the vicinity of the Park is located, there may be potential pressures from scuba diving activity.

2.9 Marine Pollution

Given the relatively large surface area of the shelf compared to that of Lord Howe Island, it is likely that any influence of the land environment through terrestrial run-off and other land-based sources of marine pollution will be limited to the inshore shelf area. There are no major rivers and only moderate rainfall, so relationships between the landmass biota and deep sea are expected to be extremely limited (Pichon 1995).

Land-based sources of marine pollution that may have a detrimental effect on the Park include rubbish disposal, water resource management and residential and tourist development. Most of the settled area is situated on sandy soils which provide a poor base for septic tank effluent disposal, and this has deteriorated ground water quality (Lord Howe Island Board 1985). Due to the small resident population and restricted tourist population, the scale of any development is quite small. Waste management on Lord Howe Island has entailed landfilling all waste after incineration of combustible materials. Given the significance of the coral reefs, the slow coral growth rate and abundance of algae, elevated nutrient levels could have major impacts on the survival of corals and disrupt the balance between algae and corals (Harrison et al. 1995). The results of a 1994 nutrient analysis showed that seawater nutrient levels were generally low and indicative of good water quality. However, evidence of high nutrient levels in the water table shows potential for increased nutrient levels to occur in reef sites associated with seepage or springs following heavy rainfall on the Island (Harrison et al. 1995).

Due to concerns about leachate possibly escaping into the lagoon from the landfill, the Lord Howe Island Board has installed new bio-waste treatment facilities and a recycling program. There are no approvals under the *Environment Protection (Sea Dumping) Act 1981* to dump land-sourced waste at sea.

Some 'downfall' of particulate organic or inorganic carbon from the outer shelf margin toward the deep sea presumably takes place within the Park. However, lack of data on currents on the shelf edge and along the drop-off precludes any quantification of such a process. There is no information on the relationship between shallow shelf communities and outer shelf communities (Pichon 1995).

No assessment has been taken of sewage outputs from vessels within the Park. Given the relatively low number of vessels, this impact is likely to be minimal. Australia is legislating to implement MARPOL Annex IV to provide control of sewage outputs by vessels. The risk of oil spills from vessels is low due to the absence of shipping lanes through or near the Park. Any spill would have detrimental effects on flora and fauna in the Park. Australia has the capability to respond to spills of oils and chemicals, known as the National Plan to Combat Pollution of the Sea by Oil and other Noxious Substances (the National Plan). Lord Howe Island is equipped to respond to minor spills but is limited in its capacity due to distance from response equipment on the mainland.

Discarded waste from vessels is known to have significant impacts on habitats and associated wildlife. Discarded fishing gear and other debris from commercial, charter and recreational fishing and rubbish such as plastic bait bags are known to entangle or choke marine species. Domestic and international shipping are regulated to prevent and or minimise impacts from waste, flotsam and oil spills.

While the Lord Howe Island Board hold no records of marine debris surveys, there are reports of turtle entanglement in fishing nets, light sticks from longline fishing operations washing up on beaches, and other longline gear caught on reefs. Buoys and other floating debris from fishing operations often wash up on Island beaches (pers. comm. NSW Marine Parks Authority 2001).

2.10 Pest Species and Natural Predators

Ballast water carried in ships has now been recognised as one of the main vectors for the translocation of non-indigenous marine organisms around the world. Other vectors include hull fouling, aquatic plants and aquaria supplies and fishery products (AQIS 2002;

Carlton 1985). Ballast water management guidelines and regulatory practices have been introduced by the Australian Quarantine Inspection Service (AQIS) in an attempt to minimise the risk of new species becoming established. Lord Howe Island occasionally hosts vessels entering Australia from overseas and there is increased interest from cruise ships to stop over at the Island. There is no information on pest species in Commonwealth waters.

A small population of the predatory native crown-of-thorns starfish *Acanthaster planci* has been reported in Lord Howe Island waters since 1975 (Harriott 1995). The starfish are mostly distributed on deeper offshore reefs and appear to be selectively preying upon *Acropora* spp. and *Montipora* spp. corals (DeVantier and Andrews 1987). Surveys in 1993 and 1994 indicate that the starfish may be moving into shallower waters closer to major coral communities in the northern reefs of Lord Howe Island (Harrison et al. 1995). The present starfish population is small and causes minimal damage. There is only a small probability that the present starfish population will result in a major outbreak. The recovery of the coral community from a major outbreak would be slow, because of the apparently low rate of input of coral larvae from sources external to the reef (Harrison et al. 1995).

2.11 Mining operations (including petroleum and mineral exploration and recovery)

The potential petroleum reserves for the Lord Howe Rise have been estimated by Symonds and Willcox (1989) at around 4.5 billion barrels. However, the Park is less than 2 per cent of the entire area. Furthermore, the Park lies largely over the apron of Lord Howe Island, where no petroleum potential is expected (at least within the 12 nm outer boundary of the Park) because of the thick pile of volcanic rocks and the structural disruption of possible underlying basin sediments by the intrusive activity (Hill et al. 2000a; 2000b). The mineral potential of the offshore zone between 3 and 12 nm is unknown and based on the broad geological setting, an extinct basaltic shield volcano, the potential for metallic minerals is not likely to be significant.

Although the area of the Lord Howe Rise considered most promising lies away from the Park, there is some interest in limited seismic survey for geoscientific research within the Park boundary to allow for the development of a regional geological perspective. Seismic activity for petroleum exploration outside the Park may indirectly cut across the Park boundary due to the angle at which seismic waves are reflected, or to allow a vessel to turn.

There are no exploration permits or production licences over the Park. The Offshore Exploration Strategy (1999) proposes the release of exploration acreage in 2001–2005. According to AGSO, in light of current information, the Park does not contribute to any significant downgrading of potential petroleum reserves in the Lord Howe Rise region as a whole or threaten future petroleum reserves in the region (pers. comm. AGSO 2000).

2.12 Tourism

The history of the Islanders and their special relationship with the sea is well known. After the whaling industry declined in 1870, the economy reverted to a subsistence basis until the export of kentia palm seed developed as a major enterprise in 1900. Tourism has gradually replaced agriculture as the most prosperous industry on the Island post-World War 2 (Lord Howe Island Board 1985) and the Island economy is almost entirely based on the tourism industry.

The tourism industry is based primarily on the natural attractions of the Island and its image as an unspoilt holiday destination providing a variety of water- and land-based activities (Lord Howe Island Board 2000). The number of visitors has more than doubled over the past 15 years. The *Lord Howe Island Board Regional Environmental Plan* limits the number of tourists on the Island at any one time to 400. During 1999–2000, 12,900 visitors were recorded as paying the Island Service Levy. The levy is not payable by children under 16 years of age, Islanders and relatives of Islanders, or visitors on official business (Lord Howe Island Board 2000). A visitor survey conducted in February and March 2000 by the Lord Howe Island Visitor Centre shows that most visitors are over 50 years of age. The average length of stay is 7 days. Water activities, such as boat tours, glass bottom boat tours, snorkelling, boat fishing and shore line fishing, are very popular with visitors to the Island.

2.13 Scientific Research

Due to its unique seamount characteristics, geographic location, distance from the mainland and relatively limited impacts from fishing, the species and habitats of the marine environs of Lord Howe Island provide an exceptional opportunity for marine scientific research. Scientific research has always been a significant activity on the Island, with the first known collection of Lord Howe fish made by the naturalists aboard HMS *Herald* in 1853. The Australian Museum has been closely associated with the study of the natural history of Lord Howe Island for more than 120 years (Allen et al. 1976). Seismic surveying for geoscientific purposes, for example to better understand the linkage between near geologic structure and benthic processes is also an important area of research in this region.

Scientific research and monitoring is a key component in the management of the Park. Poorly designed or unnecessary experiments can impact upon habitats and sensitive marine species through the collection of species using anaesthetics, spears, explosives or traps, the use of seismic survey and the installation of transects and other equipment. To date there have been few manipulative experiments and no large projects with significant impacts.



3. Management Framework

3.1 Management Approach in Planning

This and the following sections of the Plan deal with management of the pressures identified in section 2. Consistent with the Australian and New Zealand Environment and Conservation Council (ANZECC) Best Practice in Performance Reporting in Natural Resource Management: Benchmarking and Best Practice Program (ANZECC 1997), the following approach is used:

1. identification of the **overarching strategic objectives**;
2. specification of the **potential and actual pressures** on identified conservation values (previous section);
3. development of **management goals** focused on balancing sustainable use with conservation; and
4. development of **management strategies** for the achievement of the management goals.

In addition to the Plan, a performance assessment system is being designed to complement the indicators identified in section 4.4, which will:

1. develop further **performance measures** to provide an indication of changes in the values and management of the Park;
2. set **targets** that will be used to determine whether or not management strategies are achieving management goals; and
3. implement **monitoring programs** to collect appropriate information.

3.2 Legal Context

The waters of the sea around Lord Howe Island extending generally to the limit of the Exclusive Economic Zone are within the jurisdiction of Australia in accordance with UNCLOS (United Nations Convention on the Law of the Sea). Under the terms of the Offshore Constitutional Settlement between the Commonwealth and the States and Northern Territory, New South Wales has regulatory responsibility for the area out to 3 nms from Lord Howe Island and surrounding islets and rocks (State waters). The EPBC Act does not generally apply to activities in State waters except in so far as the activity may affect a matter of national environmental significance.

The Park is a 'Commonwealth reserve' under the EPBC Act. The administration, management and control of the Park are the function of the Director of National Parks (the Director). The Director's functions and powers in relation to the Park have been delegated to the First Assistant Secretary, Marine and Water Division, Environment Australia.

The EPBC Act requires the Director to prepare management plans for Commonwealth reserves. Once prepared, the plans are provided to the Minister for the Environment and Heritage for approval. A management plan is a 'disallowable instrument' and, when approved by the Minister, must be tabled in each House of the Commonwealth Parliament. Unless disallowed by either the House of Representatives or the Senate on a notice of a motion given within 15 sitting days, the plan will then come into operation. A management plan for a Commonwealth reserve has effect for seven years, subject to being revoked or amended earlier by another management plan for the reserve.

The EPBC Act requires the Director to exercise the Director's powers and perform the Director's functions to give effect to the management plan for a Commonwealth reserve, and the Commonwealth and other Commonwealth agencies must not perform functions or exercise powers inconsistently with the management plan (s362). Subsection 367(1) sets out the mandatory content of a management plan (Attachment 4).

The EPBC Act (s368(3)) also requires that planning and management for the Park take account of the:

- use of the reserve for the purpose for which it was declared;
- interests of any person who has a usage right relating to sea or sea-bed in the reserve that existed immediately before the reserve was declared¹;
- protection of the special features of the reserve, including objects and sites of biological, historical, palaeontological, archaeological, geological and geographical interest;
- the protection, conservation and management of biodiversity and heritage within the reserve;
- protection of the reserve against damage; and
- Australia's obligations under agreements between Australia and one or more other countries relevant to the protection and conservation of biodiversity and heritage, for example: (refer to the glossary for a brief description of each convention)
 - UNCLOS;
 - Convention Concerning the Protection of the World Cultural and Natural Heritage 1972 (World Heritage Convention);
 - Biodiversity Convention;
 - Convention on Migratory Species of Wild Animals (Bonn Convention);
 - International Convention for the Regulation of Whaling;
 - Convention for the Conservation of Southern Bluefin Tuna 1993 (CCSBT); and
 - Convention on the Prevention of Marine Pollution from Dumping of Wastes and Other Matter (London Convention 1972) and the 1996 Protocol thereto.

¹ This does not mean the holder of a prior usage right in relation to the sea in a Commonwealth reserve is exempt from the EPBC Act. Commercial fishing cannot be carried on except in accordance with a management plan as per S 354(1).

The EPBC Act prohibits certain acts from being done in a Commonwealth reserve except in accordance with a management plan (s354(1)). These acts are:

- kill, injure, take, trade, keep or move a member of a native species;
- damage heritage;
- carry on an excavation;
- erect a building or other structure;
- carry out works; and
- take an action for commercial purposes.

Mining operations are also prohibited unless the Governor-General has approved them and they are carried on in accordance with a management plan (s355).

Actions that would, or are likely to, have a significant impact on a specified matter of 'national environmental significance' are subject to the assessment and approval provisions of the EPBC Act (Chapters 2 and 4). The matters of national environmental significance are:

- World Heritage properties;
- wetlands of international importance (Ramsar wetlands);
- listed threatened species and ecological communities;
- listed migratory species;
- nuclear actions;
- the marine environments; and
- such further actions prescribed by the EPBC Regulations under the EPBC Act.

The Park is a 'Commonwealth marine area' for the purposes of the EPBC Act. The taking of an action in a Commonwealth marine area (including the airspace above it) that will, or is likely to, have a significant impact on the environment, or the taking of an action outside a Commonwealth marine area that will, or is likely to, have a significant impact on the environment in a Commonwealth marine area, will be subject to the assessment and approvals provisions of the EPBC Act.

Responsibility for compliance with the assessment and approvals provisions of the EPBC Act lies with persons taking relevant 'controlled' actions. A person proposing to take an action that the person thinks may be or is a controlled action must refer the proposal to the Minister for the Environment and Heritage for the Minister's decision whether or not the action is a controlled action.

The EPBC Act also contains provisions that prohibit and regulate actions in relation to listed threatened species and ecological communities, listed migratory species, cetaceans (whales and dolphins) and other (listed) marine species (Part 13).

3.3 National Policy Context

The Park is part of the National Representative System of Marine Protected Areas (NRSMPA). The NRSMPA aims to establish and manage a comprehensive, adequate and representative system of marine protected areas, to contribute to the long-term ecological viability of marine systems, to maintain ecological processes and to protect Australia's biological diversity at all levels (ANZECC 1999). Marine protected areas within the NRSMPA have been established especially for the conservation of biological diversity and have secure status.

The Commonwealth Government's commitment to the NRSMPA was reaffirmed through Australia's Oceans Policy, launched in 1998, which identified the need to protect marine biodiversity through marine protected areas and called for an accelerated development of the NRSMPA. The declaration of the Lord Howe Island Marine Park and this management plan fulfils a key component of the commitments made in Australia's Oceans Policy.



4. Managing the Lord Howe Island Marine Park (Commonwealth Waters)

4.1 Strategic Objectives

The strategic objectives for the Park are designed to comply with the EPBC Act, the *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A Guide for Action by Australian Governments* (ANZECC 1999) and the purposes for which the Park was proclaimed. They form the basis for this Plan and are presented below:

- to protect the conservation values associated with marine biological diversity, marine habitats and marine ecological and geological processes associated with the Lord Howe Island seamount and its marine environs;
- to promote the awareness, appreciation, use and enjoyment of the marine environs and its unique conservation values in a way that does not impact adversely on the values within the Park;
- to provide a framework for the integrated management of conservation and multiple uses in the region consistent with protecting the sensitive marine ecosystems surrounding Lord Howe Island and its National Estate and World Heritage values;
- to complement the NSW Lord Howe Island Marine Park and protect an important succession of cross-shelf marine environments from the beach, lagoon and coral reefs to the open ocean;
- to provide a management and planning process that will allow the community to maintain their involvement in the protection of the marine environment that is central to the traditions and lifestyle of the Island community; and
- to add a representative sample of the Lord Howe Island marine environs (habitats, species and ecological processes) to the National Representative System of Marine Protected Areas (NRSMPA).

4.2 Management Zoning and IUCN Categorisation

The EPBC Act requires that a management plan for a Commonwealth reserve must assign the reserve to one of the following IUCN protected area categories:

- Strict nature reserve (IUCN Ia);
- Wilderness area (IUCN Ib);
- National park (IUCN II);
- Natural monument (IUCN III);
- Habitat/species management area (IUCN IV);
- Protected landscape/seascape (IUCN V);
- Managed resource protected area (IUCN VI).

The EPBC Act requires that the provisions of a management plan for a Commonwealth reserve must be consistent with the relevant Australian IUCN Reserve Management Principles for the IUCN category to which the reserve is assigned by the plan. Australian reserve management principles for all IUCN categories are set out in the EPBC Regulations (Schedule 8). To the extent practical, the application of these management principles will also take into account the NSW MPA zoning guidelines for consistency and ease of implementation, compliance and enforcement.

The Park is assigned by this Plan to IUCN category IV: a habitat/species management area. This is broadly consistent with a Habitat Protection Zone used by the NSW MPA in their marine parks.

The EPBC Act provides that a management plan may divide a reserve into zones and assign each zone to an IUCN category that may differ from the category to which the reserve is assigned. To meet the objectives set out in section 4.1 of the Plan, the Park is divided by this Plan into three zones (see Figure 1):

- a habitat protection zone assigned to IUCN category IV – habitat species management area; and
- two Sanctuary Zones assigned to IUCN category Ia – strict nature reserve.

The characteristics of, and Australian reserve management principles for, the relevant IUCN protected area categories are at Attachment 5.

Habitat Protection Zone (IUCN category IV)

The Habitat Protection Zone will be subject to active management intervention to ensure the maintenance of habitats and to meet the requirements of specific species. Accordingly, consistent with the Australian IUCN reserve management principles for IUCN category IV, in relation to commercial activities:

- commercial activities other than mining (exploration or development) activities may be carried on in accordance with permits or determinations issued by the Director of National Parks or as provided for under a management plan if it can be demonstrated that the activity is not incompatible with the needs of the habitat/species under active management; and
- commercial activities may be subject to conditions to ensure they do not detract from the primary focus of protecting the biological diversity values of the reserve.

Consistent with the Australian IUCN reserve management principles for habitat species management areas, the Plan provides for ecologically sustainable recreational and commercial activities that are consistent with the strategic objectives of the Park. In particular, the activities should not have significant impacts on fish populations, benthic communities or other marine life and habitats. Commercial fishing activities, such as demersal trawling and longlining (pelagic, demersal and mid-water set), will not be allowed. All mining operations (including petroleum and mineral exploration or recovery) are prohibited.

Activities which may continue in the Habitat Protection Zone, in conjunction with appropriate management measures and monitoring of impacts, include other commercial fishing activities (by droplining, handlining and trolling), recreational fishing (by handlining and trolling), fishing competitions (by handlining and trolling), scuba diving, breath-held spearfishing, charter fishing (by handlining and trolling) and other charter tours, scientific research and boating.

Sanctuary Zones (IUCN category Ia)

As shown in Figure 1, one Sanctuary Zone extends to the east of Lord Howe Island southwards from latitude 31° 30' 40" S, in line with Malabar Point at the northern tip of the Island, to a latitude 31° 35' 50" S in line with King Point.

The other Sanctuary Zone lies to the south of Ball's Pyramid in line with the latitude 31° 46' 50" S that lies approximately 500m north of South-west Rock, and extends to the outer boundary of the Park.

In accordance with the Australian IUCN reserve management principles for strict nature reserves, the two Sanctuary Zones will be managed primarily for scientific research and environmental monitoring. The primary objective is to protect a representative sample of the shelf, slope and deepwater environment. Fishing will not be permitted in the zone by any method, nor will mining operations, including petroleum and mineral exploration and recovery.

4.3 General management requirements

The carrying on of activities in the Park may be subject to provisions of the EPBC Act (for example subsection 354(1) which prohibits certain activities in a Commonwealth reserve except in accordance with a management plan, and Provisions of Part 13 in relation to listed threatened, migratory and marine species and cetaceans) and the EPBC Regulations (for example, Part 12 of the Regulations regulates a range of activities in Commonwealth reserves), including provisions relating to the issue of permits.

Other legislation, such as the *Historic Shipwrecks Act 1976* (Commonwealth) or the *Fisheries Management Act 1991* (Commonwealth), may also be relevant to control activities in the Park.

Other non-statutory management tools, such as scientific research, public education, codes of practice and protocols, may also be applied to inform and improve management and compliance.

It is proposed that the NSW MPA will provide overall coordination and implementation of management including the issue of permits under Part 17 of the EPBC Regulations, as delegate of the Director of National Parks, in consultation with Environment Australia. The permit system will recognise and be consistent with other Commonwealth arrangements for the delegation of permits that provide access to Commonwealth reserves.

4.4 Management Prescriptions and Strategies

The table below identifies the management goals, and the management prescriptions and strategies employed to meet those goals. The management goals work towards achieving the strategic objectives of the Park (section 4.1). The indicators outline the information needed to measure the performance of the management of the Park.

Table 3: Management prescriptions and strategies

MANAGEMENT GOAL	4.4.1 To protect the conservation values associated with marine biological diversity, marine habitats and marine ecological and geological processes.
MANAGEMENT PRESCRIPTIONS:	
IUCN CATEGORY IV	<ul style="list-style-type: none"> Commercial demersal trawling and longlining (pelagic, demersal and mid-water) prohibited. All mining operations (including petroleum and minerals exploration and recovery) prohibited.
IUCN CATEGORY Ia	<ul style="list-style-type: none"> Fishing is prohibited All mining operations (including petroleum and minerals exploration and recovery) prohibited.
MANAGEMENT STRATEGIES	<ul style="list-style-type: none"> Educate users of the conservation values and location of the Park. Compliance and Enforcement Plan developed and implemented.
INDICATORS	<ul style="list-style-type: none"> Vessel movements. Indicators of fish stock size and recruitment and maintenance of biodiversity.
MANAGEMENT GOAL	4.4.2 To provide for the integrated management of conservation and multiple use in the Park.
MANAGEMENT PRESCRIPTIONS:	
IUCN CATEGORY IV	<ul style="list-style-type: none"> Commercial fishing activities other than charter fishing (dealt with below) allowed subject to the following prescriptions: <ul style="list-style-type: none"> commercial fishing allowed by Island residents only; fishing can only be conducted by droplining, handlining or trolling; dropline gear must be limited to 3 lines and 15 hooks per line per vessel, and radio beacons must be installed on each buoy; handlining and trolling must be carried-on in a manner that is consistent with the legal lengths, catch limits, permitted gear, and other relevant regulations of the <i>NSW Fisheries Management Regulations 1995</i>; fish can only be taken for consumption on the Island; the activity must be carried-on in accordance with fishing concessions issued by the relevant State or Commonwealth fisheries agency; the activity must be approved generally by the Director, or each person carrying-on the activity must be specifically authorised by a permit issued by the Director under Part 17 of the EPBC Regulations; the Director may give approval if satisfied that the activity can be carried-on under relevant State or Commonwealth fishing concessions in a manner that is compatible with the strategic objectives of the Park (section 4.1), without the need for additional conditions to be imposed; any approval given by the Director may be withdrawn if the Director is not satisfied as to the preceding matters; the activity is subject to any determinations made by the Director under the regulation 12.34 of the EPBC Regulations. Charter fishing (by handlining and trolling) allowed subject to the following prescriptions: <ul style="list-style-type: none"> the activity must be carried-on in accordance with fishing concessions issued by the relevant State or Commonwealth fisheries agency, and in accordance with permits issued by the Director under Part 17 of the EPBC Regulations; the activity must be carried-on in a manner consistent with the legal lengths, catch limits, permitted gear, and other regulations of the <i>NSW Fisheries Management Regulations 1995</i>; and the activity is subject to any determinations made by the Director under regulation 12.34 of the EPBC Regulations.

MANAGEMENT GOAL	4.4.3 Increase knowledge of the marine environs and geological features for scientific purposes and Park management.
MANAGEMENT PRESCRIPTIONS:	
IUCN CATEGORY IV	<ul style="list-style-type: none"> Scientific research, including geoscientific seismic survey, allowed under a permit by the Director under the EPBC Regulations and any other permit required under Commonwealth legislation. Scientific research that involves seismic activity must also be in accordance with the guidelines for seismic activity.
IUCN CATEGORY Ia	<ul style="list-style-type: none"> Scientific research, including geoscientific seismic survey, allowed under a permit by the Director under the EPBC Regulations and any other permit required under Commonwealth legislation. Scientific research that involves seismic activity must also be in accordance with the guidelines for seismic activity.
MANAGEMENT STRATEGIES	<ul style="list-style-type: none"> EA will liaise with research organisations and other stakeholders to gain a better understanding of conservation values and biodiversity of the Park.
INDICATORS	<ul style="list-style-type: none"> Number of research reports published.
MANAGEMENT GOAL	4.4.4 Ensure parity between this Plan, the NSW MPA Zoning and Operational Plans for the adjoining State Park, World Heritage management arrangements and other management arrangements such as the Regional Environmental Plan for the Lord Howe Island Group.
MANAGEMENT STRATEGIES	<ul style="list-style-type: none"> EA representation on Lord Howe Island Marine Park Steering Committee and Advisory Committee. Where practical, management prescriptions will be consistent with NSW MPA operational and zoning guidelines for ease of implementation, compliance and enforcement. Comment on any proposal that may trigger a referral for environmental impact assessment in accordance with EPBC Act. EA support for measures developed by the NSW MPA and other agencies to minimise risk from invasive marine pests.
INDICATORS	<ul style="list-style-type: none"> Agencies, community and other stakeholders satisfied that management arrangements are streamlined, efficient and easily understood.
MANAGEMENT GOAL	4.4.5 Minimise the risk of accidental or deliberate encroachment on the Park by vessels engaged in trawling and longline activities.
MANAGEMENT STRATEGIES	<ul style="list-style-type: none"> EA to work closely with AFMA, industry groups and individual operators to improve awareness of the location of the Park, values and allowed activities. Liaise with AFMA to ensure all longline vessels have a Vessel Monitoring System (VMS) fitted. Liaise with AFMA to monitor access to the Park.
INDICATORS	<ul style="list-style-type: none"> Number of fishing vessels entering the Park. VMS records. Community observations of fishing vessels in the Park. Brochure, fact sheets and other information developed and distributed to user groups.

MANAGEMENT GOAL	4.4.6 Ensure activities are conducted in accordance with the Plan and other relevant legislation and regulations.
MANAGEMENT STRATEGIES	<ul style="list-style-type: none"> • Investigate cross-authorisation arrangements with other agencies to maintain compliance and enforcement presence in the Park. • Ensure NSW MPA staff are trained and appointed as EA wardens under the EPBC Act. • Initiate a Lord Howe Island Watch program for the Island community, commercial tour operators, restaurateurs and commercial fishers to report suspicious activities. • Develop with relevant user groups code of conduct and permit conditions.
INDICATORS	<ul style="list-style-type: none"> • Compliance and enforcement plan developed and implemented. • Brochure, fact sheets and other information developed and distributed to user groups. • Database developed to record and investigate any infringements.

4.5 Activity Management

As noted earlier in the Plan, subsection 354(1) of the EPBC Act prohibits certain actions being taken in a Commonwealth reserve except in accordance with a management plan. The EPBC Regulations also prohibit a range of activities in Commonwealth reserves. Some of the activities fall within subsection 354(1) of the Act. Activities that are prohibited only by the Regulations may be carried on in accordance with a permit issued by the Director under Part 17 of the Regulations, or if carried out in accordance with a management plan.

Activities that are subject to both subsection 354(1) of the EPBC Act and the EPBC Regulations include commercial and non-commercial fishing, and scientific research that involves killing, injuring, taking, keeping or moving a member of a native species (research that does not include these actions is still subject to the EPBC Regulations). These activities may only be carried on in accordance with a management plan (which may provide for permits to be issued).

Subsection 354(1) is a 'civil penalty provision'. The prescribed maximum penalty for contravention of subsection 354(1) is 500 penalty units for an individual and 5,000 penalty units for a body corporate. Contravention of the EPBC Regulations is also an offence.

Maximum penalties may be up to 50 penalty units. A penalty unit is \$110 at the time of preparation of this Plan.

Section 355 of the EPBC Act prohibits mining operations (including petroleum and mineral exploration and recovery) unless the Governor-General has approved the operations and they are carried on in accordance with a management plan.

Some commercial fishing activities and all mining operations will not be allowed in the Park.

Table 4 sets out the management arrangements for particular activities in the Park. It is based on the previous table (Table 3). The prescriptions in this table do not exclude any requirement for an activity to be authorised under any other relevant Commonwealth, State or Territory legislation relating to the Commonwealth.

Table 4: Management arrangements for particular activities in the Park

* Penalties may also apply under other Commonwealth, State or Territory legislation relating to the Commonwealth

ACTIVITY	MANAGED RESOURCE ZONE IUCN IV	HIGHLY PROTECTED ZONE IUCN Ia	ENFORCEMENT PENALTY
4.5.1 Commercial fishing	<ul style="list-style-type: none"> Commercial demersal trawling and longlining (pelagic, demersal, mid-water) prohibited. Commercial fishing activities other than charter fishing (dealt with below) allowed subject to the following prescriptions: <ul style="list-style-type: none"> commercial fishing allowed by Island residents only; fishing can only be conducted by droplining, handlining or trolling; dropline gear must be limited to 3 lines and 15 hooks per line per vessel, and radio beacons must be installed on each buoy; handlining and trolling must be carried-on in a manner that is consistent with the legal lengths, catch limits, permitted gear, and other relevant regulations of the <i>NSW Fisheries Management Regulations 1995</i>; fish can only be taken for consumption on the Island; the activity must be carried-on in accordance with fishing concessions issued by the relevant State or Commonwealth fisheries agency; the activity must be approved generally by the Director, or each person carrying-on the activity must be specifically authorised by a permit issued by the Director under Part 17 of the EPBC Regulations; the Director may give approval if satisfied that the activity can be carried-on under relevant State or Commonwealth fishing concessions in a manner 	<ul style="list-style-type: none"> Prohibited 	<p>Enforcement EA will further develop cooperative arrangements with NSW MPA, Coastwatch, AFMA and the Australian Defence Force to monitor fishing and other boating activity in the Park.</p> <p>Penalties s354(1) EPBC Act – 500 penalty units for an individual and 5,000 penalty units for a body corporate. r.12.34 EPBC Regulation – 50 penalty units</p>

Table 4: Management arrangements for particular activities in the Park *continued*

* Penalties may also apply under other Commonwealth, State or Territory legislation relating to the Commonwealth

ACTIVITY	MANAGED RESOURCE ZONE IUCN IV	HIGHLY PROTECTED ZONE IUCN Ia	ENFORCEMENT PENALTY
	<p>that is compatible with the strategic objectives of the Park (section 4.1), without the need for additional conditions to be imposed;</p> <ul style="list-style-type: none"> – any approval given by the Director may be withdrawn if the Director is not satisfied as to the preceding matters; – the activity is subject to any determinations made by the Director under the regulation 12.34 of the EPBC Regulations. 		
<p>4.5.2 Recreational fishing and line fishing competitions</p>	<ul style="list-style-type: none"> • Recreational fishing (by handlining and trolling) and breath-held spearfishing allowed subject to the following prescriptions: <ul style="list-style-type: none"> – the activity must be carried-on in accordance with any fishing concessions issued by the relevant State or Commonwealth fisheries agency; – a permit by the Director is not required, but the activity is otherwise subject to the EPBC Regulations, including any determinations made by the Director under regulation 12.35 of the EPBC Regulations on practices and gear to be used; and – the activity must be carried-on in a manner consistent with the legal lengths, catch limits, permitted gear, and other relevant regulations of the <i>NSW Fisheries Management Regulations 1995</i>. 	<ul style="list-style-type: none"> • Prohibited 	<p>Enforcement EA will further develop cooperative arrangements with NSW MPA, Coastwatch, AFMA and the Australian Defence Force to monitor fishing and other boating activity in the Park.</p> <p>Penalties s354(1) EPBC Act – 500 penalty units for an individual and 5,000 penalty units for a body corporate. r.12.35 EPBC Regulations – 30 penalty units.</p>

Table 4: Management arrangements for particular activities in the Park *continued*

* Penalties may also apply under other Commonwealth, State or Territory legislation relating to the Commonwealth

ACTIVITY	MANAGED RESOURCE ZONE IUCN IV	HIGHLY PROTECTED ZONE IUCN Ia	ENFORCEMENT PENALTY
4.5.2 Recreational fishing and line fishing competitions <i>continued</i>	<ul style="list-style-type: none"> Fishing competitions (by handlining and trolling) allowed in accordance with a permit issued by the Director under the EPBC Regulations, and any other relevant fishing concession. 	<ul style="list-style-type: none"> Prohibited 	
4.5.3 Commercial charter tours (including charter fishing, scuba diving, dolphin/whale watching and scenic tours).	<ul style="list-style-type: none"> Charter fishing (by handlining and trolling) allowed subject to the following prescriptions: <ul style="list-style-type: none"> the activity must be carried-on in accordance with fishing concessions issued by the relevant State or Commonwealth fisheries agency, and in accordance with permits issued by the Director under Part 17 of the EPBC Regulations; the activity must be carried-on in a manner consistent with the legal lengths, catch limits, permitted gear, and other regulations of the NSW <i>Fisheries Management Regulations 1995</i>; and the activity is subject to any determinations made by the Director under regulation 12.34 of the EPBC Regulations. Other commercial charter tours including scuba diving, dolphin/whale watching and scenic tours allowed in accordance with permits issued by the Director under the EPBC Regulations. Enforce EPBC Regulations pertaining to interactions with cetaceans, other protected species and whale watching. 	<ul style="list-style-type: none"> Charter fishing prohibited. Charter scuba diving, dolphin/whale watching and scenic tours allowed in accordance with permits issued by the Director under the EPBC Regulations. 	<p>Enforcement EA will further develop cooperative arrangements with NSW MPA, Coastwatch, AFMA and the Australian Defence Force to monitor fishing and other boating activity in the Park.</p> <p>Penalties s354(1) EPBC Act – 500 penalty units for an individual and 5,000 penalty units for a body corporate.</p> <p>r.12.35 EPBC Regulations – 30 penalty units.</p> <p>EPBC Regulations, Part 8 – 50 penalty units</p>

Table 4: Management arrangements for particular activities in the Park *continued*

* Penalties may also apply under other Commonwealth, State or Territory legislation relating to the Commonwealth

ACTIVITY	MANAGED RESOURCE ZONE IUCN IV	HIGHLY PROTECTED ZONE IUCN Ia	ENFORCEMENT PENALTY
4-5.4 Scientific research	<ul style="list-style-type: none"> Scientific research, including geoscientific seismic survey, allowed under a permit by the Director under the EPBC Regulations and any other permit required under other relevant Commonwealth legislation. Scientific research that involves that involves seismic activity must also be in accordance with the guidelines for seismic activity. 	<ul style="list-style-type: none"> Scientific research, including geoscientific seismic survey, allowed under a permit by the Director under the EPBC Regulations and any other permit required under other relevant Commonwealth legislation. Scientific research that involves that involves seismic activity must also be in accordance with the guidelines for seismic activity. 	<p>Penalties</p> <p>S354(1) EPBC Act – 500 penalty units for an individual and 5,000 penalty units for a body corporate.</p> <p>r.12.10 EPBC Regulations – 20 penalty units.</p>
4-5.5 Mining operations (including petroleum and mineral exploration and recovery)	<ul style="list-style-type: none"> Prohibited 	<ul style="list-style-type: none"> Prohibited 	
4-5.6 Commercial shipping	<ul style="list-style-type: none"> Allowed as per the right of innocent passage. Notification of marine park to be provided within Notices to Mariners and Marine Charts. Placement of navigation markers will be allowed subject to consultation with EA. 	<ul style="list-style-type: none"> Allowed as per the right of innocent passage. Notification of marine park to be provided within Notices to Mariners and Marine Charts. Placement of navigation markers will be allowed subject to consultation with EA. 	
4-5.7 Recreational scuba diving	<ul style="list-style-type: none"> Allowed 	<ul style="list-style-type: none"> Allowed 	
4-5.8 Recreational boating and yachting	<ul style="list-style-type: none"> Allowed 	<ul style="list-style-type: none"> Allowed 	<p>Penalty</p> <p>r.12.56 EPBC Regulations – 15 penalty units.</p>

Table 4: Management arrangements for particular activities in the Park *continued*

* Penalties may also apply under other Commonwealth, State or Territory legislation relating to the Commonwealth

ACTIVITY	MANAGED RESOURCE ZONE IUCN IV	HIGHLY PROTECTED ZONE IUCN Ia	ENFORCEMENT PENALTY
4.5.9 Australian Defence Force activities	<ul style="list-style-type: none">Activities carried on by the Australian Defence Force that are subject to the EPBC Act, the Plan or the EPBC Regulations may be carried on in accordance with the Act, Plan or Regulations.EA will work closely with the Australian Defence Force to ensure defence activities are consistent with the Plan and to streamline any approval processes and permit requirements where they may apply to relevant defence operations.	<ul style="list-style-type: none">Activities carried on by the Australian Defence Force that are subject to the EPBC Act, the Plan or the EPBC Regulations may be carried on in accordance with the Act, Plan or Regulations.EA will work closely with the Australian Defence Force to ensure defence activities are consistent with the Plan and to streamline any approval processes and permit requirements where they may apply to relevant defence operations.	Penalties r. 12.56 EPBC Regulations – 15 penalty units.
4.5.10 Other commercial activities	<ul style="list-style-type: none">Allowed in accordance with a permit issued by the Director under the EPBC Regulations.	<ul style="list-style-type: none">Prohibited	Penalties s354(1) EPBC Act – 500 units for an individual and 5,000 penalty units for a body corporate. r.12.36 EPBC Regulation – 30 penalty units.



5. Reviewing this Plan

5.1 Performance Assessment

A performance assessment framework is provided in the *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A Guide for Action by Australian Governments* (ANZECC 1999) and the ANZECC Best Practice in Performance Reporting in Natural Resource Management (ANZECC 1997). The performance assessment program for the Park will be based on this Plan including its:

- legislative framework;
- strategic objectives;
- analysis of potential pressures on the conservation values of the Park;
- management goals; and
- management strategies.

Initial performance indicators have been developed (see section 4.4) as part of the performance assessment process. The performance and the management of the Park will be assessed through development and implementation of:

- further performance measures;
- targets;
- data collection techniques; and
- data analyses.

A mechanism by which the results of the performance assessment are fed back into the process of making ongoing management decisions will be a key component of this program.

Environment Australia will liaise with research organisations and other stakeholders in the development and implementation of a performance assessment system that will include:

- monitoring activities and compliance in the Park;
- monitoring the status of the ecosystems of the Park with non-intrusive techniques; and
- further survey work to build on existing knowledge of conservation values of the Park.

Environment Australia will liaise with AFMA regarding performance measures and monitoring programs to assist with the management of pelagic fishing and trawling adjacent to the Park.

In selecting the performance indicators in section 4.3 and future indicators, preference is given to those which:

- provide early warning of potential threats (i.e. they should be sensitive);
- function as triggers for clear, predetermined management actions (dynamic feedback mechanism);
- are cost-effective, simple, meaningful and practical to implement and interpret;
- are easy to monitor, assess and report on;
- are established early in the value-pressure analysis;
- are scientifically credible and statistically robust;
- can essentially be quantitative, within control; and
- can be surrogates.

For the Park, the identification of performance indicators is based around the following issues and indicator groups:

- protected species;
- habitat extent;
- habitat quality;
- resource use;
- water/sediment quality;
- integrated management; and
- ecosystem level processes.

5.2 Reviewing the Plan

This Plan will operate for seven years unless revoked or amended sooner by another management plan. Performance assessment will be carried out during the life of this Plan. Results from the performance assessment program will be used to undertake a review of the Plan approximately two years before its expiry. The results of the review will be used in the development of the next management plan for the Park.



Bibliography

Allen, G.R., Hoese, D.F., Paxton, J.R., Randall, J.E., Russell, B.C., Starck, W.A. Talbot, F.H., and Whitley, G.P. (1976) Annotated checklist of fishes of Lord Howe Island. *Records of the Australian Museum*, 30:365–454

Australian Heritage Commission (2001). Lord Howe Island Group and Maritime Environs, Lord Howe Island NSW. In: *Register of the National Estate*. Australian Heritage Commission, Canberra. Online database, accessed 8 August 2001.

URL: <http://www.ahc.gov.au/cgi-bin/heritage/register/site.pl?ooo201>

ANZECC (1997) *Best Practice in Performance Reporting in Natural Resource Management*. Benchmarking and Best Practice Program, Australian and New Zealand Environment and Conservation Council, Working Group on National Parks and Protected Area Management: Canberra.

ANZECC (1999) *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A Guide for Action by Australian Governments*. Australian and New Zealand Environment and Conservation Council, Taskforce on Marine Protected Areas: Canberra.

Australian Museum (1992) Reef Biology – a survey of Elizabeth and Middleton Reefs, South Pacific. *Kowarri* 3, R. Longmore (executive editor), Australian National Parks and Wildlife Service, Canberra.

Australian Museum Business Services (1998) *Proposed Lord Howe Island Marine Park Marine Fish and Invertebrate Data Investigation*. Environment Australia: Canberra.

Australian Quarantine Inspection Service (2001) *Ballast water research series. Report no.1*. Commonwealth Department of Agriculture, Fisheries and Forestry. Online database, accessed 2 December 2001. URL:<http://www.affa.gov.au>

Bax, N.J. (1996) *Stock Assessment Report 1996: Orange Roughy* (*Hoplostethus atlanticus*). Compiled for the South-East Fishery Stock Assessment Group.

Biosis Research (1998) *World Heritage Values and Other Values of the Lord Howe Island Group – Update*. Report prepared by Biosis Research for the Commonwealth Department of Environment, Sport and Territories, Port Melbourne, February 1998.

Carlton, J.T. 1985, Transoceanic and interoceanic dispersal of coastal marine organisms; the biology of ballast water. *Oceanographic Marine Biology Annual Review* 23, 313–374.

Collie, J.S., Escanero, G.A. and Valentine, P.C. (1997) Effects of bottom fishing on the benthic megafauna of Georges Bank. *Marine Ecology Progress Series*. 155:159–172.

Commonwealth of Australia (1994) *The South East Fishery*. Bureau of Resource Sciences: Canberra.

Commonwealth of Australia (1995) *Southern Bluefin Tuna Fishery Management Plan 1995*. AFMA: Canberra.

Commonwealth of Australia (1998a) *Threat Abatement Plan for the Incidental Catch (or By-catch) of Seabirds During Oceanic Long-line Fishing Operations*. Environment Australia: Canberra.

Commonwealth of Australia (1998b) *South East Trawl Fishery Management Plan 1998*. AFMA: Canberra.

Commonwealth of Australia (1998c) *The Southern Shark Fishery 1997*. Southern Shark Fishery Assessment Group: Canberra.

Commonwealth of Australia (1999a) *South East Fishery Trawl Sector 2000 Management Arrangements*. AFMA: Canberra.

Commonwealth of Australia (1999b) *South East Non-Trawl Fishery 2000 Management Arrangements*. AFMA: Canberra.

Commonwealth of Australia (2000a) *Fishery Status Report: Resource Assessments of Australian Commonwealth Fisheries 1999*. Bureau of Rural Sciences: Canberra.

Commonwealth of Australia (2000b) *Commonwealth Policy on Fisheries By-catch*. Commonwealth of Australia: Canberra.

CSIRO (1994) *Assessment of Conservation and Management Requirements for Southern Seamounts*. Ocean Rescue 2000 National Projects. Final report for the Australian Nature Conservation Agency, September.

Dayton, P.K., Thrush, S.F., Agardy, M.T. and Hofman, R.J. (1995) Viewpoint: Environment effects of marine fishing. *Aquatic Conservation: Marine and Freshwater Ecosystems* 5:205–232.

DeVantier, L.M. and Andrews, G.J. (1987) *Report on Surveys of the Distribution, Abundance and Impacts of Acanthaster planci on the Fringing Reefs of Lord Howe Island and the Solitary Islands*. Australian Institute of Marine Science: Townsville.

Edgecombe, J. (1987) *Lord Howe Island World Heritage Area*. Australian Environmental Publications: Sydney.

Environment Australia (2000) *Lord Howe Island Marine Park Proposal*. Environment Australia, Marine Protected Area Section: Canberra.

Fager, E. W. and McGowan, J.A. (1963) Zooplankton species groups in the North Pacific. *Science* 140: 453–460.

Francis, M.P. (1993) Checklist of the coastal fishes of Lord Howe, Norfolk and Kermadec Islands, Southwest Pacific Ocean. *Pacific Sciences* 47(2):136–170.

Francis, M.P. and Randall, J.E. (1993) Further additions to the fish faunas of Lord Howe and Norfolk Islands, Southwest Pacific Ocean. *Pacific Sciences*, 47:118–135.

Gillanders, B.M., Ferrell, D.J. and Andrew, N.L. (2000) Estimates of movement and life-history parameters of yellowtail kingfish (*Seriola lalandi*): how useful are data from a cooperative tagging programme? *Marine Freshwater Research* 52:179–92.

Goñi, R. (1998) Ecosystem effects of marine fisheries: an overview. *Ocean and Coastal Management*. 40:37–64.

- Grigg, R.W. (1993) Precious coral fisheries of Hawaii and the U.S. Pacific islands. *Marine Fisheries Review* 55(2): 50–60.
- Harriott, V.J. (1992) Recruitment patterns of scleractinian corals in an isolated sub-tropical reef system. *Coral Reefs*, 11:215–219.
- Harriott, V.J., Harrison, P.L. and Banks, S.A. (1993) *The Marine Benthic Communities of Lord Howe Island*. Report for the Australian National Parks and Wildlife Service. Centre for Coastal Management, University of New England.
- Harriott, V.J. (1995) Is the crown-of-thorns starfish a threat to the reefs of Lord Howe Island? *Aquatic Conservation: Marine and Freshwater Ecosystems* 5:179–190.
- Harrison, P.L., Harriott, V.J. and Banks, S.A. (1995) *Status of the Coral Reef Benthic Communities of Lord Howe Island*. Report for the Australian Nature Conservation Agency. Centre for Coastal Management, Southern Cross University.
- Hill, P.J., Exon, N.F. and Koslow, J.A. (1997) Multibeam sonar mapping of the seabed off Tasmania: results for geology and fisheries. Third Australasian Hydrographic Symposium. *Maritime Resource Development*, Symposium Papers, Special Publication 38: 9–19.
- Hill, P.J., Rollet, N., Rowland, D., Calver, C.R. and Bathgate, J. (2000a) *Swath-Mapping and Geophysical Survey of Australia's Southeast Marine Zone: AUSTREA-1 Research Cruise using L'Atalante*. Australian Geological Survey Organisation, Record 2000/4.
- Hill, P.J., Rollet, N. and Symonds, P. (2000b) Seafloor Mapping of the South-east Region and Adjacent Waters. *AUSTREA Final Report: Lord Howe Island, South-East Australian Margin (includes Tasmania and South Tasman Rise) and Central Great Australian Bight*. Australian Geological Survey Organisation: Canberra.
- Hutton, I. (1986) *Discovering Australia's World Heritage: Lord Howe Island*. Conservation Press: Canberra.
- Hutton, I. (1991) *Birds of Lord Howe Island: Past and Present*. Coffs Harbour, NSW.

Hyrenbach, K.D., Forney, K.A. and Dayton, P.K. (2000) Marine protected areas and ocean basin management *Aquatic Conservation: Marine and Freshwater Ecosystems* 10:437–458.

Jones, J.B. (1992) Environmental impact of trawling on the seabed: a review. *New Zealand Journal of Marine and Freshwater Resources* 26:59–67.

Kennett, J.P. (1982) *Marine Geology*. Prentice-Hall, Englewood Cliffs, New Jersey, USA.

Koslow, J.A. (1993) Community structure in North Atlantic deep-sea fishes. *Progress in Oceanography* 31:321–338.

Koslow, J.A. (1994) *Assessment of Conservation and Management Requirements for Southern Seamounts*. CSIRO Division of Fisheries: Hobart.

Koslow, J.A. (1997) Seamounts and the ecology of deep-sea fisheries. *American Scientist* 85:168–76

Koslow, J.A. and Gowlett-Holmes, K. (1998) *The Seamount Fauna Off Southern Tasmania: Benthic Communities, Their Conservation and Impacts of Trawling*. Final Report to Environment Australia and the Fisheries Research and Development Corporation, Canberra.

Koslow, J.A., Gunn, J. and Rintoul, S.R. (1998) *Deep-water Ecosystem Structure and the Management of a Proposed Deep-water Marine Park South of Tasmania*. Report to Environment Australia, Canberra.

Lord Howe Island Board (1985) *Lord Howe Island Regional Environmental Study volume 1*. Lord Howe Island Board: Sydney.

Lord Howe Island Board (2000) *Report of the Lord Howe Island Board for the Year Ended 30th June 2000*. Lord Howe Island Board: Sydney.

Manidis Roberts Consultants (2000) *Lord Howe Island Group World Heritage Property Strategic Plan for Management 2000–2005*. Prepared for the Lord Howe Island Board, NSW.

Maniwavie, T., Sweatman, H., Marshall, P., Munday, P. and Rei, V. (2000) Status of coral reefs of Australasia and Papua New Guinea. In: C. Wilkinson (ed) *Status of Coral Reefs of the World*. Australian Institute of Marine Science: Townsville.

McDougall, I., Embelton, B.J.J. and Stone, D.B. (1981) Origin and evolution of Lord Howe Island, Southwest Pacific. *Journal of Geological Society Australia* 28:155–176.

Millar, A.J.K. and Kraft, G.T. (1993) Catalogue of marine and freshwater red algae (Rhodophyta) of New South Wales, including Lord Howe Island, South-western Pacific. *Australian Systematic Botany* 6:1–90.

Millar, A.J.K. and Kraft, G.T. (1994a) Catalogue of marine benthic algae (Chlorophyta) of New South Wales, including Lord Howe Island, South-western Pacific. *Australian Systematic Botany* 7:419–453.

Millar, A.J.K. and Kraft, G.T. (1994b) Catalogue of marine brown algae (Phaeophyta) of New South Wales, including Lord Howe Island, South-western Pacific. *Australian Systematic Botany* 7:1–46.

New South Wales Heritage Office and New South Wales Marine Parks Authority (fc) *Marine Park Shipwrecks and Other Underwater Relics Management Principles*. Draft report as at 21 January 2002.

Nilsson, C.S. and Creswell, G.R. (1980) The formation and evolution of east Australian current warm-core eddies. *Progress in Oceanography* 9:133–183.

Nomination of the Lord Howe Island Group by the Commonwealth of Australia for inclusion in the World Heritage List. Prepared by the New South Wales Government, Australian National Parks and Wildlife Service, and the Australian Heritage Commission, December 1981.

Parker, P. (1993) Lord Howe Island Marine Reserve: The Final Stages of Planning. *National Parks Journal* 37(2). National Parks Association: Sydney.

Pichon, M. (1995) *An Assessment of the Nature Conservation Values of the Commonwealth Waters surrounding Lord Howe Island*. Report commissioned by the Australian Nature Conservation Agency for the Ocean Rescue 2000 Program. Australian Institute of Marine Science: Townsville.

Pollard, D. and Burchmore, J. (1985) *Lord Howe Island Regional Environmental Study: Marine Environment with a Proposal for an Aquatic Reserve*. Division of Fisheries, Dept of Agriculture. Lord Howe Island Board.

Ponder, W., Loch, I. and Berents, P. (2000) *An Assessment of the Marine Invertebrate Fauna of the Lord Howe Island Shelf Based on the Collections of the Australian Museum*. Australian Museum: Sydney.

Poore, G.C.B. and Wilson, G.D.F. (1993) Marine species richness. *Nature* 361:597–598.

Poore, G.C. B., Just, J. and Cohen, B.F. (1994) Composition and diversity of Crustacea Isopoda of the southeastern Australian continental slope. *Deep Sea Research*, 41:677–693.

Richer de Forges, B. (1990) Explorations for bathyal fauna in the New Caledonian economic zone. In: A. Crosnier (ed.), *Resultats des Campagnes Musorstom*, 6(A) 145:9–54. Museum National d'Histoire Naturelle: Paris.

Richer de Forges, B., Koslow, J.A. and Poore, G.C.B. (2000) Diversity and endemism of the benthic seamount fauna in the southwest Pacific. *Nature* 405:944–947.

Rintoul, S.R., Donguy, J.R. and Roemmich, D.H. (1997) Seasonal evolution of upper ocean thermal structure between Antarctica and Tasmania. *Deep-Sea Research* 44:1185–1202.

Rintoul, S.R. and Bullister, J.L. (1999) A late winter hydrographic section from Tasmania to Antarctica. *Deep-Sea Research, Part 1: Oceanographic Research Papers* (46)8: 1417–1454.

Roberts, C.M., McClean, C.J., Veron, J.E.N., Hawkins, J.P., Allen, G.R., McAllister, D.E., Mittermeier, C.G., Schueler, F.W., Spalding, M., Wells, F., Vynne, C., Werner, T.B. (2002), Marine biodiversity hotspots and conservation priorities for tropical reefs. *Science*, February (295): 1280–1284.

Rogers, A.D. (1994) The biology of seamounts. *Advances in Marine Biology* 30:305–350.

- Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure (1993) *Fisheries Reviewed*. Commonwealth of Australia: Canberra.
- Serventy, V. (1985) *Australia's World Heritage Sites*. Macmillan: Melbourne.
- Smith, A., Pepperell, J., Diplock, J. and Dixon, P. (1991) Study suggests NSW kingfish one stock. *Australian Fisheries* 50(3):34–35.
- Smith, K.L., Schwab, W.C., Noble, M. and de Moustier, C. (1989) Physical, geological and biological studies on four Pacific seamounts: introduction. *Deep-Sea Research* 36(12):1785–1790.
- Smith, N. (ed.) (1977) *Lord Howe Island*. Australian Museum: Sydney.
- Sutherland, L. and Ritchie, A. (1977) Defunct volcanoes and extinct horned turtles. *Lord Howe Island*. Australian Museum: Sydney.
- Symonds, P.A. and Willcox, J.B. (1989) Australia's petroleum potential in areas beyond an Exclusive Economic Zone. Bureau of Mineral Resources, *Journal of Australian Geology and Geophysics*, 11:11–36.
- Veron, J.E.N. and Done, T.J. (1979) Corals and coral communities of Lord Howe Island. *Australian Journal of Marine and Freshwater Research*, 30:203–236.
- Wilkinson, C. (ed.) (2000) *Status of Coral Reefs of the World: 2000*. Australian Institute of Marine Science: Townsville.

Attachment 1

Proclamation of the Lord Howe Island Marine Park (Commonwealth Waters)

1552 *Government departments*

*Commonwealth of Australia Gazette
No. GN 24, 21 June 2000*



PROCLAMATION

National Parks and Wildlife Conservation Act 1975

I, WILLIAM PATRICK DEANE, Governor-General of the Commonwealth of Australia, acting with the advice of the Federal Executive Council and under subsection 7(2) of the *National Parks and Wildlife Conservation Act 1975*:

- (a) declare the area specified in the Schedule to be a Park; and
- (b) assign to the Park the name "Lord Howe Island Marine Park"; and
- (c) specify that the subsoil extending to a depth of 100 metres below the sea-bed within the declared area is within the Park.

Signed and sealed with the
Great Seal of Australia

on 7 June. 2000



WILLIAM DEANE
Governor-General

By His Excellency's Command

Robert Hill
Minister for the Environment and Heritage

Schedule

Lord Howe Island Marine Park

"The area of the Australian coastal sea that lies between 3 and 12 nautical miles extending from the territorial sea baselines* around Lord Howe Island, Ball's Pyramid and their adjacent islands**.

* The territorial sea baselines are proclaimed under the *Seas and Submerged Lands Act 1973*.

** Lord Howe Island, Ball's Pyramid and their adjacent islands are parts of the State of New South Wales."

9616741

Attachment 2

Protected species under the EPBC Act found in, or in the vicinity of, the Park

Listed migratory species

SCIENTIFIC NAME	COMMON NAME	TYPE OF PRESCENCE STATUS
<i>Diomedea amsterdamensis</i> (64405)	Amsterdam albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Diomedea antipodensis</i> (64458)	Antipodean albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Diomedea exulans</i> (1073)	Wandering albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Diomedea gibsoni</i> (64466)	Gibson's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Pterodroma solandri</i> (1040)	Providence petrel	– Breeding recorded within area
<i>Puffinus carneipes</i> (1043)	Fleshy-footed shearwater	– Breeding recorded within area
<i>Puffinus pacificus</i> (1027)	Wedge-tailed shearwater	– Breeding recorded within area
<i>Sula dactylatra</i> (1021)	Masked booby	– Breeding recorded within area
<i>Thalassarche bulleri</i> (64460)	Buller's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Thalassarche cauta</i> (64697)	Shy albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Thalassarche impavida</i> (64459)	Campbell's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Lagenorhynchus obscurus</i> (43)	Dusky dolphin	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Balaenoptera musculus</i> (36)	Blue whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Eubalaena australis</i> (40)	Southern right whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Megaptera novaeangliae</i> (38)	Humpback whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree

Cetaceans

SCIENTIFIC NAME	COMMON NAME	TYPE OF PRESCENCE STATUS
<i>Balaenoptera musculus</i> (36)	Blue whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Eubalaena australis</i> (40)	Southern right whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree
<i>Megaptera novaeangliae</i> (38)	Humpback whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree

Listed threatened species

SCIENTIFIC NAME	COMMON NAME	TYPE OF PRESCENCE STATUS
<i>Diomedea amsterdamensis</i> (64405)	Amsterdam albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Endangered
<i>Diomedea antipodensis</i> (64458)	Antipodean albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Diomedea exulans</i> (1073)	Wandering albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Diomedea gibsoni</i> (64466)	Gibson's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Fregetta grallaria</i> subsp. <i>grallaria</i> (64438)	White-bellied storm-petrel (Tasman Sea), white-bellied storm-petrel (Australasian)	– Breeding recorded within area – Vulnerable
<i>Thalassarche bulleri</i> (64460)	Buller's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Thalassarche cauta</i> (64697)	Shy albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Thalassarche impavida</i> (64459)	Campbell's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Balaenoptera borealis</i> (34)	Sei whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable

Listed threatened species

continued

SCIENTIFIC NAME	COMMON NAME	TYPE OF PRESENCE STATUS
<i>Balaenoptera musculus</i> (36)	Blue whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Endangered
<i>Balaenoptera physalus</i> (37)	Fin whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable
<i>Eubalaena australis</i> (40)	Southern right whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Endangered
<i>Megaptera novaeangliae</i> (38)	Humpback whale	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Vulnerable

Listed marine species

SCIENTIFIC NAME	COMMON NAME	TYPE OF PRESENCE STATUS
<i>Diomedea amsterdamensis</i> (64405)	Amsterdam albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Diomedea antipodensis</i> (64458)	Antipodean albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Diomedea exulans</i> (1073)	Wandering albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Diomedea gibsoni</i> (64466)	Gibson's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Phaethon rubricauda</i> (994)	Red-tailed tropic bird	– Breeding recorded within area – Listed
<i>Procelsterna cerulea</i> (64378)	Grey ternlet	– Breeding recorded within area – Listed
<i>Pterodroma nigripennis</i> (1038)	Black-winged petrel	– Breeding recorded within area – Listed
<i>Pterodroma solandri</i> (1040)	Providence petrel	– Breeding recorded within area – Listed
<i>Puffinus assimilis</i> (59363)	Little shearwater	– Breeding recorded within area – Listed
<i>Puffinus carneipes</i> (1043)	Flesh-footed shearwater	– Breeding recorded within area – Listed

Listed marine species

continued

SCIENTIFIC NAME	COMMON NAME	TYPE OF PRESCENCE STATUS
<i>Puffinus pacificus</i> (1027)	Wedge-tailed shearwater	– Breeding recorded within area – Listed
<i>Sterna fuscata</i> (794)	Sooty tern	– Breeding recorded within area – Listed
<i>Sula dactylatra</i> (1021)	Masked booby	– Breeding recorded within area – Listed
<i>Thalassarche bulleri</i> (64460)	Buller's albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Thalassarche cauta</i> (64697)	Shy albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Thalassarche impavida</i> (64459)	Campbell's Albatross	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Osteichthyes Cosmocampus howensis</i> (66208)	–	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Osteichthyes Halicampus boothae</i> (66218)	–	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Osteichthyes Hippocampus kelloggi</i> (66723)	Kellogg's seahorse	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree – Listed
<i>Osteichthyes Solegnathus dunckeri</i> (66271)	Duncker's pipehorns	– Species or species habitat likely to occur within area – Derived from a general distribution map > 1 degree

Source: Commonwealth of Australia, *Environment Protection and Biodiversity Conservation Act 1999*, Species Report online database, March 2001



Attachment 3

Description of commercial fisheries in the Lord Howe Island region

AFMA manages five Commonwealth fisheries in waters adjacent to Lord Howe Island. In the South East Non-Trawl Fishery (SENTF), the Eastern Tuna and Billfish Fishery (ETBF) and the Southern Squid Jig Fishery (SSJF), AFMA permits operators to fish outside 12 nm around the Island. AFMA also licenses 18 operators in the South East Trawl Fishery (SETF) with an additional permit for the East Coast Deep Water Trawl (ECDT) sector to fish outside 25 nm around the Island. This 25 nm trawl exclusion zone was introduced around the islands in May 1993 (Senate Standing Committee 1993).

Only one mainland operator is licensed to fish in the ETBF and the SENTF within 3 and 12 nm of the Island.

The East Coast Deep-water Zone – South East Trawl Fishery

Trawling is not permitted within 25 nm of Lord Howe Island and Ball's Pyramid. In October 1999 the AFMA Board approved the expansion of the South East Trawl Fishery (SETF) to include the area of waters previously managed as the East Coast Deep-water Trawl Fishery. This part of the fishery is now referred to as the East Coast Deep-water Zone (ECDWZ). As a new zone of the SETF, the ECDWZ will be subject to the following transitional management arrangements:

- an exclusion zone around the selected seamounts within the ECDWZ will apply to trawling, with the exception of approved access for robustly designed and monitored research programs;
- trawling will be excluded within a 25 nm radius of the low water mark of Lord Howe Island and Ball's Pyramid; and
- trawling will only be allowed within the remaining areas of Commonwealth waters within the ECDWZ.

In the 2000 and 2001 fishing years AFMA granted 16 and 18 permits respectively to the ECDWZ. Further to the restrictions on trawling

activity, total allowable catches for a number of species apply in the ECDWZ. All trawl vessels operating in the ECDWZ are required to carry and use a vessel monitoring system (VMS). It is intended the zone will be incorporated into the management arrangements for the South East Trawl Fishery, however, future access arrangements are yet to be determined.

The Eastern Tuna and Billfish Fishery

Operators within the ETBF are not permitted within 12 nm of Lord Howe Island and Ball's Pyramid. The only exemption applies to two vessels owned by Fortuna Fishing. The exemption was made on AFMA's assessment that this operator poses no threat to the sustainability of stocks and had a fishing history in the area prior to 1993.

South-East Non-Trawl Fishery

The SENTF includes all waters to within 3 nm around Lord Howe Island. All operators are prohibited from fishing within 12 nm of Lord Howe Island and Ball's Pyramid.

Southern Squid Jig Fishery

Whilst the SSJF includes all waters to within 3 nm around Lord Howe Island, operators are prohibited from fishing within 12 nm of Lord Howe Island and Ball's Pyramid. In addition, SSJF permit holders do not currently access Commonwealth waters adjacent to the Lord Howe region due to the remoteness of these waters and the fact that effective fishing of the species only occurs at depths of up to 150 metres.



Attachment 4

Subsection 367(1) of the EPBC Act

Content of a Management Plan for a Commonwealth Reserve

Mandatory content

- (1) A management plan for a Commonwealth reserve must provide for the protection and conservation of the reserve. In particular, the plan must:
 - (a) assign the reserve to an IUCN category (whether or not a proclamation has assigned the reserve or a zone of the reserve to that IUCN category); and
 - (b) state how the reserve, or each zone of the reserve, is to be managed; and
 - (c) state how the natural features of the reserve, or of each zone of the reserve, are to be protected and conserved; and
 - (d) if the Director holds land or seabed included in the reserve under lease – be consistent with the Director’s obligations under the lease; and
 - (e) specify any limitation or prohibition on the exercise of a power, or performance of a function, under the Act in or in relation to the reserve; and
 - (f) specify any mining operation, major excavation or other work that may be carried on in the reserve, and the conditions under which it may be carried on; and
 - (g) specify any other operation or activity that may be carried on in the reserve; and
 - (h) indicate generally the activities that are to be prohibited or regulated in the reserve, and the means of prohibiting or regulating them; and
 - (i) indicate how the plan takes account of Australia’s obligations under each agreement with one or more other countries that is relevant to the reserve (including the World Heritage Convention and the Ramsar Convention, if appropriate).



Attachment 5

Characteristics and Australian IUCN reserve management principles – habitat/species management area (IUCN category IV) and strict nature reserve (IUCN category Ia)

(Environment Protection and Biodiversity Conservation Act 1999, s347 and Environment Protection and biodiversity Regulations 2000, Schedule 8)

HABITAT/SPECIES MANAGEMENT AREA (IUCN CATEGORY IV)

Characteristics: Commonwealth reserve or zone that contains habitat for one or more species.

The management principles for the category are that the reserve or zone should be managed primarily, including (if necessary) through active intervention, to ensure the maintenance of habitats or to meet the requirements of collections or specific species based on the following principles:

- Habitat conditions necessary to protect significant species, groups or collections of species, biotic communities or physical features of the environment should be secured and maintained, if necessary through specific human manipulation.
- Scientific research and environmental monitoring that contribute to reserve management should be facilitated as primary activities associated with sustainable resource management.
- The reserve or zone may be developed for public education and appreciation of the characteristics of habitats, species or collections, and of the work of wildlife management.
- Management should seek to ensure that exploitation or occupation inconsistent with these principles does not occur.
- People with rights or interests in the reserve or zone should be entitled to benefits derived from activities in the reserve or zone that are consistent with these principles.

STRICT NATURE RESERVE (IUCN CATEGORY IA)

Characteristics: Commonwealth reserve or zone that contains some outstanding or representative ecosystems, geological or physiological features or species.

The reserve or zone should be managed primarily for scientific research or environmental monitoring based on the following principles.

- Habitats, ecosystems and native species should be preserved in as undisturbed state as possible.
- Genetic resources should be maintained in a dynamic and evolutionary state.
- Established ecological processes should be maintained.
- Structural landscape features or rock exposures should be safeguarded
- Examples of the natural environment should be secured for scientific studies, environmental monitoring and education, including baseline areas from which all avoidable access is excluded.
- Disturbance should be minimised by careful planning and execution of research and other approved activities.
- Public access should be limited to the extent it is consistent with these principles.