AUSTRALIAN NATIONAL PERIODIC REPORT

SECTION II

Report on the State of Conservation of Lord Howe Island

II.1. INTRODUCTION

a. State Party

Australia.

b. Name of World Heritage property

The Lord Howe Island Group.

c. Geographical coordinates to the nearest second

Between latitudes 31 degrees 30 minutes south and 31 degrees 50 minutes south, and longitudes 159 degrees 00 minutes east and 159 degrees and 17 minutes east.

d. Date of inscription on the World Heritage List

17 December 1982.

e. Organization(s) or entity(ies) responsible for the preparation of the report

Environment Australia, in conjunction with the New South Wales (NSW) Government through the Lord Howe Island Board

II.2. STATEMENT OF SIGNIFICANCE

Criteria

The Lord Howe Island Group was nominated for inscription on the World Heritage list, claiming to meet three of the four World Heritage criteria for a natural property as defined in Article 2 of the Convention current at the time of nomination. The property was ultimately inscribed on the list, as having satisfied two of these criteria: (Criteria 44(a) iii and iv). These criteria were defined as follows:

(iii) Contain unique, rare or superlative natural phenomena, formations or features or areas of exceptional natural beauty, such as superlative examples of the most important ecosystems to man, natural features (for instance, rivers mountains, waterfalls), spectacles presented by great concentrations of animals, sweeping vistas covered by natural vegetation and exceptional combinations of natural and cultural elements.

(iv) Be habitats where populations of rare or endangered species of plants and animals still survive. This category would include those ecosystems in which concentrations of plants and animals of universal interest and significance are found.

Justification for Listing

The following information is a summary of key outstanding universal values which were the basis for nomination of the property to the World Heritage List.

Lord Howe Island, its adjacent islands and marine environment are of outstanding universal value because:

- They are an outstanding example of an oceanic island group with a diverse range of ecosystems that have been subject to human influences for a relatively limited period.
- They are an outstanding example of the development of a characteristic insular biota that has evolved a significant number of endemic species or sub-species of animals, plants and invertebrates in a very limited area.
- The islands support extensive colonies of nesting seabirds and as such are of considerable significance over a wide oceanic region.
- The islands are the only known breeding locality for the Providence Petrel *Pterodroma solandri.* They also contain the largest breeding concentration in the world of the Red-tailed Tropic bird *Phaethon rubricauda*. They include the most southerly breeding colony of Masked Booby *Sula dactylatra* in the world and among the most southerly breeding stations known for the Sooty Tern *Sterna fuscata* and the Noddy *Anous stolidus*.
- The reef is a rare example where there is a transition between algal and coral reefs, where many species are at their ecological limits, endemism is high, and unique assemblages of temperate and tropical forms cohabit.
- The island group is secure from outside environmental influences and legislative provisions exist to ensure that development, mainly the small tourist industry, does not jeopardise the island's natural values.
- The nomination includes the most southerly coral reef in the world.
- The islands are the only known occurrence of a remarkable volcanic exposure, there being some 1000 m of unweathered volcanics with a great variety of upper mantle and oceanic type basalts.
- Lord Howe Island supports populations of endangered endemic species or sub-species of birds, in particular the Lord Howe Island Woodhen *Tricolimnas sylvestris* and the Lord Howe Island Pied Currawong *Strepera graculina crissalis*.
- The islands contain features, formations and areas of exceptional natural beauty.
- The islands are an outstanding example of significant ongoing geological and biological processes and man's inter-relationship with those processes.

Thus the Lord Howe island group is presented as an area of outstanding natural significance worthy of inclusion in the World Heritage List.

Information supporting heritage significance combining original and current knowledge

The Lord Howe Islands Group was inscribed on the World Heritage List for its unique landforms and biota, its diverse and largely intact ecosystems, natural beauty, and habitats for threatened species.

The World Heritage site includes the whole island region, covering approximately 1,540ha of land area. The wider island group which includes Admiralty Islands, Mutton Bird Islands, Balls Pyramid and associated coral reefs and marine areas covers 136,300ha.

Physical Features
The main island of Lord Howe measures 10km from north and south and is little more than 2km in width. It roughly describes a crescent, enclosing a coral reef lagoon on its south-western side. The island's topography is dominated by the southerly Mount Gower (875m) and Mount Lidgbird (777m). Steep cliffs rise several hundred metres to form the seaward flanks of Mount Gower. Only a narrow isthmus of lowland country in the north-central part of the island is habitable. The northern tip consists of steep hillsides culminating in extensive sea cliffs against the northern coastline. Scattered around the main island are several groups of smaller islands and rocks. The most distant of these is a group of small islets and rock stacks around the 650m pinnacle of Balls Pyramid, 25km to the south-east of Lord Howe.

Lord Howe Island is the eroded remnant of a large shield volcano which erupted from the sea floor intermittently for about 500,000 years, 6.5 to 7 million years ago in the late Miocene (McDougall et al., 1981). The island group represents the exposed peaks of a large volcanic seamount which is about 65km long and 24km wide and which rises from ocean depths of over 1,800m. The Lord Howe seamount is near the southern end of a chain of such seamounts, mostly below sea level, extending for over 1,000km. These mark the successive movement of the Australian tectonic plate over a 'hotspot' within the upper mantle below. Four separate series of volcanic rocks are recognised on the main island group, the oldest being exposed in the Admiralty Group and on the north-eastern tip of Lord Howe. These include tuffs, breccia and basalts, with widespread intrusion of basaltic dykes, and are overlain by progressively younger units to the south (Davey, 1986). The youngest volcanic rock is Mt Lidgbird basalt, which is present in lava flows up to 30m thick. Sedimentary aeolian calcarenite or dune limestone characterise the lowland parts of the main island (Davey, 1986).

The dominant land forming process on Lord Howe since the last of the volcanic eruptions has been marine erosion, which has cut and maintained major cliffs. Slope failure and accumulation of talus at the foot of some cliffs, especially in the south, have modified their original shape. Local variations in lithology are the major determinant of the shape of the irregular rocky coastline and of the small residual islands and rock stacks. There are numerous resistant projecting points and sea caves (Davey, 1986).

Subsequent erosion means that the present islands occupy only one-fortieth of the original area. Lord Howe Island has sedimentary deposits of Pleistocene and Holocene (Recent) age, including cross-bedded calcarenite with intercalated soil horizons, lagoonal deposits, a single sand dune, and alluvium. The Island supports the southernmost true coral reef in the world, which is of Pleistocene to Recent age and differs considerably from more northerly warm water reefs. It is unusual in being a transition between an algal and coral reef, due to fluctuations of hot and cold water around the island. The entire island group has remarkable volcanic exposures not known elsewhere, with slightly weathered exposed volcanics showing a great variety of upper mantle and oceanic type basalts. Ball's Pyramid represents the nearly complete stage in the destruction of a volcanic island. The intercalated soil horizons have yielded important palaeontological data, with interesting fossil finds such as the shells of land snail Placostylus and the terrestrial giant horned

turtle *Meiolania platyceps*, which probably became extinct more than 20,000 years ago. A fossil bat skull, uncovered in 1972, has been described as a new species *Nyctophilus howensis*; it may have persisted into modern times. Significant landforms in the preserve are listed in Davey (1986).

Climate
Climate is humid subtropical with a mean temperature of 16°C in August and 23°C in February. Both diurnal and seasonal temperature range is about 7°C. A temperature of 0°C has been recorded on the summit of Mount Gower. Mean annual rainfall in the lowlands is almost 1700mm, with a pronounced maximum in winter and a mean rainfall of 100mm in February. The highest annual rainfall recorded in the lowlands is 2870mm, with a minimum of 1000mm. The southerly part of Lord Howe Island is generally wetter due to orographic effects. Relative humidity is high at 75-78% and wind levels average 13 knots in August, 9-10 knots in January and March. Climatic data and summaries are available in Anon. (1969), Gentilli (1971), Pickard (1983) and Rodd (1981).

Vegetation
A wide variety of vegetation types has been described for the islands, with the diversity corresponding with the range of habitats, viz. lowland, montane, valleys, ridges and areas exposed to the maritime influence. Variable exposure to wind and penetration of salt spray appear to be the main determinants of vegetation occurrence, structure and floristics. Lord Howe Island is almost unique among small Pacific Ocean islands in that its mountains have sufficient altitude for the development of true mist forest on their summits. There are 241 native species of vascular plants on the island, including 105 endemics (DEST/ERIN (1995). Sixteen of these are considered rare, endangered or vulnerable. There are four endemic palm species in three endemic genera. There are also two other endemic genera in the families Asteraceae and Gesneriaceae. Other endemic species are widely scattered among families. Endemism is particularly noticeable among ferns and in the families Asteraceae, Myrsinaceae, Myrtaceae and Rubiaceae.

There are 48 species of indigenous pteriodphytes (including 19 endemic ferns) belonging to 32 genera, and 180 species of angiosperms (56 endemics) in 149 genera. A further four species are represented by endemic subspecies or varieties; there are no gymnosperms. Some of the endemics suggest recent speciation, and many have confusing origins, such as the three endemic palm genera Howea, Hedyscope and Lepidorrhachis, and also Dietes sp., the three congeners of which are endemic to southern Africa and which has seeds with apparently only short range dispersal capacity. Other noteworthy endemics are *Dendrobium moorei* and *Bubbia howeana*. Many species are threatened or have restricted distribution on the island; there is only one known plant of non-endemic *Pandanus pedunculatus*, and *Chionochloa conspicua ssp. nov.* (Poaceae) is an endemic known only from one clump on Mount Lidgbird.

The vegetation has affinities with sub-tropical and temperate rain forests, and 129 plant genera are shared with Australia, 102 with New Caledonia and only 75 with New Zealand. There are 160 naturalised, introduced plant species, mostly, but not exclusively, in the lowland settlement area.

Weeds pose a significant threat to the native vegetation on the island. There are 218 introduced plants on the Island. 18 introduced species have been declared Noxious

Weeds under the NSW Noxious Weed Act 1993 (see Table 1). Weeds species of the greatest concern are Ground Asparagus (*Protoasparagus aethiopicus),* Climbing Asparagus *(Protasparagus plumosus),* Bridal Creeper *(Protasparagus asparagoides),* Cherry Guava *(Psidium cattleianum)* and Sweet Pittosporum *(Pittosporum undulatum*). A Strategic Plan for Weed Management was prepared by the Board in 2002 which provides a framework for prioritising and implementing weed control measures.

Twenty-five vegetation associations in twenty alliances have been identified (Pickard, 1983). Fourteen of these associations have endemic species as their dominant components. The slopes of the northern hills are dominated mostly by Drypetes/Cryptocaria rain forest, with *Howea forsterana* palm forest on the flats behind North Bay and *H. belmoreana* palm forest in the narrower gullies running down towards Old Settlement Beach. Melaleuca/Cassinia scrubs and Cyperus and Poa grasslands occur on the exposed slopes of Mount Eliza and along the crest of the sea cliffs on the northern coast. The southern mountains are covered with a more variable suite of rain forest and palm associations, often with Pandanus along drainage lines, and with scrub and cliff associations in the more exposed parts and along the coastline. Mutton Bird Point(on the east coast) and King Point (at the southern tip) have small occurrences of Poa grassland. The upper slopes of mounts Gower and Lidgbird include areas of forest dominated by another of the endemic palms, *Hedyscepe canterburyana*. The very humid summit plateau on Gower and the summit ridge on Lidgbird consist of structurally distinct gnarled mossy forest (Davey, 1986).

Currently *Chamaesyce psammogeton* (a perennial herb which occurs on the foreshore) is the only plant which has been listed under the NSW Threatened Species Conservation Act 1995. Six endemic plants occurring in the southern mountains have recently been nominated for endangered status under this act.

Table 1 - Noxious Weed Listings for Lord Howe Island

Classification	Common Name	Species Name
W1	Bitou Bush	*Chrysanthemoides monilifera*
W2	African Boxthorn	*Lycium ferocissimum*
	Arundinaria Reed	*Arundinaria sp.*
	Rhizomatus Bamboo	*Phyllostachys sp.*
	Giant Reed / Elephant Grass	*Arundo donax*
	Castor Oil Plant	*Ricinus communis*
	Glory Lily	*Glorisa superba*
	Lantana	*Lantana camara*
	Rhus Tree	*Toxicodendron seccedaneum*
	Sweet Pittosporum	*Pittosporum undulatum*
W3	Climbing Asparagus	*Asparagus plumosus*
	Ground Asparagus	*Asparagus aethiopicus*

Classification	Common Name	Species Name
	Bridal Creeper	*Asparagus asparagoides*
	Cherry Guava	*Psidium cattleianum*
	Tiger Lily	*Lilium formosanum*
	Crofton Weed	Ageratina adenophora
	Ochna	Ochna serrulata
W4c	Madiera vine	Anredera cordifolia

Table 2 - Threatened Species Listings for Lord Howe Island

Common Name	Species Name	Classification (NSW TSC Act)
Perennial Herb	*Chamaesyce psammogeton*	Endangered
Lord Howe Island Gecko	*Christinus guentheri*	Vulnerable
Lord Howe Island Phasmid	*Dryococelus australis*	Endangered
White Bellied Storm Petrel	*Fregetta grallaria*	Vulnerable
Woodhen	*Gallirallus sylvestris*	Endangered
White Tern	*Gygis alba*	Vulnerable
Lord Howe Island Golden Whistler	*Pachycephala pectoralis contempta*	Vulnerable
Earthworm	*Pericryptodrilus nanus*	Endangered
Red-tailed Tropicbird	*Phaethon rubricauda*	Vulnerable
Lord Howe Island Land Snail	*Placostylus bivaricosus*	Endangered
Lord Howe Island Skink	*Pseudomioa lichenigerum*	Vulnerable
Kermadec Petrel	*Pterodroma neglecta*	Vulnerable
Black Winged Petrel	*Pterodroma nigripennis*	Vulnerable
Providence Petrel	*Pterodroma solandri*	Vulnerable
Little Shearwater	*Puffinus assimilis*	Vulnerable
Flesh Footed Shearwater	*Puffinus carneipes*	Vulnerable
Sooty Tern	*Sterna fuscata*	Vulnerable
Lord Howe Island Currawong	*Strepera graculina crissallis*	Vulnerable
Masked Booby	*Sula dactylatra*	Vulnerable
Lord Howe Island Silvereye	*Zosterops lateralis tephropleura*	Vulnerable

Note: The Woodhen and Lord Howe Island Currawong are also listed as vulnerable under the Commonwealth EPBC Act.

Table 3 - Rare Plant Species

Species	Habitat	Status
Caesalpinia bonduc	Neds Beach and Old Settlement Beach	Widely distributed in the tropics
Calystegia affinis	2 sites only; start of Max Nicholls Track and 200m south of Grey Face (Mt Lidgbird)	Endemic to Lord Howe and Norfolk Islands
Carmichaelia exsul	Limited sites in the southern Mountains, 300-500m elevation	Endemic to Lord Howe Island
Coprosma inopinata	2 sites only; Mt Gower summit, SE Mt Lidgbird	Endemic to Lord Howe Island
Corybas barbarae	1 site only; on Malabar walking track	Recorded from Woy Woy to the North Coast on the mainland
Geniostoma huttoni	2 sites only; Razorback and SE Mt Lidgbird	Endemic to Lord Howe Island
Plectorrhiza erecta	Widespread; Malabar spur, Goat House, the Saddle, Razorback	Endemic to Lord Howe Island
Polystichium moorei	Cliffs on Mt Lidgbird, mouth of Soldiers Creek	
Sticherus lobatus	1 site; Mt Gower summit	Also found from southern Queensland, NSW to Victoria

Fauna
A population of the Large Forest Bat *Vespadelus darlihgtoni* occurs on the Island. No other indigenous native mammals are known. Introduced species, however, include mouse *Mus musculus*, rat *Rattus rattus*, goat *Capra hircus* and, formerly, pig *Sus domestica*.

There are at least 129 native and introduced bird species, mostly vagrants, with 27 breeding regularly. A partial species list is given in Davey (1986). Lord Howe and Norfolk Island are the only known breeding sites in the world for providence petrel *Pterodroma solandri*. Fleshy-footed shearwater *Puffinus carneipes hullianus* breeds in substantial numbers on Lord Howe, with possibly half the world's population present seasonally. Other important species breeding within the property include kermadec petrel *Pterodroma neglecta*, black-winged petrel *P. nigripennis*, wedge-tailed shearwater *Puffinus pacificus*, little shearwater *P. assimilis*, white-bellied storm petrel *Fregetta grallaria*, masked booby *Sula dactylatra*, red-tailed tropic bird *Phaeton rubricauda* in greater concentrations than probably anywhere else in the world. Sooty tern *Sterna fuscata*, Noddy *Anous stolidus* and Grey ternlet *Procelsterna cerula*. Several migratory wader species are regular visitors to the island, principally are double-banded dotterel *Charadrius bicinctus*, eastern golden plover *Pluvialis dominica*, turnstone *Arenaria interpres*, whimbrel *Numenius phaeopus* and bar-tailed godwit *Limosa lapponica*. Four endemic birds are present. Lord Howe Island woodhen *Gallirallus sylvestris*, reduced to

some 26 individuals in 1975, has been successfully bred in captivity and now numbers around 220 (DEST/ERIN, 1995). The other endemic land birds are silver-eye *Zosterops tephropleura*, Lord Howe Island golden whistler *Pachycephala pectoralis contempta,* both reasonably abundant (Davey, 1986). The Lord Howe Island currawong *Strepera graculina crissalis* is relatively common in the southern mountains, with lesser numbers found in the north (Lord Howe Island Board, in litt., August 1995).

The Islands support two species of terrestrial reptile, skink *Pseudomoia lichenigerum* and gecko *Christinus guentheri,* which are in limited numbers on the main island but are abundant on other Islands in the group. Many of the endemic invertebrates from the moss forest on the summit of Mount Gower have been collected and described. The small terrestrial gastropods (Hydrobiidae) comprise nine species and sixteen subspecies, a greater number of subspecies than those found on the eastern Australian mainland. The terrestrial molluscs have suffered from habitat changes; two colonies of large ground snails Placostylus sp.appear to be maintaining their numbers, though distinct forms seem to have become extinct on other parts of the island. There are five endemic species of flies (Diptera) and a further nine confined to Lord Howe and Norfolk Islands. Specimens of Lord Howe Island Phasmid *Dryococelus australis*, a large flightless Phasmid thought to be extinct on Lord Howe Island, were recorded in small numbers in recent surveys in 2001 and 2002 on Ball's Pyramid and a proposal to begin a captive breeding program for this endangered species is being planned for January 2002. Over 50% of more than 100 species of spiders recorded for Lord Howe Island are thought to be endemic. One endemic species of leech and ten endemic species of earthworm have also been recorded. The terrestrial and freshwater crustacea are not well known, but include a freshwater crab *Halicarcinus lacustris* and a freshwater prawn *Paratya howensis*. Three new genera and 12 new species of terrestrial isopod have been recorded and recently a new species of talitrid amphipod from the top of Mount Gower was described.

Many fauna species from Lord Howe Island have been listed as threatened under both the *Environment Protection and Biodiversity Conservation Act* 1999 and the NSW *Threatened Species Act* 1995 (see Table 2). Threatened Species Recovery Plans have been approved for the Woodhen and Landsnail (*Placostylus bivaricosus*). A Threatened Species Recovery Team was established in 2002 to coordinate recovery planning for all threatened species on Lord Howe Island.

Marine Flora and Fauna

Oceanography

The marine hydrological regime of Lord Howe Island places it at the 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 (Harriot 1995). The Tasman Front undulates in a north-south direction (Stanton 1979), and contributes to alternating cooler (19ºC) and warmer waters (25ºC) around the Lord Howe Island Group.

Seamounts modify the large scale dynamics of oceanic currents and the density stratification of the water column. Geographic location, water depth and the intensity of the flow field near the seamount govern the interactions between seamounts and oceanic currents. (Smith et al 1989).

Currents are usually enhanced over seamounts with enhanced mixing in the benthic boundary layer over the summit and flanks. The eddies created around seamounts sweep small planktonic organisms and small meso-and bathypelagic fishes, 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 comprise the diet of seamount associated fishes (Koslow and Gowlet-Holmes 1998; Koslow et al. 1998). The physical perturbations created by seamounts in a flow field are believed to influence directly both the pelagic and benthic communities associated with these structures.

In general these processes contribute to enhanced 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. The ecological significance of seamounts is also attributed to their presentation as spawning and mating areas of far-ranging pelagic species (Hyrenbach et al. 2000). For all these reasons seamounts are regarded as representing 'hot-spots' of high productivity and biodiversity and are excellent natural laboratories to examine the influence of flow on sedimentation processes and biological community dynamics.

Conservation Values - Species
As the majority of information on the marine biology of the Lord Howe area is limited to the shallower inshore areas (Ponder et al 2000), no formal assessment can be made of the productivity and ecological importance of the fauna or their 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 and provide important habitat for endemic, rare and endangered species of plants and animals and in-situ conservation of biological diversity (deForges et al. 2000; Smith et al. 1989; CSIRO 1994).

Samples taken from 4 seamounts on the Lord Howe Island Rise revealed 108 species of fish and macroinvertebrates, of which 31% were new to science and potential seamount endemics (de Forges et al 2000, p944) and four new genera were obtained. 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 the low species overlap between different seamounts in the region leads to highly localised species distributions that is exceptional for the deep sea. The authors consider that the seamounts in the region provide an exceptional opportunity to examine evolution and speciation in the deep sea and that additional sampling is likely to reveal more discoveries of previously unknown species (de Forges et al. 2000, p945, Smith et al 1989).

Within the Lord Howe Island region over 305 species of algae, at least 83 species of coral, more than 65 species of echinoderm (sea stars and urchins) and over 400 species

of fish have been. An Australian Museum review (Ponder et.al. 2000) of samples taken from waters greater than 40 m depth show a relatively high endemism (overall 13.1%) of the rather rich shelf fauna, the majority of these endemics (9.8%) being restricted to the shelf. This would suggest that the shelf fauna may have even higher endemicity than the shallow water fauna, which has already been determined to have high conservation values (e.g Harriott et al. 1993, Pichon 1995).

Fish

Fish fauna of the region has been well described, and extensive collections and surveys by the Australian Museum and fish donated by the Islanders have contributed to the number of deepwater species listed. The current collection confirms a diverse fish fauna, with 447 species and 107 families recorded of fishes known to 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 protected Doubleheader *Coris cyanea* are commonly found in the lagoon. *Paracaesio pedleyi*, *Labracoglossa nitida* and *Pseudanthias sp*. occur here in large schools. *Chromis hypsilepsis* and *Pseudolabrus luculentus* were among the most common species at depths below 35 metres.

The deepwater pelagics known through fishing activities include marlin (blue and black striped), shark (whalers, some tigers, whites and makos), sailfish, dolphin fish, Spanish mackerel, yellowfin tuna, wahoo, trevally, bonito, big kingfish and spangled emperor (Edgecombe 1987).

While most of the fish are wide ranging tropical forms, 15 (4%) are endemic to the Island group (including Norfolk Island) and around 40 (10%) of which are regionally endemic (Tasman Sea) (Table 1). Other endemics continue to be described. The Australian Museum (1998) identified three fish species of possible conservation significance in depths greater than 40m around Lord Howe Island and Ball's Pyramid. These species are: *Genicanthus semicinctus*; the Ballina angelfish *Chaetodontoplus ballinae*; and a species of bullseye or sweeper *Pempheris adspersus*.

Seabirds

The Lord Howe Island group is a major seabird breeding island (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 these include: masked booby, grey ternlet, sooty tern, common noddy, black noddy, white tern, red-tailed tropic bird, wedge-tailed shearwater, flesh-footed shearwater, black-winged petrel, white-bellied storm petrel, Kermadec petrel, Providence petrel, little shearwater (Hutton 1991). Of these, 11 are listed as vulnerable under the NSW *Threatened Species Conservation Act,* 1995 (Manidis Roberts. 2000). Ball's Pyramid is the only known location in Australia where the Kermadec petrel breeds (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 (Manidis Roberts 2000). Five other vulnerable species occur as occasional visitors to Lord Howe Island.

Corals and Echinoderms

While most of the coral and echinoderms (sea stars and urchins) species found at Lord Howe Island are common and widespread tropical corals 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 coral species from 33 genera in 11 families; this represents relatively high diversity considering the Islands' latitude and isolation from other major coral communities (Harriot et al 1993). More than 65 species of echinoderms, made up of 70% tropical species, 24% temperate species and 6% endemic, have also been recorded (Pollard and Burchmore 1985).

Most of the coral communities are dominated by a few abundant species including *Acropora palifera*, *Porites* spp., *Pocillopora damiconis*, *A. glauca* and *A. lovelli*. Many of the species that have been recorded from the Island are extremely rare, 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 crown of thorns starfish numbers and some coral bleaching in the late 1990s, the impacts have been minimal and the coral communities are apparently in good condition (Maniwavie 2000). However, recovery from such threats is constrained to slow process of reef formation at this high latitude. Controls on coral reefs systems in sub-tropical areas are believed to include: water temperature, competition with macro-algae, high nutrient levels, reduced coral fecundity, reduced recruitment and reduced growth rate (Hariott et al. 1993).

Algae

One of the more striking features of 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. 1977). Researchers have noted that the decline in coral abundance with increasing latitudes is negatively correlated with the increasing significance of macroalgae in the benthic communities (Harriott et al.1993). This may be brought about by the low abundance of herbivorous fish schools, which keep algae on tropical reefs grazed to a stubble (Allen et. al 1977). It is also thought that the increasing fleshy macroalgae in cooler waters possibly out competes coral species or is 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 collecting. There are more than 305 species of benthic algae, including 47 (15%) endemic species (Millar and Craft 1993; 1994; 1994a). For its size the island is perhaps 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 records for the genera Neomeris, Boodlea, Valoniopsis, Ventricaria and Trichosolen, and is also the site of highest latitude records for particular species in such

genera as Halimeda, Polyphysa, Caulerpa, Chaetomorpha, Chlorodesmis, Codium, avrainvillea, Struvea and Dictyosphaeria.

Invertebrates
There is limited information available on deep water invertebrates offshore the Lord Howe Island group. The Australian Museum (Ponder et al 2000, p2) analysis of samples dredged in 1960 and 1976 offshore Ball's Pyramid and Lord Howe Island found the following species within 30 nautical miles of the Island but 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 m beyond the 12 nm boundary consisted of very fine foram ooze and clay and contained only 8 molluscs of which only one 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 general lack of comparative material from the deep Tasman Sea.

The Museum assessment considered that the shelves had a high conservation value due to the relatively pristine state of the (believed to be un-trawled) shelves compared to other Australian shelfs and the high level of endemicity of the Island's fauna (Ponder et al 2000, p2).

Marine Mammals and other listed species
Hump Back Whales, Sperm Whales, Short Fin Pilot Whales and Oceanic Bottlenose Dolphin are all regularly encountered in Lord Howe Island Waters. Dense Beaked Whales, Pygmy killer whales and Dwarf Sperm Whales have also been seen. Migratory dolphins such as the Spinner Dolphin, the Dusky Dolphin and Pan Tropical Spotted Dolphin may pass through Lord Howe Island waters.

Australian and New Zealand Fur Seals and Leopard seals are infrequent visitors.

Cultural Heritage
The earliest European discovery of Lord Howe appears to have been in 1788 by the British colonial vessel HMS Supply. There is no recognised evidence of prior Polynesian or Melanesian discovery or settlement. A small permanent settlement was established in the 19th century, subsisting on trade with passing ships. With numerous fluctuations over the years, the settlement slowly expanded and consolidated, developing a distinctive social structure and culture with the passage of time (Davey, 1986). The island is an interesting example of restricted island settlement, although the World Heritage nomination was not made on cultural grounds (ANPWS, 1981).

A number of shipwrecks, protected under the Commonwealth *Historic Shipwrecks Act*, 1976 and the NSW *Heritage Act*1977 lie in the waters within the property. Many of these wrecks have special association with the Island's historical past, while some provide a rare insight into social, cultural and technological aspects of past maritime industry.

<u>Indicative World Heritage Values Table</u>

The *Environment Protection and Biodiversity Conservation Act* 1999 prohibits actions that have "a significant impact on the World Heritage values of a declared World Heritage property" unless the action is approved or in accordance with an accredited management plan. The World Heritage values of a property are the natural heritage

contained the property, which have the same meaning by the World Heritage Convention.

The following indicative World Heritage values table includes examples of the World Heritage values for which Lord Howe Island was listed for each World Heritage List criterion. These are, in the Commonwealth's view, the statements of the outstanding universal values of each World Heritage property. While these examples are illustrative of the World Heritage values of the property, they do not necessarily constitute a comprehensive list.

Natural criteria against which Lord Howe Island Group was inscribed on the World Heritage List in 1982.	**Examples of World Heritage values of Lord Howe Island Group for which the property was inscribed on the World Heritage List in 1982.**
Criterion (iii) contain unique, rare and superlative natural phenomena, formations and features and areas of exceptional natural beauty.	Lord Howe Island Group is an outstanding example of an oceanic island of volcanic origin containing features, formations and areas of exceptional natural beauty and aesthetic importance. The World Heritage values include: • the exceptional diversity of spectacular and scenic landscapes within a small land area; and • outstanding underwater vistas including reefs considered to be among the most beautiful in the world.
Criterion (iv) provide habitats where populations of rare and endangered species of plants and animals still survive.	Lord Howe Island Group is an outstanding example of an oceanic island of volcanic origin with a unique biota of plants and animals and important and significant natural habitats for in-situ conservation of biological diversity, including those containing species of plants and animals of outstanding universal significance from the point of view of science and conservation. The World Heritage values include: • the diversity of vegetation communities which includes 25 associations, 20 alliances and 14 sub-formations; • the diversity of indigenous vascular plant taxa comprising at least 241 species, including species of conservation significance with many endemics; • the diversity of bird taxa comprising 164 bird species, including species of conservation significance with many endemics; • seabird breeding habitats which, together, comprise one of the major breeding sites in the southwest Pacific, including for species of conservation significance; • high levels of richness and endemism of terrestrial invertebrate taxa including 100 species of spiders of which 50% are endemic; • 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 southern-most true coral reef in the world; • the diversity of marine benthic algae species including at least 235 species of which 12% are endemic; • 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% are tropical, 24% are temperate and 6% are endemic.

II.3. STATEMENT OF AUTHENTICITY/INTEGRITY

Authenticity / Integrity

The biophysical values of the property for which it was inscribed are well documented and updated in the earlier statement of significance. The property was inscribed for having met two of the World Heritage criteria for a natural property as defined in Article 2 of the Convention.

The IUCN review of the original nomination concluded that the property meets the criteria for listing in being an outstanding example of an oceanic Island of volcanic origin, having a unique biota of plants and animals, providing unique breeding grounds for colonies of seabirds, containing features, formations and areas of exceptional natural beauty, and providing the habitat for rare and endangered species. The IUCN also focussed on the high proportion of endemic plant and animal species present with specific reference to the Lord Howe Island Woodhen's status are "one of the world's rarest animals (estimated population 30)". During assessment for listing attention was also drawn to the potential inclusion of further marine sites within the property, including some element of legislative protection for these beyond the "defacto regulatory protection by the local people". Concern was also raised with respect to a proposal to construct four telecommunications masts without thorough assessment by way of an Environmental Impact Statement. The report of the sixth session of the World Heritage Committee followed up this issue by noting: "In view of the importance of Lord Howe Island as a World Heritage site, the World Heritage Committee suggests that steps be taken to replace the telecommunications towers as soon as satellite communications are available." Other potential threats to the integrity of the property at the time of inscription include; development pressures, introduced plants and animals and visitor / tourism pressures.

Maintenance of Values

There are many examples of where the World Heritage values of the property have been enhanced since inscription. These are clearly evident through both Section's II.2. and II.5. and include examples such as the success of the Woodhen captive breeding program and subsequent population risk mitigation works, resulting in a relatively stable population of approximately 200 birds. The successful eradication of feral pigs, cats and almost eradication of goats has contributed significantly to the enhancement of World Heritage values beyond their status at listing. Further actions being taken by the Board to ensure the maintenance of World heritage values are documented within this report and in more detail within the three attached working documents. The telecommunications towers highlighted in the Authenticity/Integrity section above are no longer in existence on the property.

Boundaries and Buffer Zones

There have been no boundary changes to the World Heritage Property since inscription in 1982. The Lord Howe Island Group World Heritage Property, Strategic Plan for Management: 2000 – 2005, lists the following performance outcome: "All World Heritage Values are incorporated within the World Heritage Property boundary". At this

stage no evidence has indicated that significant values exist outside the current boundary. However in negotiation with the Commonwealth Government over the gazettal of a Commonwealth marine Park, the Lord Howe Island Board and local community were seeking that the park extend to 30 nautical miles (nm). The Commonwealth, in only gazetting the park to 12 nm gave an undertaking to further investigate the level of biodiversity inherent in the 12 – 30 nm zone and, on receipt of that information, reconsider the park boundary. Should this process indicate that there are further values worthy of protection within that zone the extension of the boundary of the World Heritage Property may be warranted.

II.4. MANAGEMENT

National Legislation and Controls

The Commonwealth's *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) applies to the entire property. In addition the Commonwealth Marine Park has been declared under this recent legislation and is managed by Environment Australia. No formal referrals under this legislation have been made for the property.

State Legislation and Controls

The Lord Howe Island Board is responsible for the care, control and management of the Island group in accordance with the *Lord Howe Island Act* 1953. The five member Board consists of three elected local residents, one National Parks and Wildlife Service officer and one officer from the department responsible for the administration of the *Lord Howe Island Act* 1953 (currently also the National Parks and Wildlife Service) who is appointed by the Minister responsible.

Under the 1981 Amendment Act, Part V of the *National Parks and Wildlife Act* 1974 applies to the lands forming the Preserve. Under these provisions the National Parks and Wildlife Service are responsible for the preparation of a Plan of Management for the Preserve. The 1981 Amendment Act also provides that no part of the Preserve may be revoked other than by an Act of Parliament which affords it the same protection as a National Park under legislation of the State. Such legal status is considered to be in accordance with the description of a National Park recommended in 1978 by the IUCN Commission on National Parks and Protected Areas.

The Lord Howe Island Regional Environment Plan sets the statutory planning framework for Lord Howe Island under the NSW *Environment Planning and Assessment Act* 1979. The objectives of this document emphasise the conservation of World Heritage values. This legislation has been very successful to date in controlling development on the Island and is currently undergoing a comprehensive review to incorporate contemporary planning principles and ensure the document's ongoing effectiveness.

The NSW *Marine Parks Act* 1997 applies to the gazetted state marine park around the Island. This Marine Park is managed by the NSW Marine Park Authority.

All of the statutes of the State of NSW apply on the Island. Many of these contribute directly to the protection of World Heritage values. EG *National parks and Wildlife Act* 1974, *Noxious Weeds Act* 1993 and the *Threatened Species Conservation Act* 1995.

Regional and Local Government Statutory Controls

The *Lord Howe Island* (General) *Regulation* 1994 is enacted under the *Lord Howe Island Act* 1953. Part 5 of this regulation deals with the "protection of the Environment" and the Lord Howe Island Board adopts Policy consistent with this legislation where appropriate to ensure World Heritage values are protected. The Board meets formally on a quarterly basis and policy decisions / amendments can be made expediently to respond to changing circumstance.

Management Arrangements

Administrative and contractual arrangements

The World Heritage property is managed by the Lord Howe Island Board, which is a body corporate constituted under Part 2 of the *Lord Howe Island Act* 1953. The membership of the Board is further described above in Section II.4. The Board is responsible to the NSW Minister for the Environment and elements of administrative support are provided by the NSW National Parks and Wildlife Service. As part of the NSW public sector, the Board is subject to established public sector legislation, regulations, standards and guidelines governing administrative functions and arrangements.

Management Planning

The Lord Howe Island Group World Heritage Property, Strategic Plan for Management: 2000 – 2005 was released in February 2000. This plan was commissioned by the Lord Howe Island Board with funding provided by the NSW State Government and Environment Australia (Federal Government). It was prepared by Manidis Roberts Consultants in partnership with Lord Howe Island Board, Environment Australia and the NSW National Parks and Wildlife Service. The purpose of the Strategic Plan for management is to provide a consistent framework for the protection of the World Heritage values of the Island in accordance with the requirements of the World Heritage Convention.

The Strategic Plan for management lists six goals for the property:
- Protect the World Heritage Values
- Conserve the World Heritage values
- Rehabilitate the World Heritage values
- Present the World Heritage values
- Transmit the World Heritage values
- Integrate community and World Heritage values

The principle organization responsible for the carriage of the plan is the Lord Howe Island Board.

The Lord Howe Island Permanent Park Preserve as eluded to in Section II.4. is covered by a Plan of Management released in June 1986. This plan was prepared in accordance with section 75 of the *National Parks and Wildlife Act* 1974 and section 15B of the *Lord Howe Island Act* 1953. The preserve does not include the settlement area, nor does it include the lagoon or any reef or marine area. The boundaries and extent of the Preserve are formally defined in Schedule 1 of the *Lord Howe Island Act* 1953. The Preserve is an integral part of the Lord Howe Island region and planning for the Preserve must be integrated with planning for the region. Preparation of the Plan of Management was therefore closely coordinated with the preparation of the regional environment study, a key document in the formulation of the Regional Environment Plan as referred to also in Section II.4.

The NSW State Marine Park was gazetted in February 1999 and the NSW Marine Park Authority are currently in the process of formulating a Management Plan for the Park. A draft zoning plan has been released for public comment and a detailed analysis of the public submissions received is currently occurring.

The Commonwealth Marine Park was gazetted in June 2000, a Management Plan for the Park has been completed and will take effect from 25 September 2002.

Contact Details

Manager
Lord Howe Island Board
PO Box 5
LORD HOWE ISLAND NSW 2898

Environment Australia

Heritage Management Branch
Heritage Division
Environment Australia
GPO Box 787
Canberra ACT 2601

Changes in Ownership and / or Legal Status

The Lord Howe Island Group World Heritage Property encompasses terrestrial and marine areas under the jurisdiction of the NSW State Government and marine areas under the control of the Commonwealth Government. World Heritage listing does not affect land tenure, but may impact on how areas are managed.
The Lord Howe Island Board is responsible for the care, control and management of the Island Group (including Lord Howe Island and all adjacent islands and coral reefs situated within one marine league of the islands) in accordance with the *Lord Howe Island Act, 1953*.

Approximately 75% of Lord Howe Island and all of the other islands in the group are included in the Lord Howe Island Permanent Park Preserve. The Permanent Park Preserve has a similar status to a national park but is managed by the Lord Howe Island Board. The marine areas within 3 nautical miles of the islands (including Ball's

Pyramid) are within NSW State waters and managed by the NSW Marine Park Authority.

The marine component of the property between 3 and 12 nautical miles from the Islands forms part of the Australian Territorial Sea under the control of the Commonwealth Government. This Marine Park is managed by Environment Australia on behalf of the Commonwealth Government The waters of the Property beyond the 12 nautical mile limit are within the Australian Exclusive Economic Zone and are also administered by the Commonwealth.

There have been no changes in ownership or status since inscription of the property, only the legal gazettal of the two Marine Parks.

Staffing, Financial and Training Resources

As at 30 June 2001 the Lord Howe Island Board employed a total of 53 staff including temporary and casual positions. Of these 4 staff are employed full time within the environmental management (including protection / enhancement of world heritage values) function, a further 6 staff operate part time and in the range of 4 – 12 staff are employed on a short term casual basis. The bulk of the fiscal resource used to employ the staff shown above is sourced from external sources, often short- term project based grants.

Recent Lord Howe Island Board expenditure on environmental management programs is as follows:

Year	Amount
1997 - 1998	$436,500
1998 - 1999	$594,500
1999 - 2000	$640,000
2000 - 2001	$433,000
2001 -2002	$615,000

In addition to above expenditure the NSW Marine Park Authority has directly incurred expenditure focussed on the protection and enhancement of world heritage values as follows:

Year	Amount
1999 - 2000	$308,000
2000 - 2001	$253,000
2001 -2002	$335,400

Scientific and Technical Studies

Subject	Researcher	Organisation	Date
Geology			
Geology	Mark Dickson (PHD student)	University of Wollongong	1998-99
Geology	David Kennedy (PHD student)	University of Wollongong	2000-01
Plants			
Rare endemic plant survey	Dr Tony Auld & Ian Hutton	NSW National Parks & Wildlife Service	2001-2002
Ferns	Jim Croft (Director Botany)	Australian National Herbarium	2000
Liverworts & general collection for herbarium specimens	Elizabeth Brown	Royal Botanic Gardens, Sydney	2001-02
Invertebrates			
Invertebrates	Gerry Cassis (Head, Centre for Biodiversity)	Australian Museum	Summer 2000 & 2001
Phasmid	Dr David Priddel	NSW National Parks & Wildlife Service	2001 *Captive breeding program proposed.*
Ants	Archie McArthur	Honorary Research Associate, South Australian Museum	Oct 2000
Austrolopa & Peloriidids families	Max Day	CSIRO	Dec 2001
Birds			
Providence Petrel	Adam Bester (PHD student)	Charles Sturt University	2000-2001
Sooty Terns	Lisa Oneill (PHD student)	Charles Sturt University	2000-2002 *(in progress)*
Masked Booby	Paul O'Neill	Griffith University	Jan 2001
Masked Booby	Dr David Priddel (Senior Research Scientist)	NSW National Parks & Wildlife Service (NPWS)	2001
Flesh-footed Shearwater & Wedgetailed Shearwater	Dr Pam Dyer	University of the Sunshine Coast	Jan 2001
Flesh-footed Shearwater	Dr David Priddel	NSW NPWS	*Proposed to commence Oct 2002*
Woodhen census (twice/year)	Board staff		Ongoing

Subject	Researcher	Organisation	Date
Lord Howe Island Marine Park			
Hard coral recruitment and response to environmental stress	Dr Peter Harrison	Southern Cross University	On-going
Habitat preference of common herbivorous reef fish	Dr David Booth	University of Technology, Sydney	2001
Growth rate studies of commercially important species	Dr Doug Ferrell	NSW Fisheries	On-going
Recruitment and survival of endemic and other fish	Stephen Swearer	University of Melbourne	March 2001
Coral research	Dr Bette Willis	James Cook University	Jan 2001
Coral research	Karen Miller & David Ayre	University of Wollongong	Jan 2001

Some of the scientific and technical reports prepared for the Lord Howe Island group include:

- Vegetation of Lord Howe Island, 1983, Pickard (Royal Botanic Gardens, Sydney);
- Flora of Australia 49, Oceanic Islands, 1994, Green;
- Report on the rare plant *Calystegia affinis* on Lord Howe Island, 1999, Hutton;
- Strategic Plan of Management Lord Howe Island Group World Heritage Property, 2000-05, 2000, Manidis Roberts Consultants;
- Rare plant survey Lord Howe Island, 2001, Hutton;
- Strategic Plan for Weed Management for Lord Howe Island, 2002, Lord Howe Island Board;
- Draft Vegetation Rehabilitation Plan for Lord Howe Island, 2002, Lord Howe Island Board; and
- Vegetation and Habitat of Significance within the settlement area of Lord Howe Island, 2002, Hunter (NSW National Parks & Wildlife Service).

Two approved Threatened Species Recovery Plans have also been prepared:

- Land Snail *Placostylus bivaricosus*
- Woodhen *Gallirallus sylvestris*

Visitation

	1997-98	1998-99	1999-00	2000-01	2001-02
July	394	442	666	449	567
August	494	564	618	462	529
September	755	1155	1197	866	962
October	1068	1097	1273	1023	1074
November	817	1302	1069	1138	1092
December	1035	1545	1373	1255	1390
January	1306	1601	1458	1414	1366
February	968	1084	967	986	1161
March	1107	1471	1176	1165	1316
April	1327	1157	1358	1189	1072
June	885	1073	944	765	782
July	545	602	478	458	498

Total	**10,701**	**13,090**	**12,575**	**11,166**	**11,806**

Education, Interpretation and Awareness Raising

Some of the publications that have been prepared on Lord Howe Island include:

- Native Plants of Lord Howe Island Field Guide, 2002, prepared by Ian Hutton (funded by Environment Australia)
- Noxious Weed Control Booklet, Guidelines for Lord Howe Island residents, 1999, prepared by Lord Howe Island Board (funded by Environment Australia)
- Visitor Walking Track Maps, 1999, prepared by the Lord Howe Island Board (funded by Environment Australia)
- The Australian Geographic book of Lord Howe Island, 1998 by Ian Hutton
- Birds of Lord Howe Island, 1990, by Ian Hutton

II.5. FACTORS AFFECTING THE PROPERTY

Development Pressures

The Board approximately three years ago identified that the subdivision of land under the guidelines of the existing Regional Environment Plan (REP) had the potential to result in development at potentially un-sustainable levels in areas possibly not suitable. In identifying this as an issue the Board placed a moratorium on subdivision pending a comprehensive review of the REP. This review has now commenced and the issue of sustainable levels and methods of development are paramount in the drafting of the new plan. It is anticipated that a new REP will be in place by mid 2003.

Environmental Pressures

Introduced plants and animals are arguably the greatest threat to the World Heritage values of the property.

Weeds pose a significant threat to the native vegetation on the island. There are 218 introduced plants on the Island. 18 introduced species have been declared Noxious Weeds under the NSW Noxious Weed Act 1993 (refer to Table 1). Weeds species of the greatest concern are Ground Asparagus (*Protoasparagus aethiopicus),* Climbing Asparagus *(Protasparagus plumosus),* Bridal Creeper *(Protasparagus asparagoides),* Cherry Guava *(Psidium cattleianum)* and Sweet Pittosporum *(Pittosporum undulatum*). A Strategic Plan for Weed Management was prepared by the Board in 2002 which provides a framework for prioritising and implementing weed control measures. Significant resources are currently dedicated to the implementation of the actions contained within this plan. The majority of this resource being external project specific grants.

Feral pigs have now been totally removed from the property. A major feral goat eradication program was conducted in late 1999, resulting in the removal of the

majority of goats other than a few individuals. This program continues to be followed up with the aim remaining total eradication. Introduced rodents have (prior to inscription of the property) contributed significantly to the decline of indigenous biodiversity on the Island. The Board has undertaken control baiting for many years as a population control strategy. In September 2001 the Board commissioned a feasibility study into the eradication of rodents from the property. This study concluded that the total eradication of rodents is feasible and preliminary work is continuing on this major initiative.

The Board has recently commenced the drafting of a Quarantine strategy that will ensure that the risk of any further introductions of introduced organisms are minimised. This strategy should be completed by March 2003 and implementation commenced immediately thereafter.

On a macro scale, the effect of global warming and any associated rising sea temperatures could have a devastating effect on the mist forests on the summit of Mount Gower in a relatively short time frame. While mitigation of this risk is well outside the control of the Board, the board is currently liasing with mist forest experts at the University of Hawaii with the intention of instigating monitoring of this important environment.

Visitor / Tourism Pressures

Tourist numbers are effectively "capped" to a limit of 400 at any time through the Regional Environment Plan (REP). While as mentioned earlier in this report this plan is undergoing comprehensive review the Board has maintained a position that this limit will remain unchanged. This strategy has been very effective to date in ensuring that visitor pressure are contained within sustainable levels and should continue to do so.

Other Pressures

The management planning process for the Marine Parks have identified existing and potential pressures on some fish species through both Islander and Charter fishing. This will be largely addressed through appropriate zoning in the Park's, which are likely to include significant areas of sanctuary zone, which will be closed to all types of fishing. In addition the Marine Park Authority, with support of the Board are proposing short term legislative change to protect two important species, the Blue fish and Double-Header from commercial fishing. The Board has also recently undertaken to further consider the prospect of limiting the number of licensed Charter Vessels operating within the Marine Park.

Number of Inhabitants living within the Property

At 30 June 2001 the estimated total number of persons resident on Lord Howe Island, including persons temporarily stationed on the Island by various authorities, was 325, comprising:

Adult Males	121
Adult Females	122
Males under 18	39
Females under 18	43

II.6. MONITORING

Current monitoring program

New South Wales legislation: *Threatened Species Conservation Act 1995* outlines monitoring criteria for measuring impacts, or the potential for impacts on protected species. The Act requires that a Species Impact Statement (SIS) be prepared in relation to any activity, which may result in an impact. The following tables outline the current monitoring program with respect to Lord Howe Island's World Heritage values:

Monitoring Performance Outcomes to Protect World Heritage Values

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
6.2.1	All World Heritage values incorporated within the World Heritage Property Boundary.	Yes/No	Values assessment	2001
6.2.2	All organisations aware of the World heritage values and the need for their protection acknowledged in fulfilling their responsibilities within the World Heritage property	Memorandum of understanding or similar agreements between agencies acknowledging World Heritage values signed.	Percentage of MOU's signed	1999
6.2.2	Marine areas and values adequately protected.	Marine Parks established in NSW and Commonwealth Waters.	Gazettal of marine parks	1999
6.2.3	World Heritage values protected by State and Commonwealth legislation	Number of impacts on World Heritage values decline.	Research and monitoring	Ongoing
6.2.4	The World Heritage values of the Property protected from shipping impacts.	Number of impacts from shipping declines.	Monitoring	Ongoing
6.2.6	No new species that have the potential to degrade World Heritage values introduced.	Note species and ensure degradation is not occurring.	Research and monitoring	Ongoing
6.2.7	Sustainable agricultural practices which do not degrade World Heritage values.	Note World Heritage values and ensure agricultural practices do not degrade them.	Research and monitoring	Ongoing
6.2.8	Natural resource industries are sustainably managed and do not degrade World Heritage values.	No degradation of World Heritage values due to natural resource use.	monitoring	Annually

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
6.2.9	Fisheries managed sustainably and do not degrade World Heritage values.	Effort required to maintain yield.	Number of fishing hours required to maintain yields	Ongoing
6.2.10	Land-use and development controls are adequate to protect World Heritage values.	Cumulative impacts are not degrading World heritage values.	Monitor condition of World Heritage values	Ongoing
6.2.11	Fire protection management and planning is adequate to protect World Heritage values.	Number of unplanned fires and unmanaged fires.	Record keeping	Ongoing
6.3.8	Regional ecological processes protected.	Inter-governmental liaison.	Through discussions	Biannually

Monitoring Performance Outcomes to Conserve World Heritage Values

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
6.3.1	Management is based on and enhanced by sound research knowledge.	Proportion of research projects critical to World Heritage management.	List management projects	Annually
6.3.2	Ecosystems conserved.	Number of species maintained.	Monitoring and research	Ongoing
6.3.3/ 6.3.4	Populations of native plant and animal species are maintained at levels that ensure their ongoing viability in the wild.	Number of species requiring recovery plans.	Monitoring and research	Annually
6.3.5	World Heritage values not impacted by new species of plants and animals.	Number of World Heritage value species adversely impacted by species of plants and animals.	Monitoring and research	Annually
6.3.6	Geodiversity maintained.	No loss of geological values.	Monitoring and research	
6.3.7	Marine ecosystem conserved.	Marine parks managed in accordance with plans.	Monitoring and research	Annually
6.3.9	Lord Howe Island's scenic beauty maintained.	Percentage of residents and visitors satisfied.	Survey	Annually

Monitoring Performance Outcomes to rehabilitate World Heritage Values

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
6.4.1, 6.4.2, 6.4.3	Degraded values restored or reinstated by priority	Areas most in need rehabilitated.	Inventory	Annually
6.4.4	Regional habitats rehabilitated.	Habitats most in need rehabilitated.	Inventory	Biannually

6.4.5	Degraded landscapes rehabilitated.	Area rehabilitated	Inventory	Five yearly
6.4.6	Wetlands restored.	Number of wetlands reinstated.	Map wetlands	Five yearly

Monitoring Performance Outcomes to present World Heritage Values

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
6.5.1, 6.5.2, 6.5.3	Information about the Property is available to people on the Island.	Availability of information on the island about World Heritage values.	Exit survey	Annually
6..5.4	Information about the property is available to people off the island.	Number of "hits" on internet site.	Monitor internet site	Annually

Monitoring Performance Outcomes to transmit World Heritage Values

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
6.6.1	Planning and management address both immediate and long-term outcomes.	Number of agencies and locals involved in planning.	Inventory	Annually
6.6.3	Agencies are able to fulfil ongoing management responsibilities.	Funding is secure and reliable.	Non-compliance with Strategic Plan due to lack of funding	Annually
6.6.4	Monitoring program undertaken.	Monitoring achieved.	Inventory	Annually
6.6.5	Management of the values is enhanced by improved scientific knowledge.	Reduced impact on World Heritage values.	Number of impacts	Ongoing
6.6.6	Water resources sustainably managed.	Groundwater quality.	Monitoring	Annually
6.6.7	Waste sustainably managed.	Change in volume of landfill.	Monitoring	Annually
6.6.8	Energy resources sustainably managed.	Change in energy consumption.	Number of kilowatt hours	Annually

Monitoring Performance Outcomes to integrate World Heritage Values

SIS Ref	Performance outcome	Performance measure	Method of measurement	Timing
	Values of local community recognised.	Increasing proportion of residents satisfied the recognition of local cultural values.	Inventory	Annually
6.6.2	Island community involved in ongoing management of the World Heritage Property.	Number opportunities realised for community involvement in World Heritage area management.	Non-compliance with Strategic Plan due to lack of funding	Annually

Results of current monitoring program and of Key Indicator measurement

Performance Measures not progressed or finalised

Table No.	Issue No.	Comment
8	7	Surveying of residents and visitors has been conducted on opportunistic non regular basis only.
10	1	Regular exit surveys not conducted, above infrequent surveying done on exit.
10	2	Lord Howe Island Board does not currently have a web site. Do however contribute to the Lord Howe island Tourism Association site and monitor "hits".
11	2	Long-term security of funding is a significant management issue. A proportion of State Funding and almost all Commonwealth funding is project specific and generally short-term.

Note: Table and Issue numbers refer to those in the World Heritage Property, Strategic Plan for Management: 2000 – 2005.

Performance Measures progressed

Table No.	Issue No.	Comment
7	2	Marine parks have been established in NSW and Commonwealth waters. MOU's will follow finalising of Management Plans.
7	5	Comprehensive Weed Control Strategy completed in 2002, including detailed distribution mapping to enable accurate long term monitoring.
7	9	Will be fundamental in the current review of the REP.
7	11	Detailed Revegetation Plan currently being finalised which will clearly identify priority habitats.
8	1	LHIB Research Priorities Policy and Plan being finalised
8	3	Two Threated Species Recovery Plans finalised. Threated Species recovery team also initiated to assist in the coordination of planning and management actions.
9	1,2&3	Detailed Revegetation Plan currently being finalised which will clearly identify priority habitats. Wetlands will feature significantly in this document.
11	5	Groundwater monitoring commenced
11	6	Waste volumes monitored through survey occurring three to four times per year. Significant positive steps achieved in this regard.
11	7	Energy consumption monitored. The Board remains committed to restructuring toward the use of renewable energy sources.

Note: Table and Issue numbers refer to those in the World Heritage Property, Strategic Plan for Management: 2000 – 2005.

II.7. CONCLUSIONS AND RECOMMENDED ACTION

While a large amount of further work and resourcing is required to enhance the quality of the Island's World heritage values, there is no doubt that significant progress has been made since the inscription of the Property. However, as several operational projects on Lord Howe relate to monitoring of key species, which may be World Heritage values themselves, or are fundamental to the maintenance of these values,

there is a need to establish a reliable, on-going stream of discrete funds in order to sustain these projects through to their logical conclusion.

Future management initiatives and directions are outlined in both the Lord Howe Island Board's Corporate and Operational Plans, with specific reference to the Natural Environment and Cultural Heritage Key Result Area.