

## World Heritage Sites

### Protected Areas and World Heritage



## LORD HOWE ISLAND GROUP AUSTRALIA

*This isolated oceanic archipelago was designated for its spectacular volcanic landforms and biota, its diverse and largely intact ecosystems and habitats for threatened species, especially birds and invertebrates, and for remarkable natural beauty.*

### COUNTRY

Australia

### NAME

Lord Howe Island Group

### NATURAL WORLD HERITAGE SITE

1982: Inscribed on the World Heritage List under Natural Criteria vii and x.

### STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

### IUCN MANAGEMENT CATEGORY

II National Park

### BIOGEOGRAPHICAL PROVINCE

New Caledonian (5.6.13)

### GEOGRAPHICAL LOCATION

Located in the southwest Pacific Ocean, 800 km north-east of Sydney and 630 km off the New South Wales coast, at 31°30' to 31°50'S by 159°00' to 159°17'E.

### DATES AND HISTORY OF ESTABLISHMENT

1982: The preserve established under Section 19A of the Lord Howe Island (Amendment) Act, 1981.

1998: A State Marine Park (46,545 ha) declared by the state of New South Wales within 3 nautical miles around both Lord Howe Island and Ball's Pyramid;

2000: A Commonwealth Marine National Park (3,005 km<sup>2</sup>) declared from 3 to 12 nautical miles out from each main island. It follows the base of the seamounts that underlie the Island and Ball's Pyramid and includes the sea-bed to a depth of 100 metres. It is divided into 3 zones: a Habitat Protection zone (IUCN category IV) and two smaller Sanctuary zones (IUCN category Ia).

### LAND TENURE

State Government of New South Wales. All permanent private occupation is on leasehold from the government subject to conditions (ANPWS, 1981). Administered by the Lord Howe Island Board.

### AREA

1,176 ha. The World Heritage site includes the whole island land surface, the seaward boundary of which follows the mean high water mark and excludes all littoral and marine areas. It is surrounded by the State and Commonwealth Lord Howe Island Marine Parks. The wider island group includes several offshore islets, the Balls Pyramid group of rocks 25 km southeast and associated coral reefs and seas.

## ALTITUDE

Sea-level to 875m (Mount Gower)

## PHYSICAL FEATURES

The site includes about 76% of the land area of the main island and surrounding islets. These include the Admiralty Islands immediately north, Mutton Bird and Sail Rock immediately east, Rabbit Island in the western lagoon, Gower Island immediately south and the Ball's Pyramid group 25 km south-east, plus a number of small islets and rocks. Lord Howe Island measures 10 km north to south by 2 km wide in a shallow crescent, enclosing a coral reef lagoon on its west and anchored in the south to two mountainous volcanic plugs rising sheer from the sea, Mount Gower (875m) and Mount Lidgbird (777m). Only a narrow isthmus of lowland in the north-centre of the island is habitable. The northern tip of steep hillsides culminates in extensive sea cliffs against the northern coastline. Within its small area there is an exceptional diversity of spectacular scenic landscapes and underwater vistas, including reefs considered to be among the most beautiful in the world. Ball's Pyramid is a steep triangular stack of bare rock which rises sheer 650m.

The island group is the eroded remnant of a large shield volcano which erupted from the sea floor intermittently for about 500,000 years in the late Miocene between 6.9 and 6.4 million years ago. It now forms the peak of a large volcanic seamount some 65 km long by 24 km wide which rises from a depth of over 1,800m on the southwestern edge of a 1,000 km chain of such submarine seamounts, the Lord Howe Rise. These mark the successive movement of the Australian tectonic plate over a hotspot in the upper mantle below (McDougall *et al.*, 1981). Four separate series of volcanic rocks are seen 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 occurs in lava flows up to 30m thick. The lowland part of the main island is of sedimentary deposits of Pleistocene and Holocene age, including cross-bedded aeolian calcarenite or dune limestone, with intercalated soil horizons, lagoonal deposits, alluvium and a single sand dune (Davey, 1986).

Since the last eruptions the dominant landforming process has been marine erosion, which has carved major cliffs. Slope failure and the accumulation of talus under 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. This erosion has reduced the islands to one-fortieth of the original area. Ball's Pyramid represents the nearly completed destruction of a volcanic island. The entire group has remarkable volcanic exposures not known elsewhere, with slightly weathered exposed volcanics showing a great variety of upper mantle and oceanic type basalts. 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. The group 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 unique in being a transition between the algal and coral reefs, due to fluctuations of warm and cold waters around the island. Significant landforms in the preserve are listed in Davey (1986).

## CLIMATE

The climate is humid subtropical with a mean temperature of 16°C in August and 23°C in February. The diurnal and seasonal temperature ranges are both about 7°C. A temperature of 0°C has been recorded on the summit of Mount Gower. Rain falls year-round. The mean annual rainfall in the lowlands is over 1,710mm, with a maximum in winter and a mean rainfall of 100mm in midsummer. The highest annual rainfall recorded in the lowlands is 2,870mm, with a minimum of 1,000mm. The south part of the 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 Pickard (1983) and Rodd (1981). The alternating influences of warm and cool ocean 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 (DEWHA).

## VEGETATION

Lord Howe Island is largely covered in rainforest, remarkable in that less than 10% of this primary vegetation has been cleared though a further 10% at least has been disturbed by grazing animals.

There is a wide variety of vegetation types, the diversity corresponding to the range of habitats: lowland, montane, valleys, ridges and areas exposed to maritime influence. Variable exposure to wind and salt spray appear to be the main determinants of vegetation occurrence, structure and floristics. Most of the island is dominated by rainforest or palm forest. It is almost unique among small Pacific Ocean islands in that its mountains have sufficient height for the development of true cloud forest on their summits. Grasslands occur on the more exposed areas. There are 241 native species of vascular plants, in 25 plant associations, 20 alliances and 14 sub-formations. There are 105 endemic species which dominate 14 of the associations, 16 of which are considered rare, endangered or vulnerable (Pickard, 1983; DEST/ERIN, 1995). The vegetation has affinities with both sub-tropical and temperate rain forests: 129 plant genera are shared with Australia, 102 with New Caledonia and 75 with New Zealand. There are 160 naturalised introduced plant species, mostly, but not exclusively, in the lowland settlement area.

The lowland rainforest is divided into five types by Mueller-Dombois & Fosberg (1998): *Drypetes - Cryptocaria* forest dominates the slopes of the northern hills, with *Kentia* palm *Howea forsterana* forest on the flats behind North Bay and *H. belmoreana* palm forest in the narrower gullies running down towards Old Settlement Beach, mixed broadleaf *Cleistocalyx - Chionanthus*, and pandan *Pandanus forsteri* forest. The understorey is rich with ferns, tree-ferns and mosses. There is *Melaleuca - Cassinia* scrub, and *Cyperus* and *Poa* grasslands 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 rainforest on the peaks and palm associations, often with *Pandanus* along drainage lines, and with scrub and cliff associations in the more exposed sections and along the coastline. Mutton Bird Point on the east coast and King Point at the southern tip, have small areas of *Poa* grassland. The submontane forest of Mounts Gower and Lidgbird is dominated by another endemic palm, *Hedyscepe canterburyana* with *Cryptocaria gregsonii*. The very humid summit plateau on Mount Gower and the summit ridge on Mount Lidgbird is covered by a structurally distinct gnarled mossy cloud forest dominated by *Zygogynum howeanum* and *Dracophyllum fitzgeraldii* (Roberts, 2001; Davey, 1986).

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 pteridophytes, including 19 endemic ferns, belonging to 32 genera, and 180 species of angiosperms with 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*, *Hedyscepe* 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 *Chionochoa conspicua* ssp.nov in the Poaceae is an endemic known only from one clump on Mount Lidgbird.

## FAUNA

No indigenous native mammals are known except for a small population of the large forest bat *Eptesicus sagittula*. A fossil bat skull was uncovered in 1972, and described as a new species, Lord Howe long-eared bat *Nyctophilus howensis* (CR), which may have persisted into modern times. Introduced species include cats and dogs, mouse *Mus musculus* and black rat *Rattus rattus* survivors from a wreck, cattle, goats *Capra hircus* and, formerly, pigs *Sus domestica*, introduced for food, though the latter two are now eradicated.

The islands support large colonies of nesting seabirds. At least 168 bird species have been recorded either living on or visiting the islands as vagrants, with 14 seabirds and 18 land birds breeding regularly. A number of these are rare or endangered. A partial species list is given in Davey (1986). Lord Howe is one of two known breeding grounds for the providence petrel *Pterodroma solandri* (VU), a species that also nests on Phillip Island, near Norfolk Island and probably also on Ball's Pyramid. Possibly half the world's population of flesh-footed shearwater *Puffinus carneipes hullianus* breeds on the island, as do the red-tailed tropic bird *Phaeton rubricauda*, in greater concentrations than probably anywhere else in the world. The island also has the most southerly breeding colony of the masked booby *Sula dactylatra*. The white-chinned petrel *Procellaria aequinoctialis* (VU) breeds on the offshore islands (Stattersfield *et al.*, 1998). Other important species breeding in the preserve include Kermadec and black-winged petrels *Pterodroma neglecta* and *P. nigripennis*, wedge-tailed and little shearwaters *Puffinus pacificus*,

and *P. assimilis*, white-bellied storm petrel *Fregetta grallaria*, sooty tern *Sterna fuscata*, noddy *Anous stolidus* and blue noddy *Procelsterna cerulea*.

Several migratory wading species are regular visitors to the island, principally double-banded plover *Charadrius bicinctus*, lesser golden plover *Pluvialis dominica*, ruddy turnstone *Arenaria interpres*, whimbrel *Numenius phaeopus* and bar-tailed godwit *Limosa lapponica*. There are four endemic birds: the small flightless Lord Howe woodhen *Gallirallus sylvestris* (EN), one of the world's rarest birds, living in the low palm forest. This was reduced to 26 individuals in 1975 by hunting, habitat loss and disturbance by feral animals, including the introduced masked owl *Tyto novaehollandiae*, but it has been successfully bred in captivity. In 2000 the population numbered around 200 (IUCN, 2008). The other endemic birds are the widespread silver-eye *Zosterops lateralis tephroleurus* (VU), Lord Howe Island golden whistler *Pachycephala pectoralis contempta* which is reasonably abundant (Davey, 1986) and the Lord Howe Island currawong *Strepera graculina crissalis* which is relatively common in the southern mountains, with lesser numbers found in the north (Lord Howe Island Board, *in litt.*, 1995).

The islands support two native species of terrestrial reptile, the Lord Howe Island skink *Oligosoma lichenigera* (VU) and Lord Howe Island gecko *Phyllodactylus guentheri*, which are threatened with extinction on the main island but are abundant on other islands in the group. The rainbow skink *Lampropholis delicata* and bleating tree frog *Litoria dentata* have been accidentally introduced from Australia. There is a high level of diversity and endemism amongst terrestrial invertebrate taxa. Over 50% of more than 100 species of spiders recorded for Lord Howe Island is thought to be endemic. 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 New Zealand flax snail *Placostylus ambagiosus* appear to be maintaining their numbers, though distinct forms seem to have become extinct on other parts of the island. Many of the endemic invertebrates from the moss forest on the summit of Mount Gower have been collected and described. There are five endemic species of flies (Diptera) and a further nine confined to Lord Howe and Norfolk Islands. Specimens of the Lord Howe Island stick insect *Dryococoelus australis* (CR), a large flightless insect thought to be extinct on Lord Howe Island, has been found on Ball's Pyramid. One endemic species of leech and ten endemic species of earthworm, 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. The terrestrial and freshwater crustacea are not well known, but include a freshwater crab *Haliscarcinus lacustris* and a freshwater prawn *Paratya howensis*.

The waters around Lord Howe Island provide an unusual mixture of temperate and tropical organisms, including many species at their distributional limits. At least 500 species of fish have been recorded, in 107 families of which 4% are unrecorded elsewhere except for the waters around Norfolk Island and Middleton Reef to the north. 400 are inshore species and 15 are endemic. Luna lionfish *Pterois lunulata* is protected in the marine national park. The reef is the southernmost true coral reef in the world and provides a rare example of the transition between coral and algal reefs. Marine invertebrates include 83 species of corals and 65 species of echinoderms of which 70% are tropical, 24% are temperate and 6% are endemic. The benthic algae include 235 species of which 12% are endemic (DEWHA). Offshore, several species of dolphins and whales occur, sometimes entering the lagoon (Howea Divers, 2007).

## CONSERVATION VALUE

This isolated oceanic archipelago has spectacular volcanic landforms and biota, diverse and largely intact ecosystems and habitats for threatened species, especially birds and invertebrates, and remarkable natural beauty. The Park lies within a WWF Global 200 Marine Eco-region, a WWF/IUCN Centre of Plant Diversity, and a BirdLife-designated Endemic Bird Area.

## CULTURAL HERITAGE

The island was discovered in 1788 by a British convict transport ship, captain, Lidgbird Ball, and named after the First Lord of the Admiralty. There is no evidence of prior Polynesian or Melanesian settlement. A small permanent settlement was established in 1834, the settlers making a living by hunting and fishing, and by growing vegetables, fruit and meat for trade with passing ships. With numerous fluctuations over the years, the settlement slowly expanded and consolidated, developing a distinctive social structure and culture (Davey, 1986). The island is an interesting example of restricted island settlement (ANPWS, 1981).

## **LOCAL HUMAN POPULATION**

There is a population of approximately 350 permanent residents who live on the relatively level ground in the central part of the main island. Tourism is the major component of the island economy, followed by public administration and community service. Approximately 10% of the main island's vegetation has been cleared for agriculture. Commercial activities subject to control by the Lord Howe Island Board, include collection of palm seed, especially *Kentia* palm *Howea forsterana*, and cutting of *Pandanus* foliage for basket-making and other crafts (Davey, 1986).

## **VISITORS AND VISITOR FACILITIES**

The total annual number of visitors, and the revenue derived from tourism are not known. But tourists are restricted to 400 at any one time and some three to four hundred tourists may be present simultaneously during the summer (Davey, 1986). Visitor access to the island is mainly by light aircraft. There are four licensed guest houses providing full board accommodation and 13 self-contained apartment complexes (Lord Howe Island Board *in litt.*, 1995). Walking, for nature study, bird watching or photography is the major recreation: there is an extensive system of tracks throughout the reserve and a guide service is available. Scenic flights are available over the whole island group and several commercial operators offer boat tours. Proposed interpretation and environmental education activities were outlined in the management plan (Davey, 1986). There is surfing and world class diving in the species-rich marine parks surrounding both islands (Howea Divers, 2007)

## **SCIENTIFIC RESEARCH AND FACILITIES**

There has been considerable scientific interest in Lord Howe since it contains important habitats for conservation of biological diversity and has been observed and little disturbed since its relatively recent discovery in 1778. A succession of scientific expeditions in the 19th century quickly established the international significance of the island's natural history. In the early 1970s the Australian Museum undertook a terrestrial environmental survey of the island for the Lord Howe Island Board (Recher & Clark, 1974), which, with land use planning studies undertaken for the Board (Ashton, 1974) recommended an extensive land reserve for the protection of the terrestrial flora and fauna. A major research project culminated in the successful captive breeding of Lord Howe Island woodhen in the early to mid-1970s. There are programs for ongoing, biannual, annual and five-yearly monitoring of impacts on key species. A research bibliography is given in Davey (1986).

## **MANAGEMENT**

Although it is included administratively in New South Wales, Lord Howe Island and its associated islands are under the control and management of the Lord Howe Island Board which consists of three local residents. Under the Lord Howe Island (Amendment) Act, 1981, one of its members is an officer of the New South Wales National Parks and Wildlife Service nominated by the Minister administering the 1974 National Parks and Wildlife Act. Relevant laws include the: National Parks & Wildlife Act (1974, amendment 1981); NSW Environment Planning & Assessment Act (1979); Noxious Weeds Act (1993); Lord Howe Island Regulation (1994); Threatened Species Conservation Act (1995); NSW Marine Parks Act (1997); and the Environment Protection & Biodiversity Conservation Act (1999).

The Lord Howe Island World Heritage Property Strategic Plan for Management 2000-2005 was released in February 2000 (Environment Australia, 2002). The plan, prepared by the Director of Parks and Wildlife, is based on a land use policy to ensure that the management plan for the settlement area complements the reserve management plan, forming a plan of management for the island as a whole. This states that the fundamental management objectives are to: maintain the natural land-forming processes; protect significant landforms; maintain natural plant and animal populations; avoid all unnatural disturbances of plant associations and habitats; protect all individuals and the population of each species from unnatural disturbances; eliminate human disturbance; restore disturbed areas; control or eliminate introduced species; preserve outstanding natural scenery and the natural character of the preserve; promote its appreciation and enjoyment; maintain the full range of plant genetic diversity; and make provision for the continued livelihood of the local populace (Davey, 1986).

A Threatened Species Recovery Plan and a Strategic Plan for Weed Management were prepared by the Board in 2002 and a Regional Environment Plan addressed development and visitor pressure issues in 2003. Specific management activities have included the elimination of goats and feral pigs, resulting in substantial recovery of the understorey (Roberts, 2001). Funds and labour have been allocated to an intensive effort to control weed infestations and feral animals affecting the native vegetation and birds, though funding and labour constraints have so far permitted only the control and not the elimination of introduced flora and fauna.

## MANAGEMENT CONSTRAINTS

Nine of the fifteen species of land birds recorded when the island was first discovered are now extinct - seven of which were endemic. They were destroyed by hunting, introduced black rats, masked owls *Tyto novaehollandiae*, feral cats and through habitat changes caused by goats and pigs. The size of some seabird colonies on the main island has also declined from these causes. One bat, at least four invertebrate species and two plants also became extinct following human settlement (Hutton *et al.*, 2007). Endemic land snails are less abundant and confined to isolated colonies, and the two native lizards are very restricted if not extinct on the main island. There are 175 introduced plant species. Most of these have not invaded the indigenous plant communities, but in low-lying areas cleared for settlement, grazing and agriculture, destruction of the native vegetation has been virtually complete and regrowth tends to be of invading weeds such as guava *Psidium guajava*, bitou bush *Chrysanthemoides monilifera*, kikuyu grass *Pennisetum clandestinum*, ferny asparagus *Asparagus setaceus*, and asparagus fern *Protoasparagus eathropicus* (Lord Howe Island Board *in litt.*, 1995). However, adequate samples of intact lowland vegetation remain in less accessible parts of the island, some in special flora reserves (ANPWS, 1981). Control of these feral and pest species is a central objective of the management plan. Global warming, visitor and tourist pressures are also potential threats (Environment Australia, 2002).

## STAFF

53 staff including temporary positions (Environment Australia, 2002).

## BUDGET

Approximately 10% of the Board's budget is committed annually to environmental protection (Lord Howe Island Board *in litt.*, 1995). In 2001-2002 the Board's expenditure on environmental management was US\$ 615,000 in 2001-2002. The state Marine Park Authority's expenditure was US\$335,400 in 2001-2002. Most funding is given for short-term projects and more long-term funding is needed (Environment Australia, 2002).

## LOCAL ADDRESSES

Lord Howe Island Board, Administrative Office, Lord Howe Island, 2898, Australia.

New South Wales National Parks & Wildlife Service, PO Box 1967, 43 Bridge Street, Hurstville NSW.

Department for the Environment, Water, Heritage and the Arts, GPO Box 787, Canberra, ACT 2601.

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