

World Heritage Sites

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HEARD AND McDONALD ISLANDS AUSTRALIA

Heard Island and the McDonald Islands are in the Southern Ocean, approximately 4,100 km south-west of Perth and 1,700 km from the Antarctic continent. Their distinctive conservation value is as one of the world's rare pristine island ecosystems which have virtually no record of alien species and minimal human impact; also as the only volcanically active subantarctic islands they provide a window into ongoing tectonic activity, geomorphic processes and glacial dynamics.

COUNTRY

Australia

NAME

Heard and McDonald Islands

NATURAL WORLD HERITAGE SERIAL SITE

1997: Inscribed on the World Heritage List under Natural Criteria viii and ix.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

The UNESCO World Heritage Committee issued the following statement at the time of inscription:

Justification for Inscription

The Committee inscribed this property under criteria (viii) and (ix). It noted that this site is the only volcanically active sub-Antarctic island and illustrates ongoing geomorphic processes and glacial dynamics in the coastal and submarine environment and sub-Antarctic flora and fauna, with no record of alien species. The Committee repeated its request by the sixteenth session for further documentation on the marine resources of the site.

IUCN MANAGEMENT CATEGORY

1a Strict Nature Reserve

BIOGEOGRAPHICAL PROVINCE

Insulantarctica (7.4.9)

GEOGRAPHICAL LOCATION

Located in the southern Indian Ocean 4,100 km south-west of Australia and 1,700 km north of Mawson Base, Antarctica. Heard Island is at 53°06'S by 73°30'E with the McDonald Islands 43.5 km west of it at 53°03'S by 72°36'E.

DATES AND HISTORY OF ESTABLISHMENT

- 1953: Australian control was formalised under the Heard Island & McDonald Islands Act, 1953 (amended 1957 and 1963), designating the islands part of Australian External Territory;
- 1983: Heard and McDonald Islands listed on the Register of the National Estate, established under the Australia Heritage Commission Act, 1975;
- 1993: Designated a Strict Nature Reserve (IUCN) without specific Australian protected area status;
- 2002: The surrounding Marine Reserve established (65,000 ha).

AREA

36,900 ha: Heard Island: approximately 36,240 ha, McDonald I. 260 ha. The buffer area includes the adjacent offshore rocks, shoals and all territorial waters out for 12 nautical miles (~637,000 ha).

LAND TENURE

Government of Australia. Administered by the Antarctic Division of the national Department of Tourism, Arts & Environment.

ALTITUDE

Heard Island sea level to 2,745m (Mawson Peak); McDonald Islands: sea level to 230m.

PHYSICAL FEATURES

Heard Island is roughly circular, about 20 km in diameter with a peninsula extending 9 km northwest and a spit extending 8 km to the east. The topography is dominated by the Big Ben massif and Mawson Peak, the only active volcano in Australian territory which, between 1947 and 1955, erupted thirty times. The mountainous Laurens Peninsula is connected to the main island by a ridge little more than 100m wide. It is also volcanic in origin, and has extensive lava tunnels. The sand and shingle spit is very narrow and is now being breached. There are numerous outlying islets, rocks and reefs, the largest, Shag Island, lying some 10 km north of Heard Island. 80% of Heard Island is glaciated, with ice up to 150m deep and 12 main glaciers extending from 2,745m to sea level. Ice cliffs form a high percentage of the coastline. The glaciers appear to be fast-flowing as a result of the steep slope and high precipitation, and are particularly sensitive to climatic fluctuations. Measurements between 1947 and 1980 suggest that glacial retreat has been marked, especially on the eastern flank, creating several terminal lagoons on the coast. This has been associated by Allison & Keage (1986) with changes in weather patterns. There is little soil development, and ice-free areas available for terrestrial life are widely separated and mostly confined to low-lying coastal areas.

The McDonald Island group comprises McDonald Island (260 ha), with several small rocky islets (notably Flat Island and Meyer Rock). The main island consists of a sloping plateau in the north and the steep-sided Maxwell Hill in the south, both bounded by steep cliffs and joined by a narrow isthmus. The islands, all of which are ice-free, are composed of basaltic lava and tuffaceous material from the eruptions of volcanic vents near sea level which are compositionally distinct from those of Heard Island. They have experienced recent eruptions. The islands lie on the submarine volcanic Kerguelen Plateau, which rises some 3,700m above the sea floor. With the Kerguelen Islands, 440 km northwest, they are the only expressions above sea level of the Plateau and the broader Gaussberg-Kerguelen Ridge, formed over a hotspot caused by a mantle plume over which Heard Island has lain for 135 million years. The island is notable among oceanic islands because its basement rock is middle Eocene to early Oligocene karstic limestone of marine origin. The volcanic peaks, lava flows and cones formed during three subsequent phases of activity sit on this.

CLIMATE

The islands lie to the south of the Antarctic Convergence and have a cool maritime climate with strong prevailing westerly winds. The turbulence caused by the massif of Big Ben creates extremely changeable weather and drier conditions in its lee. Observations on Heard Island show a mean annual temperature of 1°C, with a summer mean of 3.2°C and a winter mean of 0.1°C. Annual precipitation is about 1,400mm with snow or rain on 75% of all days, and frequent extensive cloud cover. Snowfalls occur throughout the year with maximum frequency in winter and spring.

VEGETATION

The principal vegetation communities on Heard Island are tussock grassland, herbfield, and feldmark, with smaller areas of meadow, pool complex and cushion carpet. There are no trees. Short tussock grass *Poa cookii*, with cushions of the herb *Colobanthus kerguelensis* are present in coastal areas, with Kerguelen cabbage *Pringlea antiscorbutica* and cushions of *Azorella selago* in established moraines and valleys up to 200m. Dwarf shrub *Acaena magellanica* occurs in sheltered areas. Mosses and lichens dominate ice-free regions above 200m, and are important components of the flora at lower levels. Kelp, principally *Durvillea antarctica*, among 16 other species of macro-algae, is abundant along the coastline. The isolation of the plant communities, combined with the increasing growth of habitat resulting from glacial retreat, makes Heard Island of significance for the study of plant colonisation. Eleven species of vascular plant occur on the island: seven herbs and four grasses, with forty-two species of moss and as many as 50 lichen species identified so far. The grass *Poa annua* appears to be newly introduced to Heard Island, first being seen in 1986/87, although its introduction by humans seems unlikely.

On the McDonald Islands, tussock grass *Poa cookii* is common on eastern slopes and lower parts of the plateau, while cushions of *Azorella selago* cover higher areas, with Kerguelen cabbage *Pringlea antiscorbutica*, and dwarf shrub *Acaena magellanica*. There are five vascular plant species, at least six mosses and an undetermined number of lichens all also found on Heard Island.

FAUNA

The nominated site includes an extensive marine area, ensuring its ecological integrity since virtually all species inhabiting the islands depend on the ocean for their survival. Population levels of most species of seabirds and marine mammals breeding in the islands are reported to be stable. 23 species of marine mammals are recorded. Five species of true seals the Phocidae, and two species of eared seals, the Otariidae, are found on the islands. Large populations of southern elephant seal *Mirounga leonina* occur on Heard Island, principally on the eastern spit, although numbers decreased significantly during the 1990s. A large winter non-breeding population of leopard seal *Hydrurga leptonyx* is estimated to be around 1,000 individuals. The group is an important breeding place for Antarctic fur seal *Arctocephalus gazelle*, numbers of which are rising. Seals from the McDonald Islands probably recolonised the main Island after the severe exploitation of the 19th century. Weddell seal *Leptonychotes weddellii*, Ross seal *Ommatophoca rossii* and crabeater seal *Lobodon carcinophagus* are occasionally present on Heard Island at the extreme northern limit of their ranges; and subantarctic fur seal *A. tropicalis* was first recorded on there in 1987/88. On the McDonald Islands southern elephant seal and Antarctic fur seal breed, while leopard seal occurs. Thirteen species of whale, two dolphins and a porpoise have been recorded in the surrounding seas. These include blue whale *Balaenoptera musculus* (EN), *Balaena australis* southern right whale, *Balaenoptera physalus* fin whale (EN), sei whale *Balaenoptera borealis* (EN) and sperm whale *Physeter macrocephalus* (VU) (AAD, 2005).

Thirty-four bird species have been recorded: 19 species breeding on Heard Island and 11 on the McDonald Islands. Penguins are by far the most abundant, the commonest species being macaroni penguin *Eudyptes chrysolophus*, the islands' breeding population of which reaches two million pairs, 16% of the world total. Gentoo penguin *Pygoscelis papua* is present year-round, with a breeding population of 16,600, about 6% of the world total; also king penguin *Aptenodytes patagonicus* (5,700 pairs) and southern rock penguin *Eudyptes chrysolophus* (to 10,000 pairs). Chinstrap *Pygoscelis antarcticus* and Adelie penguins *Pygoscelis adeliae* occasionally visit. The albatross species include black-browed albatross *Thalassarche melanophris* (EN: 680-790 breeding pairs), light-mantled albatross *Phoebastria palpebrata* (200-500) and wandering albatross *Diomedea exulans* (VU), first reported breeding there in 1980. The Heard Island cormorant *Phalacrocorax atriceps nivalis* is an endemic species with a population of less than 100 pairs. As there are no introduced predators, The islands have a large population of burrowing birds such as petrels. Other breeding species are southern giant petrel *Macronectes giganteus* (3,000 pairs on Heard Island and an estimated 1,400 to 1,600 pairs on McDonald Island), Cape petrel *Daption capense*, Antarctic prion *Pachyptila desolata*, fulmar prion *P. crassirostris*, Wilson's storm petrel *Oceanites oceanicus*, South Georgian diving petrel *Pelecanoides georgicus* and common diving petrel *P. urinatrix*, Antarctic tern *Sterna vittata*, subantarctic skua *Catharacta lonnbergi*, kelp gull *Larus dominicanus* and the endemic lesser black-faced sheathbill *Chionis minor nasicornis*. Most bird populations are reported to be stable, with those of king penguin and black-browed albatross increasing. Woehler (1991) summarised published and unpublished data on the status and conservation of the 19 breeding species.

The number of terrestrial invertebrate species recorded from the islands stands at 128. Some of these are endemic and others are restricted to the Heard-Kerguelen region. In one study, four species previously unknown to science were described, along with several sub-species endemic to the Island. On Heard Island, nearly all non-parasitic insects are associated with *Azorella selago*, *Poa cookii* and *Pringlea antiscorbutica*, the commonest vascular plants. Recently, three species, a thrips, a mite and earthworms were introduced accidentally. The fish fauna around the islands of above 40 species is virtually identical to that around the Kerguelen Islands. Fifteen species of fish have been recorded from trawls at depths of greater than 170m and nine species from inshore waters. Species occurring frequently around Heard Island are icefish *Champscephalus gunnari* and *Channichthys rhinoceratus*, Antarctic cods *Notothenia squamifrons* and *Dissostichus eleginoides*, and rays *Bathyraja* spp. 150 coastal and marine invertebrates are listed in the nomination.

CONSERVATION VALUE

The Islands are a classic example of a subantarctic island group with low species diversity, but huge populations of certain species, which also shows active volcanic, glacial, karst and coastal features in

pristine condition and ecosystems far less impacted by man than on other subantarctic islands (DASETT, 1990).

CULTURAL HERITAGE

The first sighting of Heard Island was by a British captain, Peter Kemp, in 1833. Its discovery was by the American captain Heard of the *Oriental* in 1853 who first published information on the island's location and geography. The McDonald Islands were discovered in 1854 by a British sealer, Captain McDonald. Sealing gangs occupied Heard Island almost continuously for 20 years following the first landing in 1855, and sporadically thereafter until 1929. Elephant seal, fur seal, and penguin, particularly king penguin, were exploited on Heard Island and to a lesser extent on the McDonald Islands, and the sealers' sites and artefacts on Heard Island are the best preserved in the region. The Islands were annexed to Australia from Britain in 1947. The remains of three to four recent expeditions are visible.

LOCAL HUMAN POPULATION

No-one lives permanently on the islands.

VISITORS AND VISITOR FACILITIES

Heard Island is visited infrequently by 2-3 short authorised landings a year of some 2-3 hours each, and occasional other visits, mostly unofficial. The McDonald Islands are hard to land on and are visited very rarely. Access is by helicopter, amphibious craft and inflatable rubber boats (Potter, 2007). There are no visitor facilities but the potential exists for adventurous mountaineering and ecotourism.

SCIENTIFIC RESEARCH AND FACILITIES

The first visit by scientists was from HMS *Challenger* in 1874, and a scientific expedition visited in 1902. A research station was maintained from 1947 to 1955 by the Australian National Antarctic Research Expedition (ANARE), later shifted to bases on the Antarctic mainland. Further ANARE activity occurred at 3 to 4 yearly intervals over the past 45 years. Research on the McDonald Islands has been very limited, landings on the islands having been made only in 1971 and 1980, when a four day biological survey was made. An active, though intermittent, research programme is conducted into both biological and earth sciences and cultural remains. There are valuable opportunities for research in changes of the populations of key species, monitoring climate change and glacial retreat when new areas for colonisation are exposed, and the study of plate tectonics in the submarine plateau. In 1985, a 1:50,000 scale map of the whole territory was produced, and in 1986/7 an extensive aerial photographic survey of ice-free sites was completed. The building remains are significant, representing constructions spanning 50 years. The first comprehensive survey of historic sites on Heard Island was carried out in 1985-87. Between 1996 and 2006 there were two scientific expeditions 2-3 months long. An automatic weather station has functioned since 1990.

MANAGEMENT

The islands are administered under the Heard and McDonald Islands Act of 1953 and the Environment Protection and Management Ordinance of 1987 by the Antarctic Division of the national Department of Tourism, Arts & Environment (formerly the Department of the Arts, Sport, the Environment, Tourism & Territories, DASETT). Commonwealth laws extended to the External Territories oblige the government to ensure the preservation of natural and cultural heritage values. Laws may be made under the provisions of the Act for the administration and protection of the Islands, the Governor-General is empowered to enact ordinances for the Territory, and the Criminal Procedure Ordinance of 1993 provides mechanisms for their enforcement.

A Management Plan for the islands adopted in February 1996 under the Environment Protection and Management Ordinance of 1987 declares nearly all the site to be a wilderness area and provides guidelines for management of the islands (Commonwealth of Australia, 1996). It outlines protective measures that prohibit entry to the island without a permit, prohibits activities which would be potentially harmful to the natural and cultural environments and includes visitor guidelines for administration, safety, and environmental protection and a protocol for quarantining food, timber, clothing etc. Under these it is prohibited to interfere with fauna or flora, introduce any animal, plant, parasite, or disease, collect samples, except for bona fide scientific reasons, use motorised vehicles, light fires, erect permanent structures, or carry or use firearms

MANAGEMENT CONSTRAINTS

Populations of seals and penguins on Heard Island, particularly the Antarctic fur seal, southern elephant seal, and king penguin, have recovered from the heavy exploitation of the 19th and early 20th centuries, and the immediate area around the ANARE station on Heard Island has been slightly modified. Otherwise most of Heard Island is unaffected by man, and no alien plants or animals are present. Sheep *Ovis aries* were introduced with the first Australian National Antarctic Research Expedition (1947), but did not become established. One exception may be the impact of stranded fishing debris and other artefacts, and several fur seals have been seen entangled at Heard Island (Slip & Burton, 1991). The McDonald Islands are unmodified by man, and there are no alien plants or animals. One of the principal management constraints is the problem of formulating management standards and practice given the limited scientific understanding of the islands' ecosystems and their susceptibility to disturbance. Also, while isolation has been key in conserving the islands, it also makes it difficult to manage a site so far from the mainland.

STAFF

There are no staff solely dedicated to managing the islands. However in meeting its responsibilities the Australian Antarctic Division draws on the skills and knowledge of some 15 permanent members for policy, planning, environmental, legal, operational, public information and education concerns, each of whom has a watching brief on matters concerning the islands (Commonwealth of Australia, 1996).

BUDGET

The administration and management is funded from the Australian government's appropriation to the Australian Antarctic Division. The estimated budget in 1997 was about US\$234,000 per annum.

LOCAL ADDRESS

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