Lord Howe Island Group

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Australia
Inscribed in: 1982
Criteria: (vii) (x)

A remarkable example of isolated oceanic islands, born of volcanic activity more than 2,000 m under the sea, these islands boast a spectacular topography and are home to numerous endemic species, especially birds. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 01 Dec 2020

GOOD

Good management is in place, providing resourcing and commitment to address the key threats to World Heritage values. If this is sustained, the values should be preserved. The outstanding scenic values are likely to remain in good condition and, as a result of funding and ongoing implementation the 2019 Rodent Eradication Project significant natural habitat, rare plants and threatened wildlife are likely to persist in their current, or an improved, condition. It is crucial that invasive species eradication and incursion prevention projects continue to be implemented, in order to protect the successful investment to date. Threats from climate change and rising oceanic temperatures, as well as increasing impacts from marine debris require national and international action in order to reduce impacts to some values and in particular to the marine environment.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Spectacular and scenic landscape** **Criterion:(vii)**

The Lord Howe Island Group is grandiose in its topographic relief and has an exceptional diversity of spectacular and scenic landscapes within a small area, including sheer mountain slopes, a broad arc of hills enclosing the lagoon and Balls Pyramid rising abruptly from the ocean. It is considered to be an outstanding example of an island system developed from submarine volcanic activity and demonstrates the nearly complete stage in the destruction of a large shield volcano (World Heritage Committee, 2012).

▶ **Outstanding underwater vistas** **Criterion:(vii)**

Having the most southerly coral reef in the world, it demonstrates a rare example of a zone of transition between algal and coral reefs. Many species are at their ecological limits, endemism is high, and unique assemblages of temperate and tropical forms cohabit (World Heritage Committee, 2012).

▶ **Outstanding example of the development of a characteristic insular biota** **Criterion:(x)**

The Lord Howe Island Group is an outstanding example of the development of a characteristic insular biota that has adapted to the island environment through speciation. A significant number of endemic species or subspecies of plants and animals have evolved in a very limited area. The diversity of landscapes and biota and the high number of threatened and endemic species make these islands an outstanding example of independent evolutionary processes (World Heritage Committee, 2012).

▶ **Rare plants and threatened wildlife** **Criterion:(x)**

Lord Howe Island supports a number of endangered and endemic species or subspecies of plants and animals, for example the Lord Howe Woodhen (Hypotaenidia sylvestris), which at time of inscription was considered one of the world’s rarest birds (World Heritage Committee, 2012). The Lord Howe Woodhen has since made a considerable recovery following a successful captive breeding program and other conservation measures (IUCN Consultation, 2020). While sadly a number of endemic species disappeared with the arrival of people and their accompanying species, the Lord Howe Island Phasmid (Drycocelus australis), the largest stick insect in the world, still exists on Balls Pyramid and is now in captive management (IUCN Consultation, 2020). The islands are an outstanding example of an oceanic island group with a diverse range of ecosystems and species that have been subject to human influences for a relatively limited period (World Heritage Committee, 2012).

Assessment information

Threats

Current Threats **High Threat**

Invasive alien species have had negative impacts on the site's values in the past, however, a number of successful measures have been implemented to ameliorate this threat. African big-headed ants were declared eradicated from Lord Howe Island in April 2018, with two infestations subsequently detected in October 2018 and May 2019. Monitoring for this species in April 2020 did not detect any remaining

infestations, however further monitoring in summer 2021 is required in order to declare its eradication. An intensive effort since 2004 has seen an 80% reduction in weed density across island and a 90% reduction the presence of mature weeds (Bower, 2016). A continued downward trend in weed density and abundance continues and is monitored. Potential impact of the plant pathogens myrtle rust and phytophthora on the islands' terrestrial ecosystems is also of concern, incursions of which have occurred in recent years, but have been subject to treatment. The 2019 Rodent Eradication Program (appears to have been effective, but ongoing monitoring for 2 years is required to declare eradication. Elimination of remaining introduced masked owls is also required to maximize and enhance the benefit of rodent eradication. While overall, significant progress has been achieved in addressing the threat from invasive species, further monitoring will be required to confirm this. Increased biosecurity will be required to secure investments made in eradicating key pests. Other threats to the site's values include climate change, with impacts observed on both its marine and terrestrial areas. Recently, an assessment of the extent and severity of the 2019 coral bleaching event has been undertaken, but the data requires further analysis and information will be made available when this has been completed. Preliminary analysis shows high rates of bleaching and mortality within the lagoon which has negatively affected reef composition.

► Ocean acidification, Temperature extremes

High Threat

(Coral bleaching)

Inside site, widespread(15-50%)

Coral bleaching has been observed at Lord Howe Island with the most severe bleaching event recorded in 2010 (Harrison et al., 2010) and studies have shown that dominant coral taxa at subtropical reefs are highly susceptible to thermal stress (Dalton et al., 2011). In early 2019, Lord Howe Island experienced its most recent coral bleaching event, the third recorded at Lord Howe since 1998. During March 2019, the extent and severity of the coral bleaching event in the lagoon was quantified as part of a collaboration between the University of Newcastle, the University of New South Wales, James Cook University, the National Oceanic and Atmospheric Administration, and Coral Reef Watch. These researchers investigated the severity and extent of the coral bleaching for both soft and hard corals at: North Bay, Erscott's Reef, Coral Gardens, Comets, Ned's Beach and Sylph's Hole. Bleaching characteristics were quantified with respect to coral colony size, coral species and degree of bleaching. The data requires further analysis and information will be made available when this has been completed. The researchers note that bleaching of the soft coral communities was delayed in comparison to the hard corals (Lord Howe Island Marine Park news, 2019). Anemones also bleached during both the 2010 and 2019 bleaching events, which could also negatively affect resident anemonefish populations (Harrison et al. 2010, Saenz-Agudelo et al. 2011, Thomas et al. 2015). Ongoing research found high levels of stony coral and low levels of soft coral mortality across impacted reefs, with the highest bleaching and mortality at Sylph's Hole. As Sylph's Hole was most highly impacted, researchers expect that this site will be the most vulnerable to degradation from this and future events. This is significant to the value "outstanding underwater vistas" as this is the closest lagoon reef to shore, and is popular with snorkelers. It has a unique and striking Porites sp. based reef. Publications on this event and it's effects on stony and soft corals and anemones are in preparation (as of August 2020) by Steinberg et al. and Moriarty et al. If any marine species are extirpated from the island due to bleaching or other disturbances, prognosis for unaided recovery is poor. This is because Lord Howe Island is exceedingly isolated from neighboring reefs. Past studies on fish larval connectivity found little gene flow between Lord Howe Island and mainland Australia or Norfolk Island, and moderate connectivity to Middleton and Elizabeth Reefs. If natural recolonisation of Lord Howe Island reefs is to occur, it will likely be from these two oceanic reefs (van der Meer et al. 2012, van der Meer et al. 2013, van der Meer et al. 2014, Steinberg et al. 2016).

► Solid Waste

High Threat

(Marine debris)

Outside site

Plastic ingestion by seabirds is suspected of leading to increased mortality in some species. Marine debris is not coming from on-island but from the high seas and therefore is difficult to control (Key Threatening Process listing, local research). All solid waste is repurposed or shipped off Lord Howe Island.

► Invasive Non-Native/ Alien Species

High Threat
Inside site, widespread(15-50%)

(Invasive species)

Other invasive species names

African big-headed ant (Pheidole megacephala), Bleating tree frog (Litoria dentata), Garden skink (Lampropholis delicata); Masked Owl (Tyto novaehollandiae); Phytophthora (Phytophthora cinnamomi); cherry guava (Psidium cattleyanum)

Invasive species from a diverse array of taxa including African big-headed ant (Pheidole megacephala), bleating tree frog (Litoria dentata), garden skink (Lampropholis delicata), masked owl (Tyto novaehollandiae), phytophthora (Phytophthora cinnamomi) and myrtle rust (Austropuccinia psidii) pose ahigh threat to the site. Significant threats are being managed with aim of eradication of key weed species through implementation of a comprehensive Biodiversity Management Plan (2007), Weed Management Strategy (2016) and Lord Howe Island Biosecurity Strategy (2016).

African big-headed ants (Pheidole megacephala) were declared eradicated from Lord Howe Island in April 2018. A single infestation was subsequently found in October 2018, with another discovered in May 2019. Both were immediately delimited and treated, with no subsequent positive records since. Further monitoring for this species is required in order to declare eradication (IUCN Consultation, 2020a).

An intensive effort since 2004 has seen an 80% reduction in weed density across island and a 90% reduction the presence of mature weeds, with over 68 species identified for eradication over a projected 30 year period (Bower, 2016). To date six weeds have been declared eradicated with a further 20 remaining at zero density and are on the cusp of being declared with nil detection for at least two years (Board Business Paper, September 2020). The weed eradication programme is currently partly funded until 2021 but it requires ongoing secure funding up to $500K per year to achieve eradication targets (IUCN Consultation, 2020a). A recent study estimated that for cherry guava - one of the most widespread invasive weeds, it will take approximately 25 years to remove the remaining plants at current eradication levels, however, the eradication time could be reduced through application of different approaches and increased resourcing (Baker et al., 2018).

Phytophthora is only known from one location in the settlement and is being treated quarterly with a granular fungicide. Periodic testing is undertaken in the surrounding vicinity to determine the extent of the infestation as well as testing of any trees that show signs of decline. An incursion of myrtle rust was detected in the settlement area in October 2016 and was immediately delimited and treated. While myrtle rust has not been detected since, its incursion remains a high potential threat (IUCN Consultation, 2020b).

► Invasive Non-Native/ Alien Species

High Threat
Inside site, widespread(15-50%)

(Introduced rodents)

Other invasive species names

Ship Rat (Rattus rattus); House Mouse (Mus musculus)

The introduced rodents, ship rat (Rattus rattus) and house mouse (Mus musculus), have negatively impacted endemic species, which are listed values of the site. For example, a species of stick insect (Dryococelus australis) was presumed to be extinct on Lord Howe Island by mid-1930s because of predation by rats (the species was subsequently rediscovered on Ball's Pyramid - a nearby islet) (Cassis, 2017).

While the winter 2019 Rodent Eradication Program (REP) appears to have been effective, ongoing monitoring for 2 years is required to declare eradication. As part of the REP, comprehensive rodent eradication operations were undertaken over the winter of 2019. The last live rodent to be detected on the island was found on 16 September 2019 and the last recently dead rodents (x3) were found on 6 October 2019. No positive signs of live rodents have been detected to since 6 October 2019 (IUCN Consultation, 2020).

Masked Owls were introduced to Lord Howe Island in the 1920s to help control introduced rats. With the implementation of the REP, masked owls (Tyto novaehollandiae) now pose a threat to native birds, which are their only potential prey items (this includes threatened species such as the Lord Howe woodhen (Hypotaenidia sylvestris) and numerous species of seabird. Up to 20 masked owls succumbed to secondary poisoning from consuming poisoned rats during the REP, with 6 females shot since the REP and at least one remaining on the island (although there may be more). An ongoing hunting program is required to eradicate this species (IUCN Consultation, 2020).

▶ **Habitat Shifting/ Alteration, Droughts** — **Data Deficient**

(Reduced rainfall) — Inside site, extent of threat not known

Climate change appears to be causing reduced rainfall on Lord Howe Island, with 2018 and 2019 the driest years since records began. This is leading to the loss of large trees, the opening up of canopy gaps, and fern die off on Mt Gower Gnarled Mossy Cloud Forest (IUCN Consultation, 2020a). It is possibly leading to the cloud base lifting in the southern mountains which will reduce the capacity for the endangered Gnarled Mossy Cloud Forest to cloud strip moisture (IUCN Consultation, 2020b).

Potential Threats

High Threat

The proposed lengthening of the airport runway would pose a risk to marine values, threatened species and visual amenity; however, this could be minimized or avoided via alternate solutions or careful design. Potential impact of the plant pathogen myrtle rust and phytophthora on the islands' terrestrial ecosystems is also of concern. An incursion of myrtle rust was detected in the settlement area in October 2016 and was immediately delimited and treated. While myrtle rust has not been detected since, its incursion remains a high potential threat. There remains one infestation of phytophthora on the island which is treated with granular fungicide quarterly and is monitored. While coral bleaching has already been observed in the site, future oceanic warming will likely result in more severe impacts.

▶ **Flight Paths** — **High Threat**

(Future need to extend runway and periodic lowering of Blinky Beach dune) — Inside site, extent of threat not known

Possible need to extend runway by 400 metres into the lagoon to allow for continued viability of commercial air access to island or seek alternative aircraft that can use current airstrip. This requirement is based on advice from airlines that no suitable aircraft will be available in the future to service the island on the existing runway. Unless an alternate aircraft can be sourced the runway will need extending. A runway feasibility study was completed in 2019. This indicated a very low benefit cost ratio and potential environmental impacts making the extension not feasible. Other solutions to ongoing air services are being pursued (IUCN Consultation, 2020b).

The Blinky Beach dune obscures the Obstacle Height Limit for incoming Qantas flights and requires its height to be reduced every 5-10 years. The dune is the primary habitat for sand spurge (Euphorbia psammogeton), listed as an endangered species under the NSW Biodiversity Consecration Act 2016. Lowering of the dune has the potential to impact on this species. The activity of lowering the dune is considered an activity that requires assessment and approval under the EPBC Act as it is considered likely to have significant impacts on World Heritage values and other protected matters, such as threatened species (IUCN Consultation, 2020b).

▶ **Pathogens** — **High Threat**

(Risk of Myrtle Rust incursion) — Inside site, not applicable

Other invasive species names
Myrtle Rust (Austropuccinia psidii)

The potential impact of the plant pathogen myrtle rust (Austropuccinia psidii) on the islands' terrestrial ecosystems is of concern. All endemic Myrtaceae plant species have tested susceptible to the rust in laboratory. Endemic Myrtaceae species are dominant in many of the plant communities on Lord Howe Island, including the Critically Endangered Ecological Community – Gnarled Mossy Cloud Forest. Additionally, one of these species, the Lord Howe melaleuca (Melaleuca howeana) is the primary food

plant for the wild population of the Lord Howe Island phasmid (Dryococelus australis) on Balls Pyramid. An incursion of myrtle rust was detected in the settlement area in October 2016 and was immediately delimited and treated by spraying with fungicides and removing all infected hosts plants. These are introduced species including rose apple (Syzygium jambos), Fiji fire (Metrosideros vitiensis) and weeping myrtle (Agonis flexuosa). Myrtle rust has not been detected since. A survey is planned for summer 2020/21 which should allow myrtle rust and introduced host plants to be declared eradicated (IUCN Consultation, 2020a).

Overall assessment of threats

High Threat

Invasive alien species have had negative impacts on the site's values in the past, however, a number of successful measures have been implemented to ameliorate this threat. African big-headed ants were declared eradicated from Lord Howe Island in April 2018, with two infestations subsequently detected in October 2018 and May 2019. Further monitoring for this species will be required in order to declare its eradication. An intensive effort since 2004 has seen an 80% reduction in weed density across island and a 90% reduction the presence of mature weeds. The 2019 Rodent Eradication Program (appears to have been effective, but ongoing monitoring for 2 years is required to declare eradication. Elimination of remaining introduced Masked Owls is also required to maximize and enhance the benefit of rodent eradication. While overall, significant progress has been achieved in addressing the threat from invasive species, further monitoring will be required to confirm this. Increased biosecurity will be required to secure investments made in eradicating key pests. Potential impact of the plant pathogen myrtle rust on the islands' terrestrial ecosystems is also of concern. An incursion of myrtle rust was detected in the settlement area in October 2016 and was immediately delimited and treated. While myrtle rust has not been detected since, its incursion remains a high potential threat. There remains one infestation of phytophthora on the island which is treated with granular fungicide quarterly and is monitored. Other threats to the site's values include climate change, with impacts observed on both its marine and terrestrial areas. Recently, an assessment of the extent and severity of the 2019 coral bleaching event has been undertaken, but the data requires further analysis and information will be made available when this has been completed. Future oceanic warming will likely result in more severe impacts.

Protection and management

Assessing Protection and Management

▶ **Highly Effective**

Competent and professional local management team with good backup from other local and State agencies. Recent changes in governance aligns management more closely with the New South Wales (NSW) Parks and Wildlife Agency while remaining within the Department of Planning, Industry and Environment. Management of the Island under the NSW Lord Howe Island Act is the responsibility of the NSW Minister for the Environment, and it is governed through a Board with elected and appointed members.

▶ **Highly Effective**

Management is well organised and efficient with strong policy, planning and accountability systems. The World Heritage site is not included in NSW State of Parks Reporting; however the Lord Howe Island Corporate Plan sets out clear management goals and outcomes and these are reported to the NSW Parliament in an Annual Report.

▶ **Mostly Effective**

The boundary of the World Heritage site does not align with New South Wales Marine Reserve boundaries. In June 2012 the State of New South Wales clarified the area in hectares and provided an updated map (Lord Howe Island Group map, 2012).
The NSW Lord Howe Island Marine Park lies within the World Heritage site and covers approximately 460 km2, encompassing Lord Howe Island, the Admiralty Islands, Balls Pyramid and South East Rock. It extends from the mean high water mark to the three nautical mile limit of NSW waters.
The Australian Lord Howe Marine Park surrounds the NSW Lord Howe Island Marine Park and extends further seaward to 12 nautical miles (https://parksaustralia.gov.au/marine/parks/temperate-east/lord-howe/, accessed 22 July 2020). The NSW Government manages this reserve for the Australian Government. It covers 110,126 square kilometres, with depths from less than 15 metres to 6000 metres and has five zone types: National Park, Habitat Protection, Habitat Protection (Lord Howe), Recreational Use and Multiple Use.
The Commonwealth marine area (from 3 to 200 nautical miles from the coast of Lord Howe Island) is a matter of national environmental significance under the EPBC Act.

▶ **Highly Effective**

Lord Howe Island local plans are consistent with and well integrated into State and National planning frameworks (World Heritage Committee, 2012). The LHI Biodiversity Management Plan 2007 is a multi-agency approved recovery plan. Local, State and National legislation complement each other to help protect World Heritage values.

▶ **Mostly Effective**

There has been a strong local control of decision-making through majority of Islander members on the Lord Howe Island Board, however the relationship between the Lord Howe Island Board and local community was strained in the lead up to and implementation of the Rodent Eradication Programme (REP). Regular communications, rostering of suitable staff for access to leases during the implementation of the REP and completion of the implementation phase of the REP has reduced this tension (IUCN Consultation, 2020a). Regular news updates are posted on the REP webpage (https://lhirodenteradicationproject.org/news-updates/) and through householders emailed/posted to residents. A strong local involvement and leadership of sustainability and environmental stewardship also continues through community members, the LHI Museum and other groups.

▶ **Mostly Effective**

Strong legal framework at National, State and local levels is in place. Much of the site is in a Permanent Park Preserve, with the fundamental purpose of preserving the Island's native flora and fauna in accordance with the New South Wales Lord Howe Island Act 1953 and National Parks and Wildlife Act 1974. .
The Lord Howe Island Local Environmental Plan 2010 is made under the Environmental Planning and Assessment Act 1979 and controls planning and development on the Island.
The NSW Biodiversity Conservation Act 2016 is also relevant.
The World Heritage values of the Lord Howe Island Group are protected as a matter of national environment significance under the Australian Government’s Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Any new development proposal in the World Heritage site will be subject to assessment and approval under the EPBC Act if an action is considered likely to have significant impacts on World Heritage values and other protected matters, such as threatened species.

▶ **Mostly Effective**

The Lord Howe Island Board and the NSW Department of Planning, Industry and Environment carry out some enforcement including biosecurity inspections. Following the Rodent Eradication Project there have

been significant improvements to biosecurity, which have mostly been resourced by the Board. Additional funding is required to satisfactorily address the risk of incursion (IUCN Consultation, 2020b).

▶ **Highly Effective**

The only World Heritage Committee decision after inscription was the one on adoption of the retrospective Statement of Outstanding Universal Value for Lord Howe Island Group in July 2012 (Decision 36COM.8E).

▶ **Mostly Effective**

A cap on visitor accommodation beds is effective but needs stronger enforcement. There is increasing 'islander' demand for new housing that will need careful management. Unregulated water extraction and discharge of hyper saline desalinised water need to be addressed based on sustainable extraction and non-polluting discharge measures particularly if climate change affects water tables.

▶ **Mostly Effective**

No information is available on the overall budget available for the management of the World Heritage site. However, significant funds have been allocated for specific projects, such the Rodents Eradication Programme (http://www.lhib.nsw.gov.au/environment/environmental-programs/rodent-eradication). Whilst this proejct has been successful so far, the consequence of invasive species incursion (especially rodent), is heightened post eradication. While the Lord Howe Island Board has funded and implemented increased and more effective biosecurity measures, there remains a risk to both the OUV of the site and investments unless further funding is secured. The Australian Government also provides funding for the employment of an Executive Officer (IUCN Consultation, 2020a).

▶ **Highly Effective**

Well trained and professional staff are supported as necessary by NSW Department of Planning, Industry & Environment experts. Partnerships are in place with North Coast Local Land Services, Taronga Zoo, Melbourne Zoo, Lord Howe Island Museum and the Australian Museum to support island staff (IUCN Consultation, 2020a). A new cooperative agreement was reached with Port Macquarie Hastings Local Council in 2012 to provide assistance for the Lord Howe Island Board in dealing with local government matters.

▶ **Mostly Effective**

There are good programs mostly delivered by commercial operators and volunteers. Information on how members of the public can get involved in conservation programs on Lord Howe Island is available here: https://lhirodenteradicationproject.org/get-involved/

A Lord Howe Island user guide is available online at: https://www.lhib.nsw.gov.au/services/tourism/lord-howe-island-user-guide

▶ **Mostly Effective**

Adequate interpretation for tourists; however there is no comprehensive program for interpretation of World Heritage values. The Lord Howe Island Museum organizes weekly lectures on World Heritage values, and displays to promote the values, and conservation projects.
A Lord Howe Island user guide is available online at: https://www.lhib.nsw.gov.au/services/tourism/lord-howe-island-user-guide.

▶ **Mostly Effective**

Good monitoring of inputs and outputs is ensured through the Board corporate planning and reporting process, and there is good monitoring of outcomes of project activities, such as the Weed Eradication Program (Annual Reports, Weed Management Strategy) and significant improvements to biosecurity inspections and monitoring, including regular checking of over 300 rodent detection devices (IUCN

Consultation, 2020b). Monitoring has been improved as a result of the Rodent Eradication Program. Ongoing improvements are being made for weed eradication and various aspects of biosecurity (IUCN Consultation, 2020a). Monitoring is also in place for the marine environment, such as a monitoring program on McCulloch's anemonefish running since 2009 (Lord Howe Island Marine Park news, 2019).

▶ **Highly Effective**

Wide range of research activity has been undertaken and continues to be undertaken. The implementation of the Rodent Eradication Project has resulted in increased research being conducted on the island (IUCN Consultation, 2020).

Overall assessment of protection and management

Highly Effective

The protection and management of the Lord Howe Island Group is generally highly effective. There are some concerns about the stability of recurrent funding for routine management tasks. Key conservation activities have either uncertain funding or are subject to approval and community acceptance. On 27 September 2017 the Australian Government announced funding of AUD $177,000 per annum for five years from July 2018 to assist with supporting a World Heritage Executive Officer for the Lord Howe Island Group. The Australian and New South Wales governments each contributed AUD$4.5 million (AUD $9 million total) to deliver the Rodent Eradication Project. However, sustainable biosecurity management while improved, remains a risk requiring further funding and implementation of priority measures.

▶ **Assessment of the effectiveness of protection and management in addressing threats outside the site**

Mostly Effective

Because of its inaccessibility and isolation, the site is not subject to significant threats from adjacent areas. Global issues, such as rising ocean temperatures and marine debris are significant and beyond the control of local management. Ongoing threats from pests are being addressed, although ongoing improvements to biosecurity arrangements are required.

▶ **Good practice examples**

1. Because of its resident community and regular tourism, the site has the potential to become a best practice example for sustainable lifestyles and tourism through implementation and marketing of an independently accredited comprehensive environmental management system.
2. Implementation of the Rodent Eradication Project proposal has set a new benchmark in island eradications, with applicability to other islands with permanent populations.
3. The Weed Eradication Program is probably the best example of an island-wide eradication program globally. Eradication efforts on Myrtle Rust and African big-headed ants are likely to result in the first examples of these pests being eradicated from a subtropical oceanic island.
4. A Hybrid Renewable Energy Project is nearing completion that will replace at least 67% of diesel electricity generation with solar PV/battery storage. This will reduce carbon footprint and importantly risks associated with transport and use of fossil fuels in a World Heritage site. It also serves as an example of a micro grid sustainable energy project.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ Spectacular and scenic landscape

Good
Trend:Stable

Major landscape features of the site remain intact.

▶ Outstanding underwater vistas

Low Concern
Trend:Data Deficient

Threats to marine environment from marine debris and rising seas temperatures are having an impact and are not able to be controlled by site managers. Unregulated ground water extraction and pollution of water table by recharge with hyper saline desalinised groundwater further affects these values. Rodent Eradication and resultant increases in seabirds and corresponding lagoon alkalinity (from deposition of seabird guano) are likely to benefit lagoon and coral reef ecosystem health (Graham et al., 2018).

▶ Outstanding example of the development of a characteristic insular biota

Low Concern
Trend:Stable

These values have suffered significant impacts from introduced pest and weed species. However, comprehensive programs such as the implementation of the Rodent Eradication Project and weed management programs have brought positive outcomes for native biota (IUCN Consultation, 2020a).

▶ Rare plants and threatened wildlife

Low Concern
Trend:Improving

Introduced pest, pathogens and weed species all pose a threat to rare and endangered plant and animal species of the island. Comprehensive programs such as the Rodent Eradication Project, captive breeding programs for the Lord Howe woodhen (Hypotaenidia sylvestris) and Lord Howe Island phasmid (Dryococelus australis) are improving this situation (IUCN Consultation, 2020). Although the 1980s captive breeding program for the woodhen (and other measures) have resulted in a significant increase in numbers, a recent genetic analysis (Major et al., 2020) has identified significantly reduced genetic diversity (and therefore evolutionary potential) in the reintroduced lowland population compared to the less numerous source mountain population. Some additional management appears to be required to improve the genetic quality of the re-established lowland population.

Citizen science surveys overseen by the Australian Museum in 2019 discovered two previously thought to be extinct flightless wood beetles on Blackburn Island Cormodes darwini and Promethis sterrha (formerly known from the main island prior to introduction of the ship rat (Rattus rattus) (Reid et al., 2020).

Rare plant monitoring plots have also been established with funding from the NSW Saving our Species program and translocation of several species has commenced with notable population increases for Phillip Island wheat grass (Elymus multiflorus subsp. kingianus), sand spurge (Euphoria psammogeton) and LHI morning glory (Calystegia affinis).

Summary of the Values

▶ Assessment of the current state and trend of World Heritage values

Low Concern
Trend: Improving

Local threats to the values of the site are being actively addressed by management, but are subject to resourcing and other implementation issues. Eradication of cats and pigs in the 1980s had significant biodiversity benefits and eradication of wild goats (and the domestic herd) has also shown significant benefits. The last remaining domestic goats were removed just prior to the Rodent Eradication Project and are now considered eradicated from the island. Monitoring post the Rodent Eradication Project and other ongoing and planned biosecurity actions are likely to indicate very significant benefits, with rodents recognised as a threat to at least 13 bird species, 2 reptiles, 51 plant species, 12 vegetation communities, and 7 species of threatened invertebrates on the island.

However, it will be crucial that resourcing for improved biosecurity and for biosecurity programs continues, which is largely beyond the control of local managers (the Board). Other threats, in particular those likely to impact on the marine environment, are beyond the control of local managers and their effect on values is difficult to predict. Their mitigation requires national and international responses.

Additional information

Benefits

Understanding Benefits

▶ **Outdoor recreation and tourism**

Tourism is the main industry on the island, accounting for some 90% of total visitation.The property offers different marine (beach and reef walking, swimming, snorkelling, scuba diving, fish feeding, surfing, underwater photography, windsurfing, sea-kayaking, fishing, sightseeing cruises) and terrestrial activities (hiking, bird watching, bike riding, sightseeing) (Gillespie Economics, 2016).

Factors negatively affecting provision of this benefit :
- Climate change Impact level - High, Trend - Increasing
- Invasive species Impact level - High, Trend - Decreasing

Implementation of the REP is likely to benefit tourism demand, as a result of improved amenity. Climate change induced coral bleaching is likely to reduce marine-based tourism if it causes reef quality to decrease.

▶ **Importance for research**

The World Heritage site provides opportunities for scientific research. Implementation of the REP and other invasive species control programmes is likely to benefit research, inform international island eradication projects and provide research opportunity as a result of improved abundance of endemic species.

Factors negatively affecting provision of this benefit :
- Invasive species Impact level - High, Trend - Decreasing
- Habitat change Impact level - Low, Trend - Continuing

▶ **Soil stabilisation,**
Water provision (importance for water quantity and quality)

The site is important for water quality and soil stability

Factors negatively affecting provision of this benefit :
- Overexploitation Impact level - Low, Trend - Continuing

Summary of benefits

The site provides many local benefits from careful stewardship.

Projects

Compilation of active conservation projects

№	Organization	Brief description of Active Projects	Website

1	LHI Board	Weed eradication projects	
2	LHI Board	Lord Howe Island Rodent Eradication Project	https://lhirodenteradicationproject.org/
3	LHI Board	African Big Headed Ant eradication	
4	Marine Parks Authority	Various	http://www.mpa.nsw.gov.au/research.html
5	LHI Board	Plant pathogen management (Phytophthora control and Myrtle Rust eradication)	
6	LHI Board	Hybrid Renewable Energy Project	https://arena.gov.au/projects/lord-howe-island-hybrid-renewable-energy-system/
7	LHI Board	Revegetation projects	
8	LHI Board	Biosecurity	

REFERENCES

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