



LITERATURE REVIEW OF SOCIAL, ECONOMIC AND CULTURAL INFORMATION FOR LORD HOWE ISLAND MARINE PARK

A Report for NSW Department of Primary
Industries

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Prepared by

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
DPI	Department of Primary Industries
EEZ	Exclusive Economic Zone
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
LEP	Local Environmental Plan
LHI Act	Lord Howe Island Act 1953
LHI	Lord Howe Island
LHIB	Lord Howe Island Board
LHIG	Lord Howe Island Group
LHIMP	Lord Howe Island Marine Park
LHIMPAC	Lord Howe Island Marine Park Advisory Committee
LHITA	Lord Howe Island Tourism Association
MEM Act	Marine Estate Management Act 2014
MEMA	Marine Estate Management Authority
MPA	Marine Parks Authority
MPSC	Marine Pest Sectoral Committee
nm	Nautical miles
NSW	New South Wales
TEV	Total economic value
UNESCO	United Nations Educational, Scientific and Cultural Organization

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EXECUTIVE SUMMARY

Lord Howe Island Marine Park (LHIMP) is one of six marine parks within the New South Wales (NSW) marine estate and was first established in 1999. Located in the Pacific Ocean, approximately 600 kilometres from the coast of NSW, the LHIMP covers 480 km² of the NSW marine estate, including the waters surrounding, and seabed of, Lord Howe Island (LHI), Balls Pyramid and the South-East Rock.

The LHIMP is the only marine park in the NSW marine estate to be incorporated within a World Heritage site, known as the Lord Howe Island Group (LHIG). The LHIG is an outstanding example of oceanic islands of volcanic origin containing a unique biota of flora and fauna, as well as the world's most southerly true coral reef.

The LHIMP is managed under the provisions of the NSW *Marine Estate Management Act 2014* (MEM Act) and a range of other State and Commonwealth legislation. The development of a new management plan is required for the LHIMP and will follow a similar approach taken to develop the draft *NSW Mainland Marine Park Network Management Plan (2021-2031)* for the other five marine parks in NSW. As per the requirements of the MEM Act, this new approach to marine park management planning aims to conserve environmental, social, cultural and economic values of a marine park, and to manage the priority threats to those values.

This review was undertaken to support preparation of a management plan for LHIMP, by identifying and considering information on the social, cultural and economic values, and threats to those values, as is required under the MEM Act. The report also highlights knowledge gaps and associated recommendations for further research.

Social values, threats, and knowledge gaps

The social values of LHIMP identified in this review include ***physical and mental wellbeing*** through a wide range of recreational uses and the enjoyment of unspoiled natural scenic amenity and non-use values (e.g. bequest and existence); ***connection with nature through research and education*** of the rich natural environment; ***island identity, livelihood and community*** fostered by a shared history and connection to the marine environment; ***pride in international recognition*** derived from the LHIG World Heritage status; ***provision of healthy food*** through extraction and consumption of marine resources.

Most of the social values identified relate to the use and shared appreciation of the natural environment within the LHIMP, therefore the threats to these social values are predominantly related to threats to the natural environment from both natural and anthropogenic impacts. Threats also stem from conflicts between marine activities and potential restrictions on the types and capacity of recreational activities.

Cultural values, threats, and knowledge gaps

The key cultural values of LHIMP identified in this review are associated with historic uses of the Marine Park including, ***history of island settlement*** by seafarers; ***maritime heritage*** as physical reminders of the history and heritage of the region; ***traditions and lifestyle*** associated with marine traditions and lifestyle and ***history of scientific investigation*** of the thousands of unique flora and fauna species found within LHIMP.

The main threat to these cultural values is related to physical damage to underwater cultural heritage sites, lack of education and loss of information about cultural heritage. Threats also stem from potential zoning restrictions impacting access to maritime heritage sites, and limitations to funding for research or the development of interactive educational experiences relating to the maritime heritage sites, or the further research or discovery of sites yet to be identified.

Economic values, threats, and knowledge gaps

The key economic values identified for the LHIMP are *tourism* through the various recreational activities permitted in the Marine Park, as tourism is also identified as the largest contributor to the LHI economy; *employment* within the tourism sector or government and management; *fishing* through charter operations and/or the market of locally harvested seafood; *bequest, existence and scenic amenity (non-use values)* with LHI residents and visitors holding a strong regard for bequest and existence values based on the maintained preservation of LHIMP and the enjoyment of unspoiled natural scenic amenity.

The main threats to the economic values identified for LHIMP are predominantly related to changes in the tourism industry and associated marine park visitation, which include: a reduction or increase in air travel and passenger arrival; damage to the marine environment; restrictions in use; conflicts between marine users; or loss of World Heritage status.

Economic values identified in this review and the threats to these values, are based on limited and dated economic data for LHI as a whole and do not specifically relate to the LHIMP.

Recommendations for further research

A recurring limitation noted in this review is the lack of data and research on social, cultural and economic values and threats to those values directly associated with the LHIMP. Many of the studies identified are for the LHI as a whole and do not distinguish specific social, cultural, and economic values of the Marine Park, which are different to those of the island as a whole, but still strongly connected.

The main recommendation from this review, in relation to further research, is that direct consultation with different marine park user groups is essential to further identify the LHIMP social, cultural, and economic values, and threats to these values, to a suitable degree of detail.

Much of the information about the use and values of LHIMP contains general information on activity in the park but lacks the personal perspectives of marine park users. To better identify the social values of LHIMP and potential threats to these values, we recommend direct consultation with both LHI residents and visiting marine park users.

To better identify the cultural values of LHIMP and potential threats to these values, we recommend direct consultation with different marine park user groups from both LHI residents and visiting marine park users.

We recommend further research into the economic values of LHIMP, specifically more data related to marine based tourism and fishing activities on LHI. This review identified that there is currently no available economic data on recreational and charter fishing within the LHIMP and further research is recommended to identify the economic value of fishing in LHIMP, including the exclusive market of retained seafood on LHI.

As much of the economic value of LHIMP is directly associated with tourism and visitor expenditure, we recommend more frequent and robust visitor surveys. In addition, we suggest surveying visiting private vessels, which are active LHIMP users and may provide useful insight into private vessel use of the marine park and associated economic values.

We also recommend that bequest and existence values identified for LHIMP, should be further investigated as part of any future targeted community surveys and should include gathering these values from wider Australian and international communities who will also likely have a level of existence and bequest values for the LHIMP.

1. INTRODUCTION

The New South Wales (NSW) marine estate is a valuable environmental asset, and the State government's vision for the marine estate is a 'healthy coast and sea, managed for the greatest wellbeing of the community, now and into the future'. Six marine parks extend across approximately 3,451 km² (or 35 per cent) of the NSW marine estate. Of the six marine parks, Cape Byron, Solitary Islands, Port Stephens-Great Lakes, Jervis Bay and Batemans marine parks are located on the coast of mainland NSW, while Lord Howe Island Marine Park (LHIMP) is situated approximately 600 km offshore from the mainland coastline.

In 2021, the NSW Department of Primary Industries (DPI), on behalf of the Marine Estate Management Authority (MEMA), produced a draft management plan for the network of five mainland marine parks. As part of the planning process, BDO EconSearch prepared a report (BDO EconSearch, 2021) outlining the key social, cultural and economic literature associated with the NSW mainland marine parks, which was then used to inform the draft management plan¹ for the network of mainland marine parks. The aim of the draft management plan is to outline the priority actions and programs to be delivered over the next 10 years to conserve and enhance the environmental, social, cultural, and economic values identified across the mainland marine park network, and to address threats to these values based on an evidence-based risk assessment and local knowledge. Although part of the NSW marine park network, a separate management plan will be prepared for LHIMP due to its unique values, threats and needs as an offshore island with World Heritage status.

This technical paper builds on the work conducted by BDO EconSearch in 2021, and reviews the social, cultural and economic literature associated with LHIMP specifically. As part of the review, this report identifies several limitations and knowledge gaps in the existing literature and provides recommendations for future research to inform MEMA and NSW DPI's development of the draft management plan for LHIMP.

The terms of reference for this study are provided in Appendix 1. The remainder of the report is structured as follows:

- Section 3 provides the context to the literature review by describing LHIMP, key threats and values, and the external authorities directly related to the marine park: the Commonwealth Parks Australia-managed Lord Howe Marine Park; the Lord Howe Island Board (LHIB); the Lord Howe Island Tourism Association (LHITA); and the World Heritage status of the area. Section 2 also includes a socio-economic profile of Lord Howe Island (LHI), to provide context to the local socio-economic conditions relevant to the LHIMP.
- Sections 4 to 6 provide the literature reviews for the social, cultural, and economic values, respectively, including: identification of key values and benefits; threats to the values identified; and knowledge gaps and research recommendations for each value.
- Section 7 provides conclusions and recommendations from the literature reviews.

¹ Draft NSW Mainland Marine Park Network Management Plan (2021-2031).

2. BACKGROUND INFORMATION

This section provides context to the literature review by presenting background information about the LHIMP and describes the LHI setting including, the socio-economic profile and the overarching governance of the island and surrounding waters. A broad overview of the key ecological and anthropogenic threats to the LHIMP are provided, as well as the existing management rules, including zones, in place to mitigate some of these threats. The contextual background of the values and threats associated with LHIMP, current management arrangements, World Heritage status and LHI's tourism industry help shape the literature review identifying the social, cultural and economic values of LHIMP, and associated threats. A map showing LHIMP and zones within the marine park is provided in Figure 2-1.

2.1 Lord Howe Island

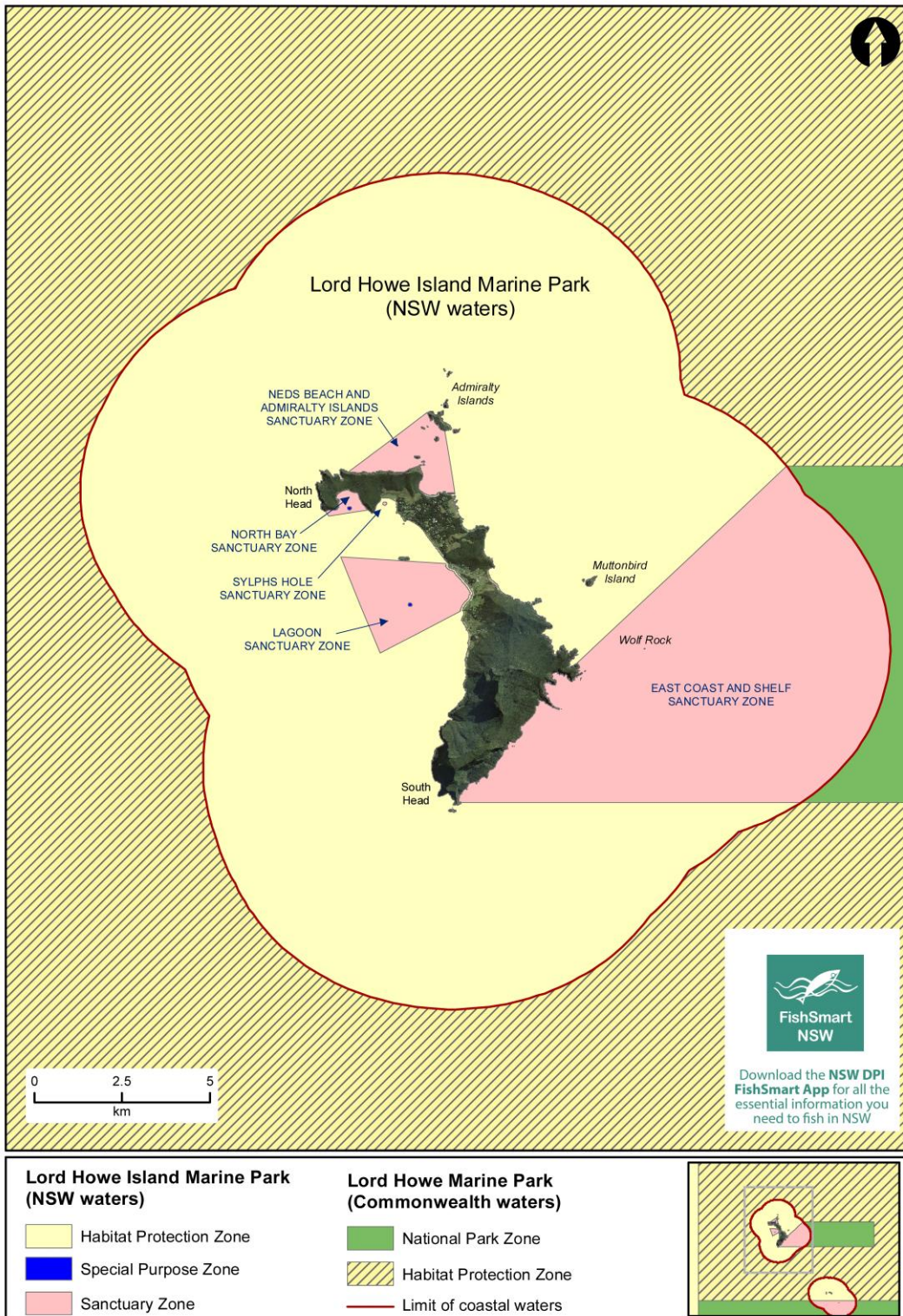
Lord Howe Island is part of an offshore island group located in the Pacific Ocean, 700 km northeast of Sydney (LHIB, 2010a). LHI itself is the largest island in the group, has an area of 1,455 hectares, is 11 km long and 2.8 km wide at its widest point (Figure 2-1) (LHIB, 2022a). Prior to its discovery in 1788 and settlement in 1833, LHI and the other islands in the group remained isolated from human visitation or activities (LHIB, 2010a, Anderson, 2003). Only the largest island in the group is settled, with a resident population of about 380 people (ABS, 2017). The small island community has a strong connection with the environment, playing a vital role in the continued protection of the island's outstanding environmental values, both land-based and marine. Tourism is the largest industry on the island and provides the major income for the community (Betteridge and Betteridge, 2012; Pollock, 2017). Agricultural activities provide some food, but most of the island's food and materials are sourced from the Australian mainland and imported by air or by sea freight from Port Macquarie in NSW (LHIB, 2010a; AECOM, 2016). There is a small fishery comprised of charter and recreational fishing vessels based on LHI and operating around LHI and Balls Pyramid, in both State and Commonwealth waters. These fishing activities include a commercial element, where fish are taken and sold for consumption on the island, however catch is not exported off LHI (Figueira and Harianto, 2022). Seventy-five percent of the terrestrial area on the main island, and all the outlying islands, are protected for conservation purposes as a Permanent Park Preserve (LHIB, 2009; 2010a). The marine areas around the islands are protected by LHIMP which covers NSW coastal waters (within 3 nm off land) and the Commonwealth managed Lord Howe Marine Park, which extends further seaward of the NSW coastal water limit of 3 nm and encompasses Elizabeth Reef and Middleton Reef to the north of LHI (Arche Consulting, 2010; Director of National Parks, 2018).

Figure 2-1 shows the LHIMP and the current management zoning arrangements, Figure 2-2 illustrates the adjacent zoning in the Commonwealth managed Lord Howe Marine Park and Figure 2-3 shows the overall size of LHIMP, in relation to the extremities of the Commonwealth managed Lord Howe Marine Park.

2.2 Lord Howe Island Marine Park (NSW)

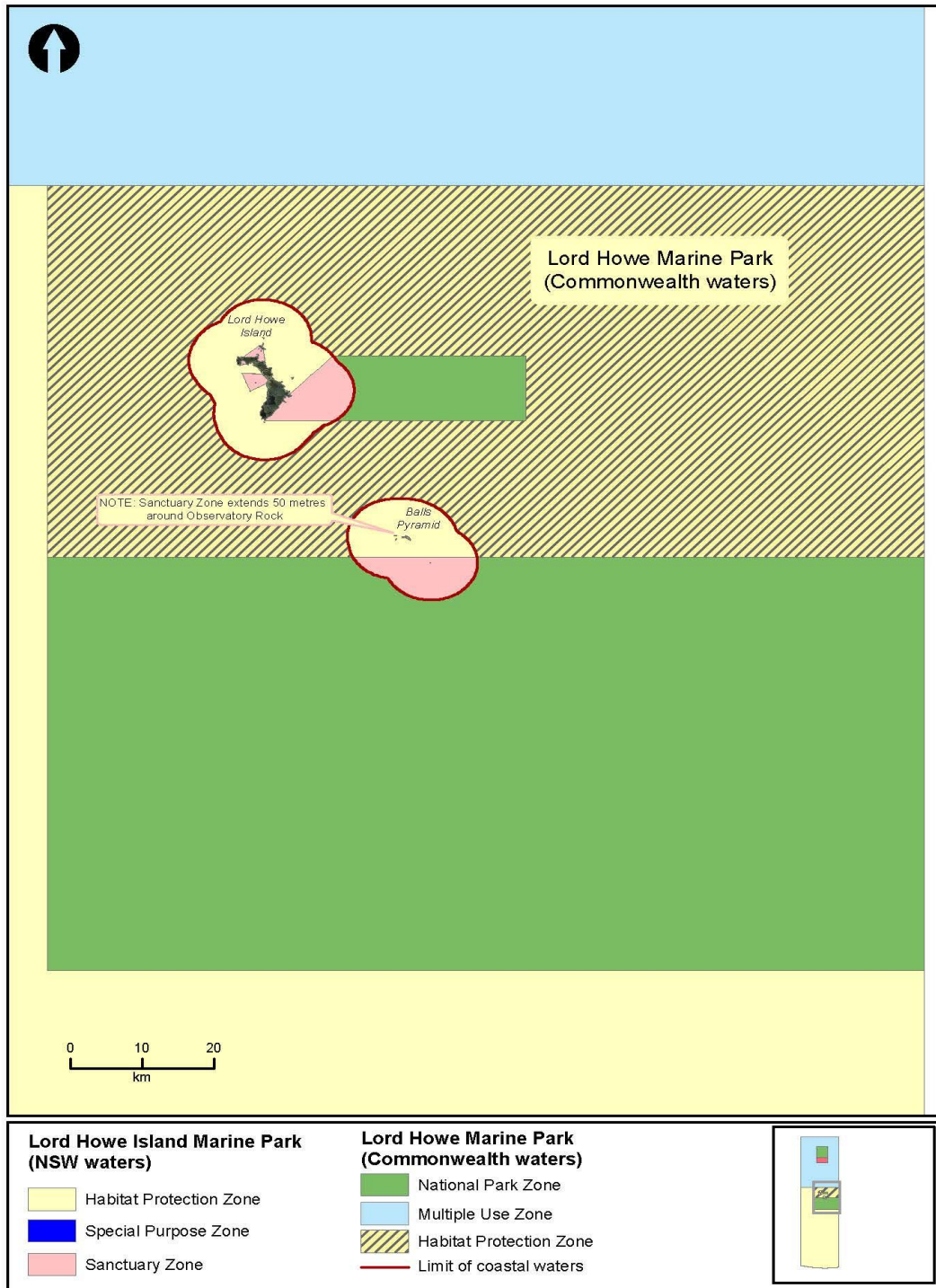
The LHIMP is primarily managed under the NSW *Marine Estate Management Act 2014 (MEM Act)* but other legislation also continues to apply. The LHIMP is one of six marine parks within the NSW marine estate and was first established in 1999, with management rules (including zones) commencing in 2004. As shown in Figure 2-1, LHIMP is in two parts and includes the area around LHI and the area around Balls Pyramid and South-East Rock, covering a total area of around 480 km² (Arche Consulting, 2010).

Figure 2-1 Lord Howe Island Marine Park (NSW)



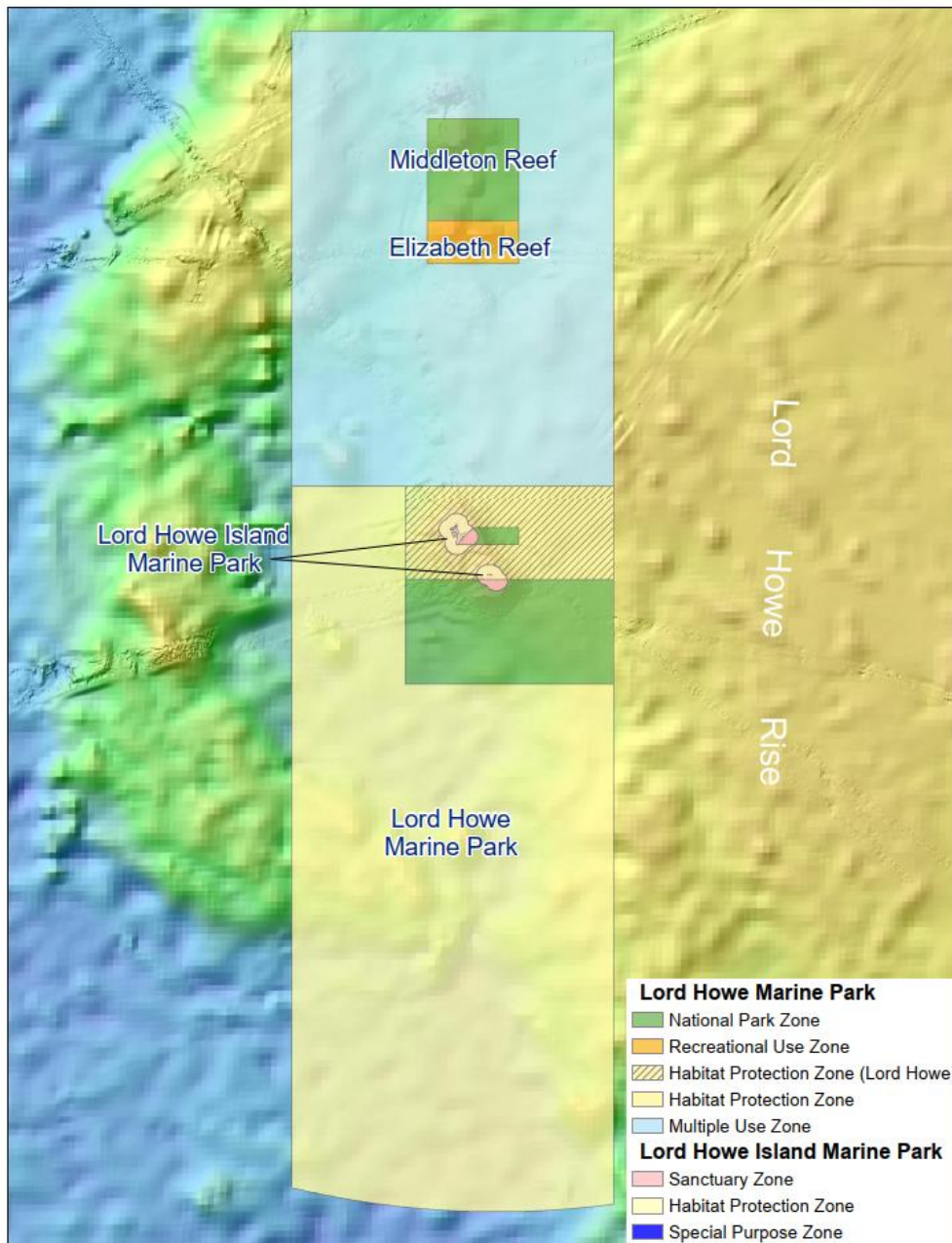
Source: NSW DPI

Figure 2-2 Lord Howe Marine Park (Commonwealth)



Source: NSW DPI

Figure 2-3 Overview of Lord Howe Island Marine Park (State) and Lord Howe Marine Park (Commonwealth)



Source: NSW DPI

LHIMP is home to several thousand species of flora and fauna, many of which are endemic to the region, with new species still being discovered (Environment Australia et al. 2001; NSW MPA, 2004). The Marine Park includes a wide range of habitats including coral reefs, a sheltered lagoon, fringing reefs, sandy beaches, intertidal and subtidal rocky reefs, seagrass beds, mangroves, shelf habitats, deep seamount slopes and open waters (NSW MPA, 2010d). The lagoon extends along the western side of the island and has a great concentration of marine biodiversity. It is sheltered by a fringing reef, making the shallow inshore waters calm and accessible for a range of recreational and commercial activities. There are three formal navigation

channels into the lagoon through the fringing reef, one at the northern end of the reef, aptly named North Passage and two towards the southern end of the reef, named Erscotts Passage and South Passage. Being the most sheltered waters in the LHIMP, some infrastructure and associated activities are confined to the lagoon including vessel moorings for private and public use, vessel load lines for commercial tour operations, a jetty, boat ramp, swimming pontoon and navigation markers. Moorings include: public temporary moorings managed by the LHIB and hired to visiting vessels; public day-use moorings managed by the LHIMP for commercial and recreational uses including as snorkelling and diving; and private moorings. This infrastructure facilitates a range of marine park uses, thereby supporting the social, cultural and economic values of LHIMP (LHIB, 2016; NSW DPI, 2021).

Coastal areas of the LHIMP also provide important context for social, cultural and economic values. The lagoon foreshore stretches from the northern end of Old Settlement Beach to the southern end of Kings Beach generally between Lagoon Rd and the mean high water mark. The foreshore is Crown Land held under various forms of tenure including government reserves, special leases, permissive occupancies and commercial leases pursuant to the *Lord Howe Island Act 1953* (LHI Act). The foreshore has important scenic, conservation, tourism and recreation values as identified by the LHIB (2015b) including:

- Recreational facilities, including BBQs, picnic areas, walking tracks, children's playground, dog exercise area, private boat sheds, boat maintenance and storage, and community use
- Access to important tourism resources for community-based and marine-based businesses (such as the commercial boatsheds)
- Environmental including landscape/scenic values, areas protecting habitat for native plants and animals, dune stabilisation and erosion protection, etc.
- Public assets such as the boat ramp allowing access to the Lagoon, and the proposed new slipway, load lines and the jetty
- Cultural heritage including the long association of residents to the foreshore, boatsheds and slipways, and Norfolk Island Pines at Lovers Bay being listed as heritage items under the Local Environmental Plan (LEP)
- Amenity including shade and shelter.

Many of these values are inherently linked to, and supported by, the social, cultural and economic values of the adjacent LHIMP. A range of infrastructure and activities occur along other coastlines of the island which also support the social, cultural and economic values of both the LHIMP and adjacent land. This includes BBQs, shelter, commercial equipment hire and fish feeding at the iconic Neds Beach; track and stair access to several beaches and shore-based fishing locations; coastal walking trails and lookouts with seating, and dog walking areas.

The environmental values of the LHIMP and management of threats to these values are also important background information when considering social, cultural and economic values. LHIMP is extremely isolated in comparison to other parks in the NSW marine estate, supporting a unique marine environment on a remote oceanic island which requires special management of some threats (Environment Australia, 2002; AECOM, 2016; NSW DPI, 2022b). LHIMP is home to the southernmost coral reef in the world and offers a unique mix of temperate and tropical species and habitats, resulting from the convergence of the warm East Australian Current with the cool waters of the southern temperate Tasman Sea (LHIB, 2010a; AECOM, 2016; NSW DPI, 2022b). Because LHIMP supports unique and vulnerable ecosystems and has high endemism of vulnerable species, the area is at particularly high risk from both anthropogenic and natural threats (AECOM, 2016;

UNESCO, 2020). A review of the environmental values of the LHIMP and associated threats has been undertaken (Harasti et al. 2022) however, some of the threats to the LHIMP ecosystems which may also have relevance to social, cultural and economic values include:

- Pests and diseases - various agencies work in partnership toward the removal of destructive pests (e.g. rodents and noxious weeds) from the terrestrial environment of LHI. The marine ecosystems of LHIMP could also be drastically affected by the introduction of non-native species, pathogens or marine pests. The introduction of marine pests can occur through anthropogenic means, including ballast water discharge or from fouled hulls of arriving vessels. In addition, marine pests can arrive naturally through ocean currents (AECOM, 2016). Aquatic biosecurity threats are currently managed through ballast water restrictions, biofouling requirements and the National Marine Pest Surveillance Strategy (MPSC, 2019).
- Habitat disturbance - vessels anchoring within LHIMP can cause damage to sea floor habitats including coral or seagrass, which can be slow to recover. Large vessels unable to gain safe passage into the lagoon, have been reported to frequently anchor in the lee of LHI (to the west of the lagoon, north of Malabar, or east of Neds Beach depending on conditions). This activity is believed to have taken place for the past 150 years. There are restrictions on vessel size and anchoring areas to reduce the risk of habitat damage from anchoring (NSW DPI, 2022d). The use of moorings in the lagoon can also impact sea floor habitats, however the management of moorings, including courtesy day-use moorings managed by LHIMP staff, reduces the need for anchoring while supporting economic, social and environmental values (LHIB, 2016). Habitat damage can also result from the installation and maintenance of infrastructure in the LHIMP or adjacent foreshore, as well as practices such as coastal fortification and beach nourishment to address erosion (Haskoning Australia, 2014). A marine park permit is required for any works within LHIMP (Woods, 2021).
- Water pollution - pollution can be generated from shipping and boating activities (litter, solid waste - marine pollution can occur from fuel and oil spills or discharged greywater and effluent). In addition, pollution from terrestrial sources can occur as point source discharge (e.g. sewage treatment and disposal) or diffuse source discharge (e.g. agricultural or urban runoff or groundwater) and can impact marine biodiversity and ecosystem functions. Nutrient rich inputs from terrestrial run off (nutrients sourced from fertilisers and septic systems) can also cause damage in the LHI lagoon (Davis, 2022a).
- Extractive activities - mining and fishing or collecting marine life can disrupt marine ecosystems if not adequately managed. Mining is prohibited in NSW marine parks and fishing activities in LHIMP are subject to marine park management rules to conserve biodiversity. State-wide fishing size and bag limits also apply at Lord Howe Island for fisheries management purposes. Fish are taken and sold for use on LHI and the fishing fleet is comprised primarily of charter fishing and recreational vessels. All fish must be used within the vicinity of LHI, with no export of fish allowed (LHIMP, n.d.; NSW DPI, 2022b; 2022c).
- Wildlife disturbance - fish feeding can disrupt normal fish populations and the ecological processes within the marine ecosystem and affect the health of fish. As such, fish feeding is only permitted within three Special Purpose Zones in LHIMP with restrictions in place to reduce cumulative effects (Brookhouse, et al. 2013; NSW DPI, 2022b). Additionally, practices such as burleying (scattering bait), fish cleaning and the discarding of fish waste can attract sharks, posing a risk to public safety (Environment Australia et al. 2001). In order to address these risks, all fish caught outside the LHI lagoon cannot be cleaned within the lagoon, although there is an exemption to clean recreationally

caught fish in the lagoon. Shark depredation (the full or partial removal of hooked fish from fishing gear before the fish is landed) has also been documented in line caught fish from charter and recreational fishing in LHIMP and surrounds (Mitchell et al. 2021).

- Climate change - marine heatwaves and coral bleaching and other associated natural disruptions pose a threat to the LHIMP ecosystem. This is an ongoing threat which requires international cooperation to manage, however local management actions to mitigate other threats (such as water quality) can help build marine ecosystem resilience (Davis, 2022b). The ecosystems within LHIMP are unique and vulnerable and are considered at high risk from the effects of climate change (UNESCO, 2020).
- Resource use or access conflict - conflict between different types of recreational use can also occur and therefore require management, including dog walking which can impact the enjoyment and amenity of beaches for other users; fishing and fish cleaning which can increase risk of attracting sharks and danger swimmers and snorkellers; spearfishing which can affect other passive water-based recreational activities and tourism (NSW DPI, 2022b, NSW MPA, 2010b); and boating which can also reduce safety and amenity of waters for other users (Environment Australia et al. 2001). This is particularly the case in the LHI lagoon where there is considerable competition for limited space and resources for a number of activities which are not all compatible (Environment Australia et al. 2001).

Under current management arrangements, restrictions also apply to activities in the LHIMP which may pose a risk to environmental, social, cultural or economic values for example, domestic animals; motorised vehicles; jet skis and personal watercraft; photography and filming using structures; ballast water exchange; organised sporting activities, events or educational activities; use and export of resources; and research.

Activities are also regulated in three types of zones at LHIMP: sanctuary zones; habitat protection zones; and special purpose zones; that aim to conserve biodiversity as described in Table 2-1 and shown on Figure 2-1. Unlike most mainland marine parks, there is no general use zone in LHIMP.

A management plan is required under the MEM Act for each marine park in NSW, including the LHIMP. Management plans outline the priority actions and programs to be delivered over 10 years to conserve and enhance the environmental, social, cultural and economic values of marine parks and address priority threats to these values based on an evidence-based risk assessment and local knowledge.

Management agencies associated with LHIMP, besides DPI and other State agencies, elaborated in the following sections of this report are: Parks Australia for the Commonwealth managed Lord Howe Marine Park; the LHIB, which is the primary statutory authority managing the island; the LHITA, which facilitates and promotes tourism which is the main industry on the island; and the Lord Howe Island Group's (LHIG) World Heritage status, inscribed through the United Nations Educational, Scientific and Cultural Organization (UNESCO). When carrying out its functions, the LHIB is required to have particular regard to the World Heritage status of the area and to conserve those values for which the area was inscribed on the list.

Table 2-1 Management zone types, Lord Howe Island Marine Park

Zones	Description	Activities
Sanctuary zones	Provide the highest level of protection for biodiversity and natural and cultural features.	Activities that do not involve harming any animal, plant or habitat, including many recreational activities, such as boating, surfing, snorkelling, diving and permitted research and educational activities.
Habitat protection zones	Protection to physical and biological habitats by reducing high impact activities.	Recreational and commercial activities (including recreational fishing and some forms of commercial fishing), scientific research, educational activities and other activities.
Special purpose zones	Provide for sites requiring special management arrangements including protection of Aboriginal and other cultural features or for marine facilities, or for specific park management reasons.	In LHIMP there are three special purpose zones to allow and manage fish feeding activities.

Source: NSW DPI (2022a).

2.3 Lord Howe Marine Park (Commonwealth)

The Commonwealth Lord Howe Marine Park was established in 2000, one year after the establishment of the NSW managed LHIMP in 1999. It extends from the limit of State managed waters (3 nm), northwards encompassing Elizabeth Reef and Middleton Reef and southwards to the limit of the Australian Exclusive Economic Zone (EEZ) (Figure 2-2). The marine park covers 110,126 km², with a depth range from less than 15 m up to 6,000 m, and an average depth of 3,232 m.

The following values pertinent to Lord Howe Marine Park have been identified in the Australian Marine Parks *Temperate East Marine Parks Network Management Plan* (Director of National Parks, 2018; Parks Australia, 2018):

- Environmental values - Lord Howe seamount chain – key ecological feature; Elizabeth and Middleton Reefs Ramsar² site (which is also a wetland of international importance under the EPBC Act³ and forms the southernmost open-ocean reef platform in the world and supports internationally significant populations of seabirds and shorebirds); and Tasman Front and eddy field – a region that separates the warm, nutrient-poor waters of the Coral Sea from the cold, nutrient-rich waters of the Tasman Sea.
- Cultural values – the small community of LHI has a particularly strong affinity and historic connection to the ocean surrounding it, including the waters and features within the Lord Howe Marine Park.
- Heritage values – The LHIG World Heritage Property (described further in Section 2.6). The LHIG was included in the National Heritage List in 2007. The Commonwealth managed marine park contains over 25 known shipwrecks listed under the *Underwater Cultural Heritage Act 2018*. Shipwrecks in NSW coastal waters are also protected under the *NSW Heritage Act 1977*.

² The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat is an international treaty for the conservation and sustainable use of Ramsar sites (wetlands)

³ Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*.

- Social and economic values - tourism, commercial fishing, recreation (including fishing), and scientific research, are important activities in the marine park. These activities contribute to the wellbeing of regional communities and the prosperity of the nation (Parks Australia, 2018).

As shown in Figure 2-3, management of the Commonwealth Lord Howe Marine Park uses five types of zones: National Park, Habitat Protection, Habitat Protection (Lord Howe), Recreational Use and Multiple Use (Parks Australia, 2022). The current management rules and zones for the Lord Howe Marine Park complement those of the NSW LHIMP and began on 1 July 2018 (Parks Australia, 2018). Zones in adjoining areas of the NSW and Commonwealth managed marine parks are aligned to provide consistent management arrangements (Figure 2-2).

There are two small coral reef atolls within the Lord Howe Marine Park (Figure 2-3), Elizabeth Reef and Middleton Reef, which are located approximately 150 km north of LHI (Environment Australia, 2002). Elizabeth Reef is a recreational use zone allowing for some extractive recreation (e.g. fishing), while Middleton Reef is a National Park Zone where only non-extractive uses are permitted (Commonwealth of Australia, 2018). Elizabeth Reef, and Middleton Reef to its north, are only accessible by boat and are used for scientific research; recreational visits by LHI and mainland residents; and a sheltered stop over location for private vessels undertaking longer ocean crossings. Snorkelling and scuba diving is permitted at both reefs with no permit, while recreational fishing is only permitted at Elizabeth Reef with a permit, and not allowed at Middleton Reef (Parks Australia, 2018; 2022).

As the Lord Howe Marine Park waters are further from shore with very little sheltered area, they are mostly used by those in the LHI community who have larger vessels capable of accessing offshore waters. About half of the area between LHI and Balls Pyramid is covered by Lord Howe Marine Park (Figure 2-1), and many activities within the Commonwealth waters around LHI are a subset of the activities taking place in State waters, e.g. fishing, sight-seeing, snorkelling and diving (offshore) (LHIMP Manager, pers. comm. 07/04/22). Commercial tourism also occurs in the waters of Lord Howe Marine Park using vessels based at LHI, with operators requiring a commercial activity licence to undertake commercial tourism within Lord Howe Marine Park. The waters of Lord Howe Marine Park and LHIMP are both used for tourism and private recreational activities from the island, intrinsically linking the economic, social and cultural values of the parks.

2.4 Lord Howe Island Board

The LHIB is a statutory authority established under the provisions of the LHI Act. It is charged with the care, control, and management of the Island and the affairs and trade of the Island where the Island is defined in the LHI Act to include Lord Howe Island and all adjacent islands and coral reefs situated within one marine league measured from low-water mark on the coast of Lord Howe Island together with the islands known as Balls Pyramid, Wheatsheaf Island, Observatory Rock and South-East Rock and the unnamed islands in the vicinity thereof.

The LHIB is also responsible for the care, improvement, and welfare of the Island residents. The LHI Act sets out the Board's Charter and functions and establishes the Permanent Park Preserve.

The LHIB is responsible to the NSW Minister for the Environment and Heritage and is made up of:

- Four Islanders⁴, elected by the LHI community
- One person appointed by the Minister to represent the interests of business and tourism
- One person appointed by the Minister to represent the interests of conservation
- One person employed in the Department of Planning and Environment (LHIB, 2022b).

The LHIB meets quarterly, and community members are invited to attend open sessions, except if restrictions are in place for confidentiality or privacy issues (LHIB, 2021). The management tasks of the board include, among others: advising NSW government on matters affecting management of the island; attracting, developing and retaining an effective workforce on the island; consultation with the LHI community to discuss local issues; collaboration with the tourism association to market the island as a tourism destination; environmental concerns such as pest control; and the management of all planning, infrastructure and services on the island. All management decisions on the island go through the LHIB, in collaboration with the NSW Department of Planning and Environment where applicable (LHIB, 2021).

Some functions of the LHIB directly overlap with or affect the marine park, such as: conservation activities related to fisheries, fauna and flora; moorings and vessel management within the LHIMP; and wastewater management such as preventing run-off into the marine environment (LHIB, 2015a; LHIMPAC, 2021a, 2021b). LHIB policies which regulate activities within, or directly adjacent to, the LHIMP with explicit regard to social, cultural and economic values and threats include:

- Lord Howe Island Lagoon Foreshore Management Plan - as discussed previously this policy explicitly acknowledges a number of scenic, conservation, tourism and recreation values which are inherently linked to social, cultural and economic values of the LHIMP (LHIB, 2015b).
- LHIB Mooring Management Policy - this policy explicitly acknowledges that moorings in the lagoon and their effective management make a significant contribution to the economic, social and environmental values of the island, including the LHIMP (LHIB, 2016).
- LHIB Cruise Ship Policy - this policy provides a framework for regulating cruise ship activity within the LHIMP to minimise threats posed to environmental, social and economic values (LHIB, 2005a).
- Lord Howe Island Local Environmental Plan 2010 - This plan establishes a framework for managing development on the island or in the marine park, with explicit acknowledgement that development both supports social, cultural and economic values and can pose a threat to these values (LHIB, 2010b).

2.5 Lord Howe Island Tourism Association

Tourism is the main industry and largest source of employment on LHI and is heavily focussed on the island's environmental values of both the marine and terrestrial environments (Walsh et al. 2019; see also Section 3). The LHITA is responsible for marketing the island and planning and management around tourist expectations and experiences⁵. There is a limit of 400 visitors to the island at any given time, managed by the LHIB through a cap on the number of beds available for commercial public use (e.g. at hotels and

⁴ The *Lord Howe Island Act 1953* defines a group of people as 'Islanders' and gives them certain legal privileges. Only people who meet the criteria as 'Islanders' can run as an elected member of the LHIB. More information: <https://www.lhib.nsw.gov.au/sites/lordhowe/files/public/images/documents/lhib/Publications/Info%20Sheets/plg%20sheet%204%20-%20who%20is%20a%20lh%20islander.pdf>

⁵ Not all tourism related businesses on LHI are represented by the LHITA, as membership is optional.

lodges). Visitors staying in private accommodation, whether with family/friends or on a private vessel, are not counted in the 400-person cap (LHITA, pers. comm. 13/04/22). However, 400 tourists on the island at any given time is an indicator of the size of the industry in relation to the permanent population of approximately 445 people (ABS, 2022).

As tourism is the largest industry on LHI, the LHITA works to adapt the industry to suit the sustainability ethos of the island. A current initiative in progress managed by LHITA is the application for eco-destination certification for the island. This will support attracting ecologically mindful visitors, who are interested in appreciating and maintaining sustainable tourism practices. Promoting ecotourism can help to protect the environment and promote the island's World Heritage status, a process which will in turn strengthen the tourism industry (LHITA, pers. comm. 13/04/22).

LHITA often works with Destination NSW and Tourism Australia to promote LHI as a tourism destination in Australia and abroad (LHITA, pers. comm. 13/04/22).

2.6 World Heritage Status

LHI and the surrounding waters and islets received World Heritage status in 1982, in recognition of the natural beauty and rich terrestrial and marine biodiversity, and as an outstanding example of an isolated island ecosystem developed from submarine volcanic activity. The World Heritage Property is referred to as the LHIG, which covers a total area of 1,463 km², of which 1,450 km² is marine environment. The LHIG is comprised of LHI, the Admiralty Islands (North Rocks, Tenth of June, South Island and Roach Island), Mutton Bird Island, Blackburn Island, Gower Island, Balls Pyramid and offshore islets (LHIB, 2010a). The area was recognised as being of outstanding universal value for several reasons (UNESCO, 2003a):

- The islands and surrounding waters are an outstanding example of an ecologically diverse oceanic island group which has only experienced a relatively short period of human influence
- They are an outstanding example of an insular biota with a high level of endemism in a very limited area
- The islands are significant over a wider oceanic region for their role as an important breeding ground for several species of seabirds
- The reef is a rare example of the 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 protections exist to ensure that any development, mainly the small tourist industry, does not jeopardise the island's environmental values
- The LHIG is home to the most southerly coral reef in the world
- The islands are the only known occurrence of a remarkable volcanic exposure, there being some 1,000 m of unweathered volcanic material with a great variety of upper mantle and oceanic type basalts
- LHI supports populations of endangered endemic species or subspecies of birds
- 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.

There are indications that the World Heritage status of the island group is of significant value to the LHI community, as well as the island's tourism industry (LHIB, 2010a). LHI's World Heritage status has been consistently reported as an attraction for tourists visiting the island, and the longevity of this status is important not only to the environment and local community, but also to the island's tourism industry (LHITA, pers. comm. 13/04/22).

UNESCO conducts periodic assessments of the conservation status and management of each World Heritage site, and pressures affecting the island group have been identified (UNESCO, 2003b; 2020). Since 2003, several measures have been put in place to address issues of invasive plants and animals, and the pest reduction process has been considered largely successful. However, the risk of invasive non-native species is ongoing due to the insular island ecosystem and related vulnerabilities. Another increasing risk is the effects of rising temperatures and coral bleaching. LHI has been experiencing increasing coral bleaching events, which are detrimental to its unique intersection of algal and coral reef systems. This affects the health of the reefs and marine life, which are one of the outstanding values contributing to the island group's World Heritage status (UNESCO, 2003b; 2020). Changing climate also influences the terrestrial environment, slowly altering habitats and ecosystems.

UNESCO also identified the aeroplane flight path and the proposal to extend the airport runway as high threats to the World Heritage values and conservation of the island group. There was a proposal to extend the airport runway by 400 m into the LHI lagoon to accommodate newer and larger aircraft, which require more landing distance, to land at the island. This has since been rejected, and alternative options are being sought. The sand dune at Blinky Beach, on the approach to the runway, is an obstruction for incoming aircraft, and the height of the dune is consequently reduced every 5-10 years, affecting the natural ecosystem which falls within the LHIMP (AECOM, 2018). Although all solid waste is repurposed or shipped off the island, intractable marine debris can arrive from the high seas and has been attributed to plastic ingestion by seabirds and consequent increases in mortality rates for some species (UNESCO, 2020).

Despite the identification of some of these threats, UNESCO has consistently maintained the LHIG as a World Heritage Site of universal value, and findings conclude that management of the site is adequate to maintain this status and a 'good' conservation outlook (UNESCO, 2003b; 2020).

3. SOCIO-ECONOMIC PROFILE OF THE LORD HOWE ISLAND COMMUNITY

The following socio-economic profile of the LHI community is drawn from the *2021 Census of Population and Housing*.

Socio-economic indicators are grouped into the following themes:

- People - demographics and education
- People - cultural and language diversity
- People - employment
- Families and households

People - demographics and education

Age and gender

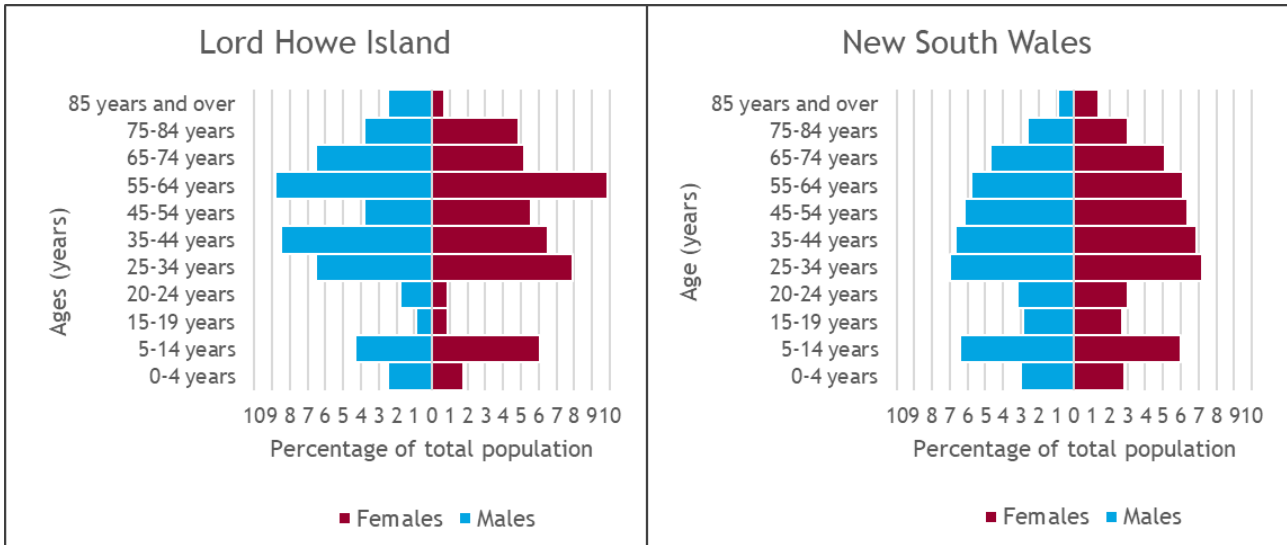
Figure 3-1 presents a population pyramid of LHI and NSW in 2020. In the 2020 Census, there were 445 people living on LHI. Of these 220 (48.7 per cent) were male and 232 (51.3 per cent) were female. Aboriginal and/or Torres Strait Islander people made up 1.1 per cent of the population (ABS 2022). In comparison, the Aboriginal and/or Torres Strait Islander population in NSW was 3.4 per cent⁶. However, the gender ratio was similar in NSW at 49.4 per cent males and 50.6 per cent females (ABS 2022).

The median age of people on LHI was 46 years. Children aged 0 - 14 years made up 17.1 per cent of the population and people aged 65 years and over made up 24.5 per cent per cent of the population. In comparison, the state-wide median age was younger at 39 years.

As can be seen from Figure 3-1, the population of LHI differs from that of NSW. The largest age group on LHI is 55-64, for both males and females. The lowest subpopulation by a substantial margin is the 15-19 age group. This population distribution can be explained by Islander life stages, which often includes going to the mainland to complete secondary and tertiary education and then returning to the island afterwards, aged in their 20s and 30s (Pinetrees, 2022a; LHIB, n.d.). The LHIB provides financial support for Islanders going to the mainland for tertiary education with the intention to return and reinvest in the island community (LHIB, 2022c).

⁶ This difference is explained further in Section 5.1

Figure 3-1 Population by age group and gender, Lord Howe Island and NSW, 2021



Source: ABS 2022

Education

Table 3-1 describes the statistics on the levels of educational attainment of Islanders and NSW, for comparison. These statistics are represented graphically in Figure 3-2.

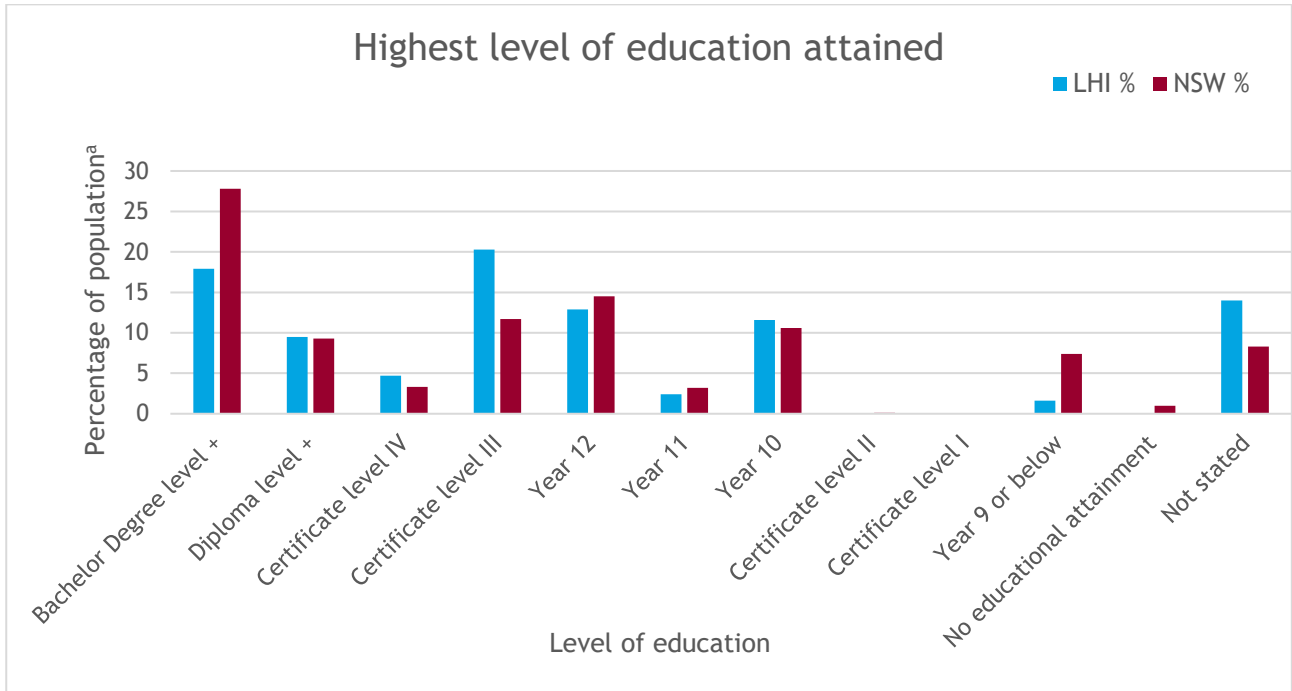
Table 3-1 Level of highest educational attainment, Lord Howe Island and NSW, 2021

Level of highest educational attainment ^a	Lord Howe Island		New South Wales	
	(persons)	%	(persons)	%
Bachelor Degree level and above	68	17.9	1,838,502	27.8
Advanced Diploma and Diploma level	36	9.5	616,322	9.3
Certificate level IV	18	4.7	216,768	3.3
Certificate level III	77	20.3	771,009	11.7
Year 12	49	12.9	954,987	14.5
Year 11	9	2.4	212,538	3.2
Year 10	44	11.6	698,390	10.6
Certificate level II	0	0	4,703	0.1
Certificate level I	0	0	764	0
Year 9 or below	6	1.6	487,855	7.4
No educational attainment	0	0	64,827	1
Not stated	53	14	549,965	8.3

^a People aged 15 years and over

Source: ABS 2022

Figure 3-2 Level of highest educational attainment, Lord Howe Island and NSW, 2021



^a People aged 15 years and over
Source: ABS 2022

LHI has a flatter distribution in educational attainment in comparison with NSW, with relatively lower proportions of the population with Year 9 or below secondary education or with bachelor’s degree or above. There is a significantly high proportion of Islanders with Certificate Level III in comparison to NSW as whole (20 percent in comparison with 12 per cent for NSW), which may be related to the types of job opportunities on the island (e.g. tourism and hospitality).

People - cultural and language diversity

Culture

Table 3-2 shows the country of birth of the LHI population and provides a comparison of the percentage of the population in NSW who were born in those countries. Almost 75 per cent of the LHI population were born in Australia, compared to 65.4 per cent of the NSW population. The next most common countries of birth of LHI residents are New Zealand, Canada, Chile, England and Germany. Comparatively, the next five most common countries of birth after Australia for the overall NSW population are China, England, India, New Zealand and Philippines (ABS 2022). This is reflective of a limited opportunity for immigrant settlement⁷.

⁷ The *Lord Howe Island Act 1953* allows only Islanders to lease/co-lease property on Lord Howe Island. Properties can be leased or subleased to a non-Islander only in exceptional circumstances, where the LHIB “must satisfy itself that no Islander is willing and able to take up the lease” (LHIB n.d.). As a result, immigration mainly occurs through becoming a spouse of an Islander.

Table 3-2 Country of birth, Lord Howe Island and NSW, 2021

Country of birth	Lord Howe Island		New South Wales	
	(persons)	%	(persons)	%
Australia	332	74.6	5,277,497	65.4
<i>Other top responses</i>				
New Zealand	23	5.2	118,527	1.5
Canada	7	1.6	15,214	0.2
Chile	7	1.6	14,073	0.2
England	5	1.1	231,385	2.9
Germany	5	1.1	28,921	0.4

Source: ABS 2022

Another measure of levels of immigration and diversity is the country of birth of the populations' parents. As can be seen from the data in Table 3-3, when compared to the broader NSW population, LHI has a much smaller percentage of people who have both parents born overseas. Additionally, the percentage of the LHI population with both parents born in Australia is higher than the NSW average.

Table 3-3 Country of birth of parents, Lord Howe Island and NSW, 2021

Country of birth of parents	Lord Howe Island		New South Wales	
	(persons)	%	(persons)	%
Both parents born overseas	87	19.3	3,181,894	39.4
Father only born overseas	32	7.1	509,789	6.3
Mother only born overseas	41	9.1	369,492	4.6
Both parents born in Australia	252	56.0	3,529,168	43.7

Source: ABS 2022

Language

On LHI 85.8 per cent of people only spoke English at home, whereas in NSW the proportion was substantially lower at 67.6 per cent (ABS 2022). Similarly, a relatively low proportion of LHI households spoke a non-English language at home (9.9 per cent) compared to NSW (29.5 per cent, ABS 2022).

Broadly these data suggest that LHI has a lower level of international immigration compared to the state average, resulting in a more ethnically homogenous population.

People - employment

Labour force status

Table 3-4 describes the labour force status of people on LHI and NSW, which is summarised graphically in Figure 3-3.

At the 2020 Census, LHI had a relatively low level of unemployment (2.4 per cent in comparison with 4.9 per cent for NSW), however work appeared to be slightly more seasonal or involved fly-in-fly-out arrangements (11.2 per cent away from work in comparison with 9.0 per cent for NSW).

Table 3-4 Labour force status, Lord Howe Island and NSW, 2021

Labour force status ^a	Lord Howe Island		New South Wales	
	(persons)	%	(persons)	%
Worked full-time	98	40	2,136,610	55.2
Worked part-time	108	44.1	1,151,660	29.7
Away from work ^b	35	14.3	395,888	10.2
Unemployed	6	2.4	189,852	4.9

^a People who reported being in the labour force, aged 15 years and over, in the week prior to Census night

^b People who have a job from which they are on leave or otherwise temporarily absent

Source: ABS 2022

Figure 3-3 Labour force status, Lord Howe Island and NSW, 2021



^a People who reported being in the labour force, aged 15 years and over, in the week prior to Census night

Source: ABS 2022

Industry of employment

Table 3-5 and Figure 3-4 describe the top five industries of employment in LHI and provides a comparison of the percentage of the population of NSW who work in those industries. This describes the industry of the main job held and may not reflect the total number of people employed in the industry.

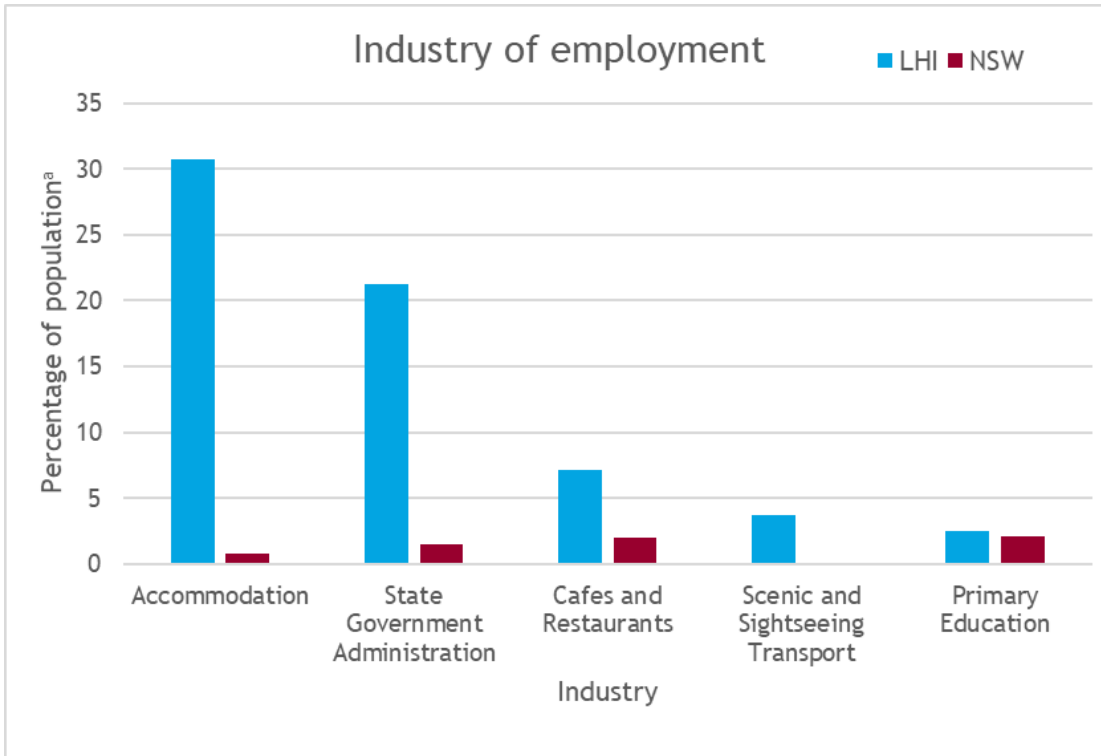
Table 3-5 Industry of employment, Lord Howe Island and NSW, 2021

Industry of employment, top 5 responses ^a	Lord Howe Island		New South Wales	
	(persons)	%	(persons)	%
Accommodation	74	30.7	30,040	0.8
State Government Administration	51	21.2	55,670	1.5
Cafes and Restaurants	17	7.1	72,942	2
Scenic and Sightseeing Transport	9	3.7	1,020	0
Primary Education	6	2.5	76,275	2.1

^a Employed people aged 15 years and over

Source: ABS 2022

Figure 3-4 Industry of employment, Lord Howe Island and NSW, 2021



^a Employed people aged 15 years and over

Source: ABS 2022

The main industries of employment in LHI vary significantly from those in greater NSW (Figure 3-4). Just over two-fifths (41.5 per cent) of LHI labour force are employed in industries directly related to tourism and hospitality, e.g. ‘Accommodation’, ‘Cafes and Restaurants’, ‘Travel Agency and Tour arrangement services’ and ‘Building and Other Industrial Cleaning Services’ reflecting a strong reliance on tourism as the main economic activity of the Island.

Volunteering

Regarding unpaid work, there is a strong culture of volunteering on LHI with 29.4 per cent stating ‘did voluntary work through an organisation or group in the last 12 months’, compared with 13.0 per cent for NSW (ABS 2022).

Families and households

Household composition

Table 3-6 describes the composition of households on LHI and in NSW. On LHI, of all households (167), 65.3 per cent were family households, 31.1 per cent were single person households and 3.6 per cent were group households. There were proportionately fewer family households and more single person households on LHI compared with NSW.

Table 3-6 Household composition, Lord Howe Island and NSW, 2021

Household composition	Lord Howe Island		New South Wales	
	(households)	%	(households)	%
Family households	109	65.3	2,065,107	71.2
Single (or lone) person households	52	31.1	723,716	25.0
Group households	6	3.6	111,646	3.8

Source: ABS 2022

Household income

Table 3-7 describes the distribution of household income on LHI in comparison with NSW. On LHI, 17.5 per cent of households had a weekly household income of less than \$650 (i.e., low income) and 12.3 per cent had a weekly income of more than \$3,000 (i.e., high income). In comparison, NSW had a higher proportion of households with high income at 26.9 per cent, and a slightly lower proportion of households with low income (16.3 per cent). Therefore, LHI had a flatter wage structure than NSW.

Table 3-7 Household income, Lord Howe Island and NSW, 2021

Household income	Lord Howe Island		New South Wales	
	(households)	%	(households)	%
Less than \$650 gross weekly income	--	17.5	--	16.3
More than \$3,000 gross weekly income	--	12.3	--	26.9

Source: ABS 2022

Median weekly household income on LHI was very similar to that of NSW in 2021 (\$1,625 and \$1,558, respectively, ABS 2022).

Rent weekly payments

Table 3-8 describes the average rent payments and distribution of rent payments on LHI in comparison with NSW. Median rent is significantly lower on LHI compared to NSW (\$310/week and \$420/week) and in consequence (given that median household incomes are similar between LHI and NSW), relative rent affordability is slightly better on LHI than in NSW (with 60.0 per cent of LHI households where rent payments were less than 30 per cent of household income, compared with 56.1 per cent of households in NSW).

Table 3-8 Rent weekly payments, Lord Howe Island and NSW, 2021

Rent weekly payments	Lord Howe Island		New South Wales	
		% ^a		% ^a
Median rent (\$)	310	--	420	--
Households where rent payments are less than or equal to 30% of household income	--	60.0	--	56.1
Households with rent payments greater than 30% of household income	--	13.3	--	35.5

^a Proportions are calculated using all tenure types for occupied private dwellings. This excludes visitor only and other non-classifiable households.

Source: ABS 2022

4. SOCIAL LITERATURE REVIEW

4.1 Social Values and Benefits of Lord Howe Island Marine Park

Our review of grey literature, published literature, and communications with key contacts have identified the following social values associated with LHIMP:

- Physical and mental wellbeing from recreational opportunities⁸
- Education about and connection with nature⁹
- Island identity and livelihood and community¹⁰
- Pride in, and maintenance of, international recognition (e.g. World Heritage status)¹¹
- Provision of healthy food¹².

These values and associated evidence are described and discussed below. Many of these social values are in line with those previously identified as benefits of the mainland NSW marine estate (Sweeney, 2014; Gollan et al. 2019), however more consultation would be needed to allow for more robust comparison of values. Some social values are also unique to LHI residents, given the resident community differs from other coastal NSW communities in a number of important ways including: a relatively stable population with multi-generational traditions and family associations; the marine environment is part of day-to-day living for most residents for recreational or commercial uses; the marine environment is an important food source for residents; many residents have a high level of skill, knowledge and experience relating to use and management of the marine environment; the community is particularly self-reliant due to its isolation (Environment Australia et al, 2001).

Physical and mental wellbeing from recreational opportunities

One of the main social values of LHIMP, is the physical and mental wellbeing from recreational opportunities for both LHI residents and visitors to the island. The LHIMP hosts a diverse range of marine recreational activities including (NSW MPA, 2009a, 2009c; 2010a, 2010b; Woods, 2021; NSW DPI, 2022b):

- Sunbathing and general beach activities
- Swimming
- Beach and reef walking
- Fish feeding
- Snorkelling
- Scuba diving
- Kayaking and stand-up paddle boarding (SUP)
- Boating

⁸ Relevant TARA social value: Participation - safety, health and well being

⁹ Relevant TARA social value: Enjoyment - enjoying the biodiversity and beauty of the marine estate.

¹⁰ Relevant TARA social values: Participation - sense of community; Enjoyment - consumptive use (extracting).

¹¹ Relevant TARA social values: Participation - sense of community; Enjoyment - enjoying the biodiversity and beauty of the marine estate.

¹² Relevant TARA social value: Enjoyment - consumptive use (extracting).

- Fishing and collecting (shore and boat based)
- Surfing, including wind and kite surfing
- Sightseeing, wildlife viewing and photography
- Organised marine sporting activities and events.

These activities provide participants with varying degrees of physical recreation, and studies suggest that being active outdoors and in marine environments can improve mental and physical wellbeing (Sweeney, 2014; Juntos Marketing, 2019). The above activities are undertaken by both residents and visitors to the Island, providing benefits and facilitating social interactions for different demographics (NSW MPA, 2010b; Pinetrees, 2022a, 2022b).

For example, recreational fishing is a major activity among residents and visitors. Most recreational fishing is undertaken from boats or from shore and is also a popular activity at the jetty within the lagoon. Other key shore-based fishing areas include the Old Gulch, Dawson Point, Clear Place to Middle Beach, Blinky Point and along the shoreline towards the southern end of the lagoon. The LHI Game Fishing Club also undertakes a number of fishing and social events, including game fishing tournaments (Woods, 2021). Other organised social events in the Marine Park include yacht races, kite surfing events, freediving events, nippers events, photography events, and swimming events (Woods, 2021).

Education about, and connection with nature

LHIMP provides rich opportunities for education about and connection with nature in several ways, including the occurrence of environmental values, accessibility of the marine environment, and opportunity for scientific engagement. The LHIMP offers many natural values including the southernmost coral reef in the world and temperate algal reefs, providing a unique intersection of two different ecosystems and high degrees of biodiversity (LHIB, 2010a; AECOM, 2016). Sheltered waters occur in the lagoon and other areas such as Neds Beach, and several activities can be undertaken without vessels or specialist experience (e.g. snorkelling, fish feeding) making the marine park's environmental values easily accessible to the public. In addition, the LHIMP offers diverse habitats for different activities and experiences of environmental values, including sandy beaches and rocky coastlines, sheltered water and shallow reefs, open ocean and deeper reefs (NSW DPI, 2022b). Experiencing these rich and varied habitats provides an opportunity for users to see the diversity of the marine environment and can help to foster appreciation. Exposure to, and education about the natural environment can promote an appreciation of environmental values (Sweeney, 2014). For example, Brookhouse et al. (2013) found that fish feeding, if managed sustainably, is a valuable activity as it is accessible to the public, allowing both residents and visitors to connect with the natural environment and develop appreciation for marine life within the lagoon.

Educational tools and materials have been formally developed in partnership with various agencies including DPI Fisheries, Department of Planning and Environment-Environment and Heritage Group, LHITA, and commercial operators to facilitate an understanding of the environmental values of the marine park (LHIMP Officer, pers. Comm. 21/10/22). These include a user guide, zoning plan summary, signage in public areas, community engagement plans, museum displays, and school education kits, among others (NSW MPA, 2009b; LHIMPAC, 2019). Interpretation and signage for the LHIMP are important resources which support management and provide opportunities for public appreciation and awareness of the marine park, including World Heritage values.

This value of education about, and connection with nature is also supported by the numerous scientific research activities undertaken in the LHIMP to understand the unique environment and rich biodiversity.

Research teams from 47 different domestic and international institutions and organisations have undertaken research in the LHIMP (NSW MPA, 2009b, 2009c; LHIMPAC, 2020; 2021; Woods, 2021). Scientific research has been a significant activity on the island since European settlement with the first known collection of Lord Howe fishes made by the naturalists aboard HMS ‘Herald’ in 1853. The Australian Museum has been closely associated with the study of the natural history of Lord Howe Island for more than 120 years (Environment Australia et al. 2001). Organised research activity has accounted for the second largest number of permits issued in the LHIMP between 1999 to 2019 (second to commercial activities) (Woods, 2021). Although there is no direct documentation of the social value this might add, it could be suggested that having researchers on the island, likely interacting with both residents and visitors, would foster community interest and engagement with the marine environment, including environmental stewardship. To support this social value, visiting researchers are required in their permit conditions to conduct a public presentation of their research at the LHI museum and write a short summary of their research findings for publication in the monthly LHIMP newsletter which is published in the local news bulletin and electronically (LHIMP Officer, pers. comm. 21/10/22). Citizen science activities also occur in the LHIMP (Woods, 2021) and participation by residents and visitors is also likely to directly support this value. We recommend exploring this value in more detail through direct engagement with visitors and residents on the Island.

Island identity, livelihood and community

The values and benefits of the LHIMP are different for residents than they are for visitors, and Island identity, livelihood and community is a social value unique to LHI residents. Unlike coastal areas of mainland Australia, the waters of the LHIMP are generally only accessible to LHI residents, guests of commercial or private island accommodation, or visiting vessels (Environment Australia et al. 2001). Residents access the marine park year-round, and it is a part of their lifestyle, routines, and for some, their livelihoods. It is suggested that residents have a sense of identity associated with both the land and waters of the island, including the natural beauty and World Heritage status (AECOM, 2016; Pinetrees, 2022a). Additionally, residents have deeper local knowledge of the park, passed down through friends and family and from personal experience, and potentially a deeper emotional connection to the waters around the Island than visitors¹³. Residents are also likely to use the park more frequently than visitors, and the types of use can differ. For example, many residents have private vessels, allowing them to use the park more frequently and providing them with a different experience to visitors, who only access the park by shore or rely on commercial tours (LHIMP Manager, pers. comm. 07/04/22). Some community activities and organised events in the marine park are generally only attended by residents, including LHI Game Fishing Club events and nippers events (Woods, 2021), contributing to the community value of the LHIMP.

As a consequence, management arrangements for the LHIMP are of very particular relevance to the local community, both in terms of social and economic implications, and in terms of opportunities for stewardship (Environment Australia et al. 2001). Those who own private vessels use trailers and the boat ramp to launch and retrieve or are reliant on moorings in the lagoon as a place to securely keep their vessels, which does not apply to most visitors¹⁴. The residents who use the marine park commercially, for example running tours, have the additional social value of having their livelihood and every-day work tied to the marine park.

The LHI identity is tied to the natural environment, and most people work in industries directly related to the appreciation of the natural beauty of the island. Some literature (Environment Australia et al, 2001)

¹³ This has been suggested in some literature and correspondence (e.g. Environment Australia et al. 2001; AECOM, 2016; Pfeiff, 2020), but would need to be measured further before a definitive claim could be made.

¹⁴ Other than visitors arriving on private vessels and using public moorings for the duration of their stay. Moorings were hired to visiting vessels on 89 occasions in the period between October 2017 and April 2019 (LHIMPAC, 2021a).

suggests that there is pride and a multi-generational identity attached with being a Lord Howe Islander, and a connection to the Marine Park is a factor in this, with its role as a source of recreation and food, particularly the self-reliance it can facilitate. Similarly, there are indications that the LHI community have a shared respect for the environment and are driven to maintain the natural beauty and health of the land and waters of the island group. There are community-based action groups to tackle plastic waste and littering, and a community driven assessment of the Climate Vulnerability Index of the LHIG (including marine park) (LHIMP Manager, pers. comm. 07/4/22). These community driven environmental initiatives and environmental stewardship can promote social relations and a shared identity through working towards a mutual cause¹⁵; however, further research would be needed to quantify the value of these shared environmental interests.

Pride and maintenance of international recognition

The World Heritage status of the LHIG is an important value for both residents and visitors, with visitors consistently ranking ‘World Heritage status’ as one of the main motivations to visit the island (Destination NSW, 2017; NSW MPA, 2007). The island community’s identity and values are tied to their environmental assets, recognised by a community pride in and preservation of World Heritage status (NSW MPA, 2007; LHIB, 2010a; Destination NSW, 2017). The role that LHIMP and its World Heritage status have on both community identity and visitor motivation indicate a social benefit of the LHIMP in bringing people together through appreciation and connection to the environment. We recommend a targeted survey question about the value of the World Heritage status and international recognition LHI receives, to further explore this value.

Provision of healthy food

A small fishery does exist in LHIMP where fish are taken and sold locally on LHI, however no export of fish from the island is permitted (Figueira and Harianto, 2022). Some residents and visitors fish recreationally, and source their own food from within the Marine Park (Environment Australia et al, 2001; AECOM, 2016). Having a degree of autonomy and self-reliance in food supply may provide emotional and psychological benefits, and is also as a way of connecting with the natural environment. Barclay et al. (2016) identified food security, including the ability to source fresh and healthy food for their community, as an indicator affecting overall community health and wellbeing among NSW aquaculture operators. Targeted research to understand the wellbeing benefits, opportunities or impacts from food provision from the marine park would be beneficial.

4.2 Threats to Social Values

Most of the social values identified are related to the use and appreciation of the natural environment and are therefore reliant on the current state or health of the LHIMP environment. Threats to social values are therefore predominantly related to the damage of this natural environment as outlined in Section 3.2, as well as potential restrictions to use and user conflict.

While many uses of the LHIMP support social values, they may also pose a threat to environmental values and mismanagement of these threats can, in turn, threaten social values. There are limitations on the number of visitors to the Island at any given time, which in return may help reduce the impacts on the natural environment. However, some of the activities undertaken on the island by both residents and visitors can have potentially damaging effects. For example, fish feeding at Neds Beach, a popular activity for tourists on the island, has been found to have negative impacts on the fish and surrounding environment in

¹⁵ E.g., community building through volunteering, reflected in the volunteering statistics described in Section 3.

the past (Brookhouse et al. 2013, Patroni, et al. 2018). The recorded negative impacts of fish feeding in the past may not only have environmental and ecological repercussions but could have also affected the social values of LHIMP. Fishers first started feeding fish at Neds Beach in the 1950s and it grew into a popular tourist activity in the 1970s. Unnatural fish behaviour and poor health were identified as key concerns over the past decade. Currently fish feeding activities are permitted at three sites within LHIMP, each occurring within designated Special Purpose Zones: Erscotts Hole, North Bay and Neds Beach. Fish feeding at Erscotts Hole and North Bay, are chiefly guided tour activities, as both locations can only be accessed by boat. Fish feeding at Neds Beach, occurs as an unguided activity and is regulated through set daily allowance of specific feed (e.g. 30 g of feed per serve) (NSW DPI, 2021). Brookhouse et al. (2013) suggested the continued management of fish feeding activities and the monitoring of fish populations, their health and behaviour, as essential in facilitating sustainable continuation of the activity.

Fish feeding is an important social value of the LHIMP, bringing tourists and residents together and promoting social relations and connection with the natural environment. As demonstrated in the past, the social benefits generated from such activities can be threatened by potential mismanagement. Threats to social values also arise from other recreational activities such as fishing or collection, or active uses with potential environmental risks, such as reef walking, fish feeding, marine litter or anchor dragging (Brookhouse, et al. 2013; NSW DPI, 2022b).

User conflict between different types of recreational use can also occur and therefore require special management, including: dog walking which can impact the enjoyment and amenity of beaches for other users; fishing and fish cleaning which can increase risk of attracting sharks and danger to swimmers and snorkellers; and boating which can also reduce safety and amenity of waters for other users (Environment Australia et al. 2001). This is particularly relevant in the LHI lagoon where there is considerable competition for limited space and resources for a number of activities which are not all compatible (Environment Australia et al. 2001).

Another threat to the social values identified is the risk of restrictions on the types and capacity of recreational activities allowed within LHIMP. The health and wellbeing benefits of recreational marine park use identified in Section 3.1 above are reliant on continued use of the LHIMP.

Understandably, damage to the LHIMP stemming from overuse or mismanagement of the protected areas have the potential to impact recreational use permissions. Because LHIMP supports unique and vulnerable ecosystems and has high endemism of vulnerable species, the area is at particularly high risk from both man-made and natural threats (overview in Section 2.2).

Social values are also threatened by coastal erosion and coastal works which impact the safety and accessibility of beaches for recreational use and organised community events, such as nippers, and reduce the scenic amenity of the LHIMP. Haskoning Australia Pty Ltd in 2014, identified a number of coastline issues at LHI, in particular erosion and recession threatening Lagoon Road (and underground cables) at Lagoon Beach near Windy Point, north of the runway rock revetment. Intermittently closed and open lakes and lagoons at Old Settlement Creek, Cobbys Creek, and Soldiers Creek are currently opened on an as needed basis, with consent from DPI Fisheries, and this has the potential to negatively and positively impact recreational activities within the LHIMP.

Although there is little evidence to suggest that current activities pose a threat, the social values associated with LHIMP are largely dependent on the park's environmental values, including biodiversity and a healthy marine environment. As a result, any negative environmental or aesthetic impacts on the LHIMP could in turn jeopardise social values of the Park.

4.3 Social Value Knowledge Gaps and Research Recommendations

As was identified in the BDO EconSearch (2021) literature review on NSW mainland marine protected areas, there has been little social research undertaken specifically on LHIMP. As a result, much of the information about the use and values of LHIMP contains general overviews of activity in the park but lacks the personal perspectives of marine park users and a focus on social values. One key study was undertaken in the summer of 2008/2009 and explored some of the uses and activities of visitors and residents on the Island and Marine Park (NSW MPA, 2010b). This study generated some important data about perceptions of management and zoning but fell short of a detailed evaluation and analysis of the broad range of social values that could be associated with the LHIMP.

Part of further research to improve knowledge about social interactions with the Marine Park may be through a new application recently developed by DPI Fisheries (LHIMP Officer, pers. comm. 21/10/22). The *LHIMP Recreational Use Data Collection App* has been designed to collect data on the type of recreational activities undertaken in the LHIMP and the spatial distribution of those activities, which could be used as an analogue for social value (LHIMP, 2022b).

Many of the social values and threats identified in this report are the result of the researchers' interpretation and inference of information. To definitively identify the social values of LHIMP and potential threats to these values, we recommend in-depth consultation with both local and visiting marine park users, preferably qualitatively or with a significantly more values-based approach than in previous surveys.

One of the social values identified with LHIMP is the opportunity for residents to source their own food from within the Marine Park (Environment Australia et al. 2001; AECOM, 2016). We recommend that the wellbeing value associated with sourcing food locally should be explored in more detail.

In summary, we recommend research to address the knowledge gaps identified (both local and visiting marine park users):

- Type of marine park use (many more options than in previous surveys)
- Reasons for use
- What use and non-use values users get out of LHIMP
- Other types of use and non-use values people may want to experience in the LHIMP
- Types of interactions with other users
- Value of these interactions
- Impact of marine park use on wellbeing
- Importance of the island's World Heritage status and associated international recognition
- Wellbeing associated with fishing and self-provision of fresh, healthy food
- Monitoring and assessment of coastal management and foreshore activities
- Continued collection of information on recreational activities undertaken, through the LHIMP Recreational Use Data Collection App.

5. CULTURAL LITERATURE REVIEW

5.1 Cultural Values and Benefits of Lord Howe Island Marine Park

The published literature on cultural values and benefits of LHIMP is relatively limited, but key values appear to be associated with the maritime history of the island, its settlement, and its development over the past two centuries. Pollock (2017) identifies the isolated development of the LHI community, and the strong community esteem in conservation of environmental values, traditions and lifestyle, as a cultural value in itself.

Our review of grey literature, published literature, and communications with key contacts have identified the following cultural values associated with LHIMP:

- History of island settlement
- Maritime heritage
- Traditions and lifestyle
- History of scientific investigation.

History of island settlement

To date, there is no evidence of any pre-European Indigenous occupation of LHI, from either Polynesians, Melanesians, Micronesians or Aboriginal Australians of the mainland (AECOM, 2018, Anderson, 2003). However, the relatively nearby Norfolk Island was inhabited prehistorically and LHI may have been easier to see from sea, due to the visibility of its high peaks (Mt Gower 875 m and Mt Lidgbird 777 m) in clear conditions from Middleton Reef, 130 km to the north (Anderson, 2003). However, Aboriginal people from the Eastern mainland coast are not likely to have travelled to LHI prior to European settlement due to its significant distance of open ocean from the mainland (Betteridge and Betteridge, 2012). Being a volcanically produced outcrop, it was also never physically connected to the Australian continent (Sewell, 2017). Anderson's (2003) survey of LHI sediments for remnants of charcoal, changes to pollen deposits or other indications of a human presence indicated an absence of human presence prior to European discovery around 1788. They concluded that the European colony established in 1834 was the initial island colonisation.

Care should, however, be taken in concluding that no Aboriginal cultural values exist in the LHIMP. All other mainland NSW marine parks protect the Aboriginal cultural connection and custodianship of Sea Country. Given the absence of historical Aboriginal settlement on the island, it is worth investigating whether totemic species from the Eastern mainland coast migrate to the LHIMP. Totemic species are seen as kin and are represented as such through kinship lineages and in storylines (Marshall 2023).

Betteridge and Betteridge (2012) discuss accounts in which Aboriginal people from the Australian mainland visited LHI. One of these accounts included an Aboriginal tracker named Tombone who guided a party dispatched by the NSW Government, to investigate a criminal matter and to also conduct a scientific survey of the island. Island folklore also tells of a Tasmanian Aboriginal man who came to LHI as one of two deserters from the ship '*Aladdin*', with his subsequent unexplained disappearance giving rise to a legend that his ghostly form still appears on Smoking Tree Ridge.

LHI was first discovered by Lieutenant Ball in 1788 whilst in command of the First Fleet vessel *HMS Supply*, enroute from Port Jackson to the Norfolk Island penal colony. *HMS Supply* made several visits to the island, noting the impenetrable forest covering the island (excluding the highest ground) and the abundance of wildlife on the island and the surrounding waters, which at the time was considered to offer hope to the

early colony of NSW which was facing dire food shortages (Betteridge and Betteridge, 2012). During subsequent visits, Lieutenant Ball and his party collected turtles which were seen as easy game and various avifauna which were noted as remarkably tame, to take back to the mainland colony for sustenance.

The settlement of LHI was largely driven by the needs of whaling and sealing ships operating in the waters of the Pacific, who used LHI as a refuge from the open ocean, a place to acquire fresh food, water and supplies, before continuing their journey. Over the course of these visits some passengers remained on the Island, resulting in a small settlement. It is believed the first settlement was established in 1834, which included three Maori women, at least one Maori man, and three European men who had been residing and working amongst the Maori for a number of years prior to their arrival on LHI (Anderson, 2003, Owens, 2008). The group landed in Blinkenthorpe Bay but set up their huts in Hunter Bay on what is now Old Settlement Beach, where they established gardens to grow various crops. Early huts on LHI were entirely thatched with palm and believed to be very similar to whaler dwellings recorded in New Zealand (Owens, 2008). Whilst the small-scale cultivation of crops provided some nutrition, early settlers and visitors to LHI were heavily reliant on the abundance of fish, sharks, turtles, seabirds and seabird eggs for subsistence.

By 1841 a second wave of settlement was underway and a more complex settlement pattern emerged with new subsistence and commercial activities (Owens 2008). Increasing human activities and occupation of the terrestrial and marine environments began to have direct effects on the environment, such as deforestation, and the ecology of the island (Owen 2008).

For the many ships that frequented LHI since its discovery, the channel into the lagoon proved hazardous due to the shallow reef, and many ships became wrecked at the Island and in surrounding waters¹⁶ (Heritage Office NSW, 2001; Nutley and Smith, 2002; NSW MPA, 2010a). The existence of the LHI community and its entire history is based on early visitors arriving by ship. For this reason, the history of settlement and maritime heritage are commemorated as named features across various prominent locations of the LHIG (Betteridge and Betteridge, 2012). The names of these features tie stories and events of the discovery and settlement of the island to the ongoing culture and connection to the Island and surrounding Pacific Ocean. Some key examples include;

- Lord Howe Island, named after Richard Howe, 1st Earl Howe (1726-1799) a distinguished British naval officer;
- Mount Gower (largest peak of LHI), named after John Leveson-Gower, 1st Earl Gower (1694-1754) a British Tory politician;
- Mount Lidgbird (smaller peak of LHI) and Balls Pyramid (worlds highset volcanic stack) both named after Lieutenant Henry Lidgbird Ball (1756-1818), Commander of HMS Supply;
- Blackburn Island, the small island in the lagoon was named after Master of HMS Supply David Blackburn;
- the Roach Islands, off the northeast corner of LHI are named after the captain of the cutter *Prince George*, which was sent to LHI to collect an escaped convict and two crew from the schooner *Adelaide*, and,
- Wolf[e] Rock, named after an ex-Royal Navy gun brig the *Wolf*, which was wrecked while working as a whaler in 1837.

Maritime heritage

The shipwrecks surrounding the Island (Appendix 3) form an essential part of the Island's history and identity today. They act as physical reminders of the history and heritage of the region and are located in both the

¹⁶ At least 12 and up to 15, mapping and identification is not yet finalised (NSW MPA 2010a, pages 94-96).

State and Commonwealth marine parks. These sites are protected by the *Underwater Cultural Heritage Act 2018* and the *NSW Heritage Act 1977*. Not only do shipwrecks act as reminders of the Island's history, but they retain detailed evidence of vessel construction, fit out, trade and cargo networks, previous economic activities, and what life was like aboard the ships from the earliest days of the colony. This is of value to historians and archaeologists as it is a direct link to the Island's settlement, Australian colonisation and early European settlement (Heritage Office NSW, 2001; Nutley and Smith, 2002).

The most easily accessible sites by snorkellers and recreational scuba divers are the wrecks of the *Favorite* and the *Jacques del Mar*, both are located in shallow waters in the lagoon with parts visible above the water. The wrecks of *Ovalau*, *La Meurthe* and *SM Stetson* are located in slightly deeper waters outside of the lagoon and are only accessible by recreational scuba divers. Two whaling vessels, the *George* and *Wolf*, are believed to have sunk in deep waters off the edge of the LHI plateau and are yet to be located. Likewise, the anchor of *HMS Supply* was believed to be lost off the Island in the 18th century and is yet to be located. Additional heritage items, which have been identified as warranting further investigation in prior studies, include the Norfolk Island Pine channel markers for Erscotts Passage and early housing made from recycled shipwreck timbers (Environment Australia et al. 2001; Nutley and Smith, 2002). In 2012 an underwater cultural heritage site was also identified at Edwin Bay, also known as Old Settlement Beach, in which a large timber section of what could have been a ships decking was identified¹⁷. Existing literature suggests that although the shipwrecks are part of the Island's underwater cultural heritage and some are easily accessible to the public, they are underutilised as a learning source and could be of more value if harnessed better for their educational potential (Nutley and Smith, 2002).

Another important part of the Island's history is the flying boat service, which was pivotal in kickstarting the tourism industry in the 1900s¹⁸ and making Island tourism what it is today. Much of the Island's development and connection with the mainland was facilitated by the flying boat service, and the history is considered of high significance to the Islanders, paving the way for the Island's current connection to the mainland (Betteridge and Betteridge, 2012). As a result, the wrecks of these flying boats are of high cultural value. One flying boat was wrecked on the Island, and there is a plaque and site commemorating the wreck (Nutley and Smith, 2002; Betteridge and Betteridge, 2012). There are indications that other flying boats are wrecked within LHIMP itself, but they are submerged within the deeper waters of the Marine Park and may not be accessible to the public for viewing or educational purposes (Nutley and Smith, 2002). The cultural value of maritime heritage is also supported by numerous placenames on LHI or in the LHIMP relating to maritime events or disasters (Blair, 2015). Other recognised maritime heritage sites include Boat Harbour, a site frequented by whaling vessels during late eighteenth and early nineteenth century; the LHI lagoon which has been used as a port or harbour by vessels throughout the human history of LHI; and the LHI Museum which houses local maritime artefacts and memorabilia (Heritage NSW, 2022¹⁹).

Traditions and lifestyle

There are suggestions that some parts of LHIMP hold cultural significance due to their historic use for fishing by the local community (Farrier, 2011). Several of these traditional fishing spots now lie within sanctuary zones of the LHIMP in which fishing is prohibited, so any research into the active use of these zones would likely be unfruitful. However, during a 2010 review of the LHIMP Zoning Plan, two areas (North Bay foreshore

¹⁷ <https://apps.environment.nsw.gov.au/dpcmaritimeheritageapp/ViewSiteDetail.aspx?siteid=2473>

¹⁸ Flying boat service started in 1947 and ran until 1974, when the airstrip was built and land aircraft began flying to the island (LHI Museum, 2022).

¹⁹ <https://apps.environment.nsw.gov.au/dpcmaritimeheritageapp/ViewSiteDetail.aspx?siteid=2364#history>;
<https://apps.environment.nsw.gov.au/dpcmaritimeheritageapp/ViewSiteDetail.aspx?siteid=2363#history>;
<https://apps.environment.nsw.gov.au/dpcmaritimeheritageapp/ViewSiteDetail.aspx?siteid=2365#history>

and South East Rock) were consistently identified by local recreational fishers as areas of importance to which they wish to regain access (NSW MPA, 2010a). The prohibition on spearfishing throughout LHIMP was also raised by mainland fishers. An attitudinal survey (NSW MPA, 2010b), however, found that 91% of LHI residents were supportive or strongly supportive of the LHIMP sanctuary zones, including 73.4% of fishers. Further consultations and research would be necessary to investigate the balance of cultural and environmental values, which is out of the scope of this report. However, in general, we recommend that social surveys should be undertaken asking residents to identify culturally significant sites more broadly, which would add to the understanding of cultural values in LHIMP.

Some heritage listed buildings and locations are associated with marine traditions and lifestyle and thereby support the cultural value of the LHIMP, including boatsheds on the lagoon foreshore, cargo shed related to the wharf, Old Settlement Beach area, and a pair or mature Norfolk Island pines used as leads for entrance into the lagoon by boat (Howard Tanner and Associated Pty. Ltd. 2000; LHIB 2010b). The cultural value of the LHIMP is also supported by numerous placenames on LHI referencing to aspects of marine and coastal lifestyle including Lagoon Road and Ocean View Drive (Blair, 2015).

Lastly, there appears to be a strong cultural identity attached to being a Lord Howe Islander, although little evidence is available other than sentiment expressed through personal communication. The process of gaining Lord Howe Islander status is arguably more complex than gaining citizenship to another country and is closely linked to identity and membership²⁰. Cultural value attributed to membership of a distinctive, small and isolated island community is highly likely, however the connection between LHIMP and cultural identity of being an Islander requires research before any conclusions can be drawn.

History of scientific investigation

Scientific investigation has always been a significant activity on LHI with the first known collection of Lord Howe fishes made by the naturalists aboard HMS 'Herald' in 1853. Lord Howe Island is home to several thousand species of flora and fauna, many of which are endemic to the region, with new species still being discovered (Environment Australia et al. 2001; NSW MPA, 2004). The Australian Museum has been closely associated with the study of the natural history of Lord Howe Island for more than 120 years (Australian Museum, 2022a). The cultural importance of this scientific history is evidenced by McCulloch's obelisk overlooking the LHIMP which commemorates the research of Allan McCulloch, an Australian Museum curator, who documented and described much of the LHIMP's marine biodiversity in the late 19th and early 20th Century (Australian Museum, 2022b). The endemic McCulloch's Anemonefish (*Amphiprion mccullochi*) was also named in recognition of the late Allan McCulloch, noting his early sketches led to the discovery of the new species of anemonefish²¹. Island residents were often involved in this scientific research and the naming of marine species after island family names (for example *Sepia baxteri* and *Cubiceps baxteri* after the Baxter family name) also supports this cultural value (McCulloch, 1923).

The World Heritage Convention (UNESCO) describes the LHIG to be an outstanding example of an island system developed from submarine volcanic activity, home to 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 (UNESCO, n.d.). These factors make the island group valuable for scientific research and learning. To date, numerous scientific research activities have been undertaken in the LHIMP to investigate the unique

²⁰ See, for example, information sheet defining a Lord Howe Islander: <https://www.lhib.nsw.gov.au/sites/default/files/2022-09/Information%20Sheet%20-%20Who%20is%20a%20Lord%20Howe%20Islander.pdf>

²¹ <https://lhimuseum.com/meet-mccullochs-anemonefish/>

environment and rich biodiversity, with research teams recorded from 47 different domestic and international institutions and organisations (NSW MPA, 2009b, 2009c; LHIMPAC, 2020; 2021; Woods, 2021). Organised research activity has accounted for the second largest number of permits issued in the LHIMP between 1999 to 2019 (second to commercial activities) (Woods, 2021).

5.2 Threats to Cultural Values

Most of the cultural values identified for the LHIMP are associated with the heritage value and historic connection of ship and flying boat wrecks within LHIMP waters. As a result, the main threat to the cultural values of these wrecks is physical damage or changes to accessibility of the wrecks. Physical damage to the wrecks can affect their conservation status and cultural and educational values. Although many wrecks are protected under the *Underwater Cultural Heritage Act 2018* and the *NSW Heritage Act 1977*, continued education and awareness around potential damage help to protect the values from these threats. The most accessible wrecks (the *Favourite* and the *Jacques del Mar*) lie on reefs within the lagoon and are therefore easily accessible to snorkellers, divers and reef walkers (Nutley and Smith, 2002).

Another related threat is any potential changes to management rules such as zoning or use restrictions, if they were to limit access to the sites. Limiting site access would presumably be to protect wrecks themselves but this also has the potential to reduce community exposure to the wrecks and could inhibit the educational potential of these wrecks.

Similarly, another potential threat could be limitations to funding for research or the development of interactive educational experiences relating to the wrecks or other underwater cultural heritage, or the further research of wrecks yet to be identified. Nutley and Smith (2002) consider the underwater cultural value of these sites to be of strong significance and suggest that the underutilisation of the sites' educational potential is a threat to the realisation of cultural heritage. Similarly, there is the potential to improve education and interpretative information for the broader marine park values (e.g. environmental, social and cultural) to enhance enjoyment and foster community support and education (NSW MPA, 2004). However, signage can also pose a threat to the value of scenic amenity and is therefore regulated by the LHIB (LHIB, 2005b). Threats to environmental values associated with wrecks or other underwater cultural heritage may also be considered threats to cultural values, as all underwater cultural heritage under the *Underwater Cultural Heritage Act 2018* includes the protection and conservation of the natural context in which underwater cultural heritage occurs within.

The 2010 Zoning Plan Review (NSW MPA, 2010a) has already indicated that the cultural value of these historical underwater sites is particularly important, and that their main threats are being either disturbed or under researched. They have suggested the increased protection of existing sites, and further exploration of newly identified sites or those not yet discovered²², which is in line with our findings.

5.3 Cultural Value Knowledge Gaps and Research Recommendations

Most of the research used in compiling this report lacks the personal perspectives of marine park users. To definitively identify the cultural values of LHIMP and potential threats to these values, we recommend direct

²² For example, an anchor from the First Fleet armed tender HMS Supply is thought to be located in the LHIMP, but has not yet been found, and the shipwreck Ovalau is at potential risk of damage from large vessel anchors due to its location in the South Passage (NSW MPA, 2010).

consultation with both local and visiting marine park users exploring a range of themes, including (but not limited to):

- What they think the cultural values of LHIMP are
- Value of maritime history of island settlement
- Use of underwater cultural heritage sites (e.g. wrecks and other types of underwater cultural heritage)
- Value of underwater cultural heritage sites (e.g. wrecks and other types of underwater cultural heritage)
- The NSW Maritime Heritage Database and National Underwater Cultural Heritage Database are updated with any new information
- How to add value to these sites (e.g. tours, interpretative materials/activities, etc.)
- Cultural value of traditional fishing locations and methods, etc.
- Investigating any linkages between the mainland and LHIMP formed through non-use cultural values held with indigenous mainland Australians and the wider Pacific
- Investigate traditional resource management approaches and traditional knowledge held by indigenous mainland Australians
- Review additional grey literature including digital scans of the monthly local newspaper (The Signal), available in kind through the Lord Howe Island Museum
- Ongoing investigation of pre-European settlement and connectivity with indigenous mainland Australians and wider Pacific.

Additionally, there is little recent research on the cultural value and conservation status of the marine heritage sites listed in this report. The most in depth reports available were an archaeological survey by Nutley and Smith (2002) a community-based heritage study by Betteridge and Betteridge (2012), and a Zoning Plan Review which has some relevant information (NSW MPA, 2010). We recommend new research be undertaken to update the existing data, with added detail about the cultural value of the marine park to users themselves.

6. ECONOMIC LITERATURE REVIEW

6.1 Economic Values and Benefits of Lord Howe Island Marine Park

Some data is available on the LHI economy, but it is difficult to identify and isolate the contribution of LHIMP itself. The key economic benefit of the LHIMP appears to be the significant value it adds to the Island's tourism industry, which is the largest contributor to the LHI economy, with most economic benefits stemming from direct tourist use and flow-on tourism related industries.

Due to the 400-bed limit on tourism accommodation (LHITA, 2022b), visitor numbers to the Island are relatively stable among years. Therefore, economic values of the LHIMP and threats to these values are unique. A marine park permit and business license from the LHIB is required to undertake commercial activities in LHIMP. Permits issued for commercial activities in the LHIMP include conditions which require the details of all activities undertaken to be reported to the LHIMP Manager at intervals of 3 to 12 months, or on cessation of the permit (NSW DPI, 2021). This information is used to inform marine park management.

The following economic values have been identified for the LHIMP

- Tourism
- Employment
- Fishing
- Bequest and intrinsic values.

Tourism

The key economic benefit of the LHIMP appears to be the significant value it adds to the Island's tourism industry, which is the largest contributor to the LHI economy. The history of the Islanders and their special relationship with the sea is well known. After the whaling industry declined in 1870, the economy reverted to subsistence base until the export of Kentia palm seed developed as a major enterprise in 1900. Tourism has gradually replaced agriculture as the most prosperous industry (Environment Australia et al. 2001).

All permits issued for activities in the LHIMP between 1999 and 2019 have been collated by DPI, with a total of 387 permits issued. The top activity for which permits were issued in the LHIMP was commercial activities (170) (Table 6-1) (Woods, 2021). There are currently 15 types of commercial activities for which permits have been issued in the LHIMP and all are related to tourism (Table 6-1). Of these, eight are for activities offered by guided tours to tourists to use the Marine Park. The remaining seven activities are for 'other services', five of which are also primarily tourism-related (e.g. equipment hire) and two are freight charter and sliprail operations that support the tourism industry indirectly (NSW DPI, 2021).

Table 6-1 Commercial activities undertaken under permit in Lord Howe Island Marine Park

Guided tours	Other services
Sightseeing and wildlife observation	Equipment hire
Snorkelling	Management of fish food dispenser
Scuba diving	Mooring hire
Charter fishing	Freight charter
Sea scooter tours	Passenger transfer
Fish feeding	Cruise ship operation
Manta boarding	Sliprail operation
Non-motorised water sports	

Source: NSW DPI 2021.

A study of visitors to the Island in 2017 found that the top five motivations to visit the Island were: ‘escape and getaway to a remote location’ (64 per cent), ‘wanted to visit a World Heritage site’ (41 per cent), ‘great swimming beaches’ (38 per cent), ‘wanted to visit a marine park’ (33 per cent) and ‘wanted an island adventure’ (32 per cent). Of these, ‘visiting a World Heritage site’, ‘visiting a marine park’ and ‘great swimming beaches’ can all be directly related to visitor use of the LHIMP. Other earlier surveys have asked questions about LHIMP specifically and found that 83 per cent of respondents knew that the waters surrounding LHI are part of a marine park, and 91 per cent ranked the ocean and Marine Park as a ‘very important’ part of their trip, with swimming, reef walking and snorkelling ranked as the most frequently undertaken marine park activities (NSW MPA, 2010c; NSW MPA, 2009a). Trends in the number of participants undertaking guided tours correlated with the total number of visitors to the Island, further demonstrating a close association between commercial activities undertaken in the Marine Park and the broader LHI tourism industry (NSW DPI, 2021).

No data were found highlighting tourism expenditure in LHIMP specifically, and much of the information available covered tourism expenditure across the whole Island and surrounding marine parks. Survey results suggest that 68-69 per cent of visitors spent money on activities while on the Island, but there are no indications of the types of activities or amount spent (NSW MPA, 2007).

There are eight main tour operators specialising in water-based activities within the LHIMP. When compared to five land-based tour operators, the LHIMP appears to support the majority of tourism-based activities on the Island. Marine-based tour companies operating within the LHIMP offer boat cruises, snorkelling, wildlife viewing, stand-up paddle board or kayak hire, sea scooter tours, beach BBQs and scuba diving (LHITA, 2022). Data submitted by commercial operators between October 2017 and April 2019 indicated that snorkelling was the most common tour activity in the LHIMP, with seven operators running snorkelling tours during the reporting period (NSW DPI, 2021). This included the operation of four vessels (glass bottom boats) running snorkelling tours inside the lagoon only, with a passenger capacity of 100; three vessels running snorkelling tours outside the lagoon (including around Balls Pyramid) with a passenger capacity of 54; and one vessel undertaking snorkelling tours both inside and outside the lagoon with a passenger capacity of 12 (NSW DPI, 2021).

The LHI foreshore surrounding the lagoon, also provides important tourism resource for commercial operators, such as the boatsheds for businesses and safe public access for various water-based activities (LHIB, 2015b). Further data differentiating between the revenue from land-based and sea-based tour operators would be needed to quantify the value of LHIMP specifically. However, some indications suggest that most visitors to the Island would visit the LHIMP at least once during a 6 to 7-night stay (Arche Consulting, 2010).

In addition to the use of the LHIMP for tourism activities through private tour companies, the Marine Park also hosts visiting private vessels, who pay a \$50 fee per night to use the moorings in the LHIMP lagoon. In addition to the mooring fee, each visiting vessel pays a \$45 administration fee and a \$45 environmental levy²³ (per person). Moorings reduce anchor damage by visiting vessels and all mooring hires are recorded, so revenue generated from private vessels using the LHIMP could be calculated if desired. For example, public temporary moorings were hired to visiting vessels on 89 occasions in the period between October 2017 and April 2019 (LHIMPAC, 2021a; NSW DPI, 2021). Cruise ship operation has been permitted and undertaken previously within the LHIMP, however has not occurred since the implementation of an updated Cruise Ship Policy in 2012 by the LHIB (NSW DPI, 2021).

A visitor survey undertaken in 2017 estimated that the visitor expenditure for an average 7-night stay on the Island was approximately AU\$2,800 per person (Destination NSW, 2017). Over half of all expenditure, for both domestic and international visitors, went to accommodation whilst on the Island. Combining estimations of both on- and off-peak tourism expenditure on LHI, Gillespie (2016) calculated the net economic benefits of tourism on LHI to be in the vicinity of \$24.5 million per year²⁴. However, this tourism data represents tourism across the Island and within both State and Commonwealth managed marine parks, and there is currently no distinction between the economic benefits of the Island-based tourism industry and the marine parks. Any intention to quantify the economic value of LHIMP specifically would require a purpose-built study.

Employment

Another economic value associated with LHIMP is the employment of two full-time Marine Park staff who reside on the island as part of the community. Management of the Marine Park is also supported by regular employment of other LHI residents with specialist skills as contractors, and the same applies to the Commonwealth Lord Howe Marine Park. The presence of marine parks in the waters surrounding LHI therefore contributes to the generation of jobs, in turn contributing to the Island community and economy.

Fishing

Fish are harvested for sale by commercial charter and recreational vessels based at LHI and operating around LHI and Balls Pyramid, in both State and Commonwealth marine parks. The only fishing method is hook and line, and the commercial export of fish from LHI is prohibited. Charter operators sell fish to clients directly, as well as to restaurants and residents. Owners of recreational vessels have also historically retained and sold excess catch, and this practice continues (Figueira and Harianto 2022). However, to date little is known about the estimated harvest for the local market and its associated economic value.

²³ This environmental levy is paid by all visitors to the island and is not specific to those coming by private vessel.

²⁴ Which included tourism provider profits, scarcity rent during peak periods and consumer surpluses of tourists.

Bequest, existence²⁵ and scenic amenity values

In addition to the market-based economic values described above, there are likely to be many non-use existence and bequest values associated with LHIMP. To align with the NSW Marine Estate Threat and Risk Assessment (BMT WBM, 2017), bequest and existence (i.e., intrinsic) non-use values for LHIMP are described as economic values, however these are also recognised and discussed as social values in this review.

Existence values are the values people hold for knowing that something (in this case, the habitats, species, cultural assets and seascapes of LHIMP) is healthy and protected without necessarily visiting it or making use of it. Bequest values are the values people have for knowing that, in this case, the LHIMP estate, will be protected and be available for future generations to enjoy. Documented stewardship activities in the LHIMP (referred to in Section 4.1, Island identity, livelihood and community) indicate Islander bequest values for the Park²⁶, however, it is expected that people elsewhere in Australia and internationally will have a level of existence and bequest values for the LHIMP too.

Scenic amenity (or aesthetic value, within the TEV framework) of LHIMP relates to the natural beauty of coral reefs and other marine ecosystems, beaches, shoreline vistas and water quality. This value underpins World Heritage listing according to criterion vii: “to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance” which includes “outstanding underwater vistas” (UNESCO, 2020). Environment Australia et al. (2001) identify the view from sea toward LHI and its surrounding islands, including the stunning Balls Pyramid, as of the highest scenic value, as is the visual aspect of the sea from most parts of the Island’s coast.

The scenic amenity of LHIMP is likely to support a number of use-based values, therefore supporting the economic value of tourism, through sightseeing and snorkelling tours which are recorded as the most frequent uses of the LHIMP (NSW DPI, 2021).

As indicated in BDO EconSearch (2021), economic valuation of non-use values for mainland marine parks are limited, and none were found for LHIMP²⁷.

6.2 Threats to Economic Values

Threats to the economic values of LHIMP are predominantly related to changes in the tourism industry and related marine park visitation. One threat to LHI tourism overall would be issues with air travel and the Island’s accessibility to visitors. The Island is small and has a varied topography, which leads to structural and development limitations, including the limited length of the airport runway (AECOM, 2018). The current runway is only accessible by light aircraft. Qantas and Eastern Air Services are the only airlines in operation between LHI and the mainland. Qantas is responsible for most of the commercial travel to the Island, operating the Dash-8 Q200 aircraft, an older model plane with a passenger capacity of 36 (Qantas, 2019). However, this type of aircraft is becoming increasingly expensive to operate and are reaching retirement. Most modern jets are too heavy to safely land on the limited runway available on LHI. Hence, the capacity for LHI’s tourism industry to continue to operate at current levels is dependent on one of two changes: a)

²⁵ Existence values are described as intrinsic values within the NSW Marine Estate Threat and Risk Assessment (BMT WBM 2017). Within the economic literature the term existence value is used (intrinsic value is not a term used) and is one of a suite of use and non-use values, along with bequest value, comprising the Total Economic Value (TEV) framework (see, for example, Gillespie (2016)). Although considered within an economic framework many of these values are also social values.

²⁶ Farrier (2011) investigated local perceptions of protecting environmental and cultural values on LHI. This study revealed a strong sense of stewardship amongst those living on LHI, thus building evidence for bequest values. However, the study’s focus was on the Island itself, with fleeting reference to marine-based values.

²⁷ Gillespie (2016) quantified marginal non-use values (avoided species loss) for LHI (i.e., not LHIMP) in the context of a pest eradication program on the island.

lengthening the airport runway into the lagoon to allow the arrival of larger and newer aircraft; b) airlines investing in newer aircraft that are suitable for the LHI airport with the existing runway length. A feasibility study was conducted to explore the available options, and it was concluded that expanding the runway into the lagoon, although logistically possible, was not a realistic option at this stage²⁸. Continued visitor arrival at current rates is therefore dependent on the airlines updating their fleet to maintain passenger capacities (LHITA, pers. comm. 13/4/22). Any reduction to visitor arrivals would affect the LHI tourism industry, which provides many of the economic benefits associated with LHIMP. Equally, an increase in the LHI tourist capacity (currently capped at 400 as described previously) could generate greater economic return to the Island, yet may also lead to adverse effects on other LHIMP values identified (Section 4.2) through increased use and user-conflict and an increased likelihood of anthropogenic threats (overview in Section 2.2).

Like the threat posed by changes in accessibility of the Island from the mainland, the economic value of LHIMP could also be threatened by changes in visitor behaviour. Tours operating within LHIMP are centred around appreciation of the marine environment, including species abundance and biodiversity. A potential risk to the economic values of LHIMP therefore includes threats to the natural beauty and attractions of the Marine Park, and a related reduction in visitor engagement within LHIMP. Because LHIMP supports unique and vulnerable ecosystems and has high endemism of vulnerable species, the area is at particularly high risk from both anthropogenic and natural threats (overview in Section 2.2). Some of the anthropogenic threats to LHIMP and its economic values stem from extractive uses, such as fishing or collection, or active uses with potential risks, such as reef walking, fish feeding, marine litter or anchor dragging (Brookhouse, et al. 2013; NSW DPI, 2022b). Other biosecurity and ecological threats such as marine pests and climate change and associated coral bleaching events²⁹ can also impact the ecological stability of LHIMP, and therefore pose a threat to the economic values associated with tourism in the Marine Park.

Similarly, the maintenance of World Heritage status is important for sustained tourism to LHIMP and the LHI more broadly. In 2017, 41 per cent of visitors to LHI indicated that ‘visit[ing] a World Heritage site’ was one of the main reasons they chose to visit the Island. The loss of World Heritage status could therefore impact tourism trends, which could have a flow-on effect on the economic values of LHIMP. This threat could be considered low risk, as a recent UNESCO report suggests the Island group’s World Heritage status is currently stable due to successful conservation and management (UNESCO, 2020). Potential impacts that could affect World Heritage status are in line with the overall threats and risks to LHIMP, namely poor management resulting in physical damage to the site, loss of conservation value, natural beauty, biodiversity, etc. (UNESCO, 2020). The mitigation of risks to World Heritage status is therefore in line with the processes needed to control anthropogenic and natural ecological and biosecurity threats to LHIMP (detailed in sections 2.2 and 4.2).

Gillespie (2016) estimated the value of tourism on LHI to the Australian community over a 20-year period. This was in the context of the (feral) rodent eradication program on the Island, in which it was estimated the tourism net benefit from successfully eradicating these pests was approximately \$3.4 million annually (\$0.7 million in profits to tourism providers and \$2.7 million in consumer surplus to tourists). Whilst this study addresses a land-based threat, and is not directly applicable to the Marine Park, it is based on the assumption that “[a]ny impact on the natural values of the Island diminishes tourism and recreation values since these are inextricably linked to the Islands unique biodiversity and World Heritage values” (Gillespie,

²⁸ There were environmental concerns, threat to World Heritage status, damage to LHIMP, and backlash from the LHI community.

²⁹ Climate change is considered a man-made threat but is not able to be managed within the LHIMP and can therefore be considered an external threat for the purpose of this report.

2016, p.15), thus drawing a firm link between World Heritage status of the LHIG (of which the LHIMP is a part) and tourism.

Scenic amenity is highly dependent on natural beauty and many threats are already listed in Section 2.2. Anthropogenic threats to “outstanding underwater vistas” (UNESCO, 2020), could also include beach erosion and coastal works such as nourishment (adding sand to beaches); rock revetments and groynes, development and infrastructure in LHIMP such as proposed lengthening of the airport runway (UNESCO, 2020); moorings or marine infrastructure in the lagoon (Environment Australia et al. 2001); or infrastructure on adjacent coastal land (LHIB, 2005b).

Another factor that could impact tourism-related economic values of LHIMP could be changes to Marine Park zones or management that increase or limit tourism within LHIMP, or that don’t effectively manage conflicting uses. There was no recorded change in the number of businesses or unemployment rate following the commencement of the current LHIMP zones and other management rules in 2004, indicating that the introduction of these management rules did not significantly disrupt the employment profile of the Island or have a significant impact on the business community (NSW MPA, 2010a). However, it is worth keeping this in mind as a potential economic threat due to the Island’s reliance on tourism and access to the LHIMP.

User conflict between commercial tour operators has also been identified as a threat to economic values (Environment Australia et al. 2001). However, due to the current 400-bed limit on tourism accommodation, visitor numbers to the Island remain relatively stable. As commercial tour operators are operating within a capped visitation rate, the commercial viability of operators may be threatened by competition and a cap on the total number of commercial operators has previously been suggested. However, the National Competition Policy and supporting legislation prevents Government from such actions as it may foster the establishment of an oligopoly (Environment Australia et al. 2001).

Extreme weather events also represent a threat to economic values, given that most commercial operations in the LHIMP are vessel-based tours and weather limits the number of trips available for visitors (Environment Australia et al. 2001; NSW DPI, 2021). Any increase in extreme weather events associated with climate change may therefore threaten the viability of tour operations and reduce the economic return from tourism.

6.3 Economic Value Knowledge Gaps and Research Recommendations

Significant knowledge gaps were identified in the research of the economic values of LHIMP and related threats. The main gaps are the lack of distinction between the tourism revenue generated from land and sea-based activities, and the lack of data about income generated from the sale of fish catch on the island.

Not only were there no separate data identifying the economic benefit of LHIMP specifically, but most of the available economic data were quite dated. Arche Consulting (2010) compiled a profile of local businesses using the LHIMP in 2010, however the data in this report are limited and more recent data are needed to generate a robust understanding of the economic value of LHIMP.

LHIMP has a different set of economic values and threats compared to those identified for marine parks within the NSW mainland marine estate (BDO EconSearch, 2021). Most significantly, an absence of commercial fishing and aquaculture operations, with LHIMP fisheries limited to recreational and charter fishing, eliminating a significant source of economic output that is generated within other NSW marine parks. However, the catch (albeit comparatively small) is consumed locally through restaurants and by LHI households, thus contributing directly to the local economy. Regulations are in place to manage fishing in

the waters of LHIMP including bag and size limits, species restrictions, and no export of fish; and catch reporting by charter operators (Figueira and Harianto 2022). However, smaller private vessels are not currently required to report catch (Figueira and Harianto 2022). No consolidated measurement of the economic value of these small-scale fishing activities in LHIMP were found during this literature search, presenting a gap in the understanding of the economic contribution of fishing. In line with Figueira and Harianto (2022), we recommend improved understanding of the catch sold on the Island, from charter and recreational fishing. It is difficult to accurately assess the fishery trends on LHI and economic value of LHIMP if these data are not captured, representing a significant knowledge gap.

We also recommend the collection of additional data related to marine based tourism activities on LHI. Permits issued for commercial activity in the LHIMP include reporting conditions which require the details of all activities undertaken to be provided to the LHIMP at the end of specified reporting periods (ranging from 3 to 12 months, or on cessation of the permit). This information is collected and analysed to inform marine park management (NSW DPI, 2021). Information on the number of visiting vessels is also available through the LHIB (NSW DPI, 2021). However, this information may be supplemented by visitor surveys including of private vessels.

Attitudinal surveys of domestic and international visitors of LHI were carried out by LHI Marine Park staff (DPI Fisheries) in 2007 and again in 2008-09, however they were not tailored for an economic evaluation or an in-depth exploration of Marine Park values, and therefore there are gaps remaining in the data. However, these surveys (NSW MPA, 2010b; NSW MPA, 2010c) could be used to provide a valuable point of comparison for any data collected in future surveys. The socio-economic information collected in these earlier surveys could be used as a starting point to identify potential trends in visitor characteristics, attitudes and activities over time, as well as levels of awareness and understanding of LHIMP (NSW MPA, 2010b; NSW MPA, 2010c).

Knowledge gaps for non-use values relevant to residents and visitors are addressed in Section 4.3, however knowledge gaps also exist for the non-use values relevant to the broader domestic and international community.

In summary, we recommend the following research to address the knowledge gaps identified:

- Updated economic profile of local businesses, as the existing report is dated
- Updated business profile of the LHIMP to identify local employment and expenditure generated by its management
- More information about income generated from sale of fish on the island: who sells it (charter or recreational fishers); who buys it (restaurants, shops, accommodation providers); how much is sold (quantity of fish); income generated (dollar values)
- Regular visitor expenditure surveys with distinction made between income generated from land and sea-based tourism activities
- A study of non-use values of communities in the rest of Australia and internationally for the LHIMP, or the LHIG World Heritage site more broadly.

7. CONCLUSIONS AND RECOMMENDATIONS

This report has provided a review of the social, cultural, and economic literature associated with LHIMP. As discussed in Sections 3 to 5 of the report, a recurring limitation throughout the review was the lack of data and research directly associated with LHIMP, given many of the studies that have been identified are related to LHI as a whole and do not distinguish specific social, cultural, and economic values of the Marine Park, which are different to those of the Island as a whole but strongly connected.

The main recommendation from this review is that direct consultation with different marine park user groups is essential to adequately identify the social, cultural, and economic values, and threats to these values. Additionally, we recommend the collection of economic data directly related to LHIMP. The Marine Park is an important natural asset around which much tourism is catered, and the distinction between marine and terrestrial tourism activities and expenditure would be of significant value for decision making in relation to a management plan for LHIMP.

Summary of the social values, threats, and knowledge gaps

The LHIMP provides several social benefits to both the LHI community and visitors on the island including: physical and mental wellbeing through a wide range of recreational uses; connection with nature through research and educational experiences; Island identity and livelihood and community fostered by a shared history and connection to the marine park; pride in international recognition derived from the World Heritage status of the LHIMP; provision of healthy food through extractive uses of the Marine Park; and enjoyment of the Marine Park's scenic amenity and non-use values.

As most of the social values identified are related to the use and shared appreciation of the natural environment within the LHIMP, the threats to these values are therefore predominantly related to threats to environmental values and may also stem from regulation of social use in the marine park.

Much of the information about the use and values of LHIMP contains general overviews of activity in the Marine Park but lacks the personal perspectives of marine park users. To definitively identify the social values of LHIMP and potential threats to these values, we recommend direct consultation with both residents of LHI and visiting marine park users. The social values and threats identified in this report are the result of the researchers' interpretation and inference of information, and further consultation and research is recommended before preparation of a management plan.

Many of the social values identified in relation to LHIMP are in line with those identified as benefits of parks within the NSW mainland marine estate such as: educational opportunities and appreciation of natural beauty; a space to socialise with family and friends or meet like-minded people; a place to live an active lifestyle and enjoy recreational activities; and the support to livelihood through tourism and fishing activities (Sweeney, 2014; Gollan et al. 2019). However, more targeted consultation would be needed to allow for more robust comparisons to mainland parks and the marine estate.

Summary of the cultural values, threats, and knowledge gaps

The key cultural values identified appear to be associated with historic uses of the Marine Park including: history of island settlement by seafarers, maritime heritage, traditions and lifestyle and history of scientific investigation. Underwater cultural heritage including shipwrecks, maritime heritage sites and historic archaeological sites in the LHIMP support cultural values in the form of physical reminders of historic events. The development of the LHI community, and the strong community esteem in conservation of environmental values, traditions and lifestyle, also support these cultural values.

The main threat to these cultural values is related to physical damage to underwater cultural heritage sites, lack of education and loss of information about cultural heritage.

However, to definitively identify the cultural values of LHIMP and potential threats to these values, we recommend direct consultation with both local and visiting marine park users. The cultural values and threats identified in this report are the result of the researchers' interpretation of secondary data and inference of information and may not be representative of public opinion. We recommend consultation with different user groups exploring a range of themes.

Summary of the economic values, threats, and knowledge gaps

The key economic values and benefits of the LHIMP are related to the island's tourism industry, including tour activities, employment, the local consumption of seafood from fishing activities and existence and bequest values.

Unlike many other NSW marine parks, there is no commercial fishing or aquaculture in the LHIMP. There is currently no available data on the economic value of the recreational and charter fishing on the island. Further research is needed to identify the economic value of fishing in LHIMP through the sale of catch on the island.

The main threats to these economic values of LHIMP are predominantly related to changes in the tourism industry and related marine park visitation, which include: a reduction in air travel and passenger arrival; damage to the marine environment; restrictions or conflicts between marine activities (while maintaining environmental values); or a loss of World Heritage status.

The economic values identified, and the threats to these values, are based on limited and dated economic data for LHI as a whole, and not specifically related to the Marine Park. We recommend further research into the economic values of LHIMP, specifically more data related to marine-based tourism activities on LHI. As much of the economic value of LHIMP is directly associated with tourism and visitor expenditure, we recommend more frequent and robust visitor surveys. Additionally, we suggest surveying visiting private vessels, as they are active LHIMP users throughout their stay and could provide useful insight into private vessel use of the marine park and associated economic values.

There is an inference of strong bequest and existence values for the LHIMP held by Islanders and visitors (which could be further investigated as part of the social survey discussed earlier), however these non-use values of communities in the rest of Australia or internationally for the LHIMP, or the LHIG World Heritage site more broadly, has not been studied and presents a significant knowledge gap.

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Disclaimer

The assignment is a consulting engagement as outlined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 17. Consulting engagements employ an assurance practitioner's technical skills, education, observations, experiences and knowledge of the consulting process. The consulting process is an analytical process that typically involves some combination of activities relating to objective-setting, fact-finding, definition of problems or opportunities, evaluation of alternatives, development of recommendations including actions, communication of results, and sometimes implementation and follow-up.

The nature and scope of work has been determined by agreement between BDO and the Client. This consulting engagement does not meet the definition of an assurance engagement as defined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 10.

Except as otherwise noted in this report, we have not performed any testing on the information provided to confirm its completeness and accuracy. Accordingly, we do not express such an audit opinion and readers of the report should draw their own conclusions from the results of the review, based on the scope, agreed-upon procedures carried out and findings.

APPENDIX 1 Study Terms of Reference

Scope

Prepare a technical paper on the current state of knowledge of social, cultural and economic information for the LHIMP including information on social, cultural and economic values and potential risks and threats to those values.

This review should expand on work already undertaken for the mainland NSW marine protected areas (BDO EconSearch in 2021) by considering information specific to LHIMP.

This review will focus on the objects of the Act and secondary purposes of NSW marine parks as outlined in s. 22 of the Act, framed within the broader context of the primary purpose of marine parks, also outlined in s. 22 of the Act.

The analysis should identify relevant social, cultural and economic values and benefits associated with LHIMP and threats to these values. A range of direct use values and benefits (relating to extractive uses such as fishing) and indirect use values and benefits (relating to non-extractive uses such as ecotourism and passive/active recreation) should be considered, as well non-use values and benefits (e.g. existence and bequest values). Less tangible immaterial social and cultural values and benefits should also be considered in the analysis (e.g. aesthetic, spiritual, inspirational, educational, cultural heritage/identity, and therapeutic values, and social relations) as these also provide important contributions to human wellbeing. Finally, please also consider terrestrial biosecurity threats from visiting vessels (rodents, weeds, plant pathogens etc).

This work should consider relevant, contextual literature including (but not limited to) background references identified below, and literature relevant to the mainland marine parks in NSW. This is so that the functioning of LHIMP as part of a state-wide network of protected areas can be fully considered, including any literature relevant to connectivity between LHIMP and mainland marine parks and internationally noting its World Heritage status.

This work should also consider the combined information on the economic, social and cultural implications of:

- World Heritage status for Lord Howe Island
- The surrounding Lord Howe Marine Park (Commonwealth) managed by Parks Australia
- The Lord Howe Island Tourism Association
- The Lord Howe Island Board.

This document will be reviewed internally by DPI, followed by an external review by an external expert panel. Knowledge gaps should also be identified during this review process.

Out of Scope

- Social, economic and cultural studies from international literature and in other jurisdictions that do not relate to or help inform current knowledge of social, cultural and economic information for LHIMP.
- A review of ecological and biological science literature relevant to LHIMP unless directly relevant to social, economic and cultural values within the LHIMP. This review will be undertaken separately.
- A threat and risk assessment for LHIMP Values - this review will be undertaken separately.

APPENDIX 2 Methods

Beginning with the key reference material provided by NSW DPI, we undertook a literature search for policy documents and legislation, academic and grey literature relating to the economic, social and cultural values of LHIMP. The search was carried out using Google, Google Scholar, Scopus and Taylor and Francis Online. Each of the reference lists of the selected documents was then scanned for additional relevant sources. An example of the keywords and search terms used in the literature search is provided in Appendix Table 2-1.

Appendix Table 2-1 Key search terms used in the literature search

Literature review section	Example keywords and search terms used
Economic	<ul style="list-style-type: none"> “economic value Lord Howe Island” “Lord Howe Island tours and/or tour operators” “Lord Howe Island economy” “Lord Howe Island tourism” “employment Lord Howe Island” “Lord Howe Island Marine Park use” “Lord Howe Island Marine Park economic values”
Social	<ul style="list-style-type: none"> “social values of Lord Howe Island Marine Park” “community use of Lord Howe Island Marine Park” “Lord Howe Island Marine Park recreation” “Lord Howe Island Marine Park use” “Lord Howe Island community” “Lord Howe Island visitor” “visitor experience Lord Howe Island Marine Park” “Lord Howe Island world heritage status”
Cultural	<ul style="list-style-type: none"> “Aboriginal history Lord Howe Island” “Lord Howe Island Marine Park cultural values” “Lord Howe Island Marine Park history” “history Lord Howe Island” “heritage values Lord Howe Island Marine Park” “traditional fishing Lord Howe Island”

Source: BDO EconSearch

Following this initial search, it was determined that limited sources were available online. As a result, NSW DPI and the LHIMP Staff collated and shared a wide range of reference material from their databases. This newly obtained material was then organised thematically (social, cultural, and economic), and each document was scanned for relevant information.

In addition to relevant literature, statistical information extracted from ABS Census datasets was used to provide context and to compile the socio-economic profile of Lord Howe Island.

Lastly, some information was also gained through personal communication with knowledgeable contacts (LHIMP Staff and Lord Howe Island Tourism Association Executive Officer). The use of personal communications as a source of information was kept to a minimum to avoid breaching the scope of the project, which was to review relevant literature. Further consultation with relevant contacts and stakeholders is strongly recommended as they are a valuable source of information.



The eventual database of reference material includes government websites; Lord Howe Island Tourism Association website; consultant reports; journal articles; personal communications; blogs; heritage reports; government reports (state and federal); ABS data.

APPENDIX 3 Shipwrecks of Lord Howe Island Marine Park

Favourite - One of the island's recent shipwrecks, the Favourite ran aground at the North Passage in 1965.

George - The earliest recorded fatality at Lord Howe Island, the whaler George either ran aground or sank off the southern end in December 1830. A two-masted whaler operating out of Tasmania.

Jacques del Mar - French-registered steel screw steamer wrecked at the Island's North Passage in 1954. Originally called Marion Sleigh.

La Meurthe - Abandoned at sea in gale whilst under the tow of St. Louis. The unmanned 'ghost ship' drove ashore near the lagoon at Lord Howe Island in 1907 much to the amazement of local residents. A timber sailing ship of 1597 ton gross.

Laura - Lost at sea after departing the Peruvian port of Callao for Newcastle to load coal. One of Laura's lifeboats eventually washed up north of Cronulla Beach, Sydney and the wheel box at Lord Howe Island.

Maelgwyn - Abandoned approximately twenty miles north-west of Lord Howe Island in 1907. Departing Pisco, Peru on 17 November 1906, the vessel became disabled in a gale after ballast shifted. All 20 crew reached Lord Howe Island in the boats.

Mystery Star - Lost after departing Lord Howe Island for New South Wales in October 1936. The vessel was never found, despite searches by RAN destroyer Waterhen and RAAF aircraft. A timber motor skiff of 4.88 metres in length.

Ovalau - cargo of copra caught fire about 100 miles from Lord Howe Island in Oct 1903 but was contained until reaching that place. Passengers and crew disembarked before the ship exploded, burnt and finally sank off North Passage. A 1229 ton, 70 metre steamer built in Scotland in 1891.

Pacific Chieftain - a 10 metre, wooden fishing vessel, wrecked November 1968 at Flat Rock near North Rock, Admiralty Islands. All 11 passengers and crew escaped on a lifeboat.

S.M. Stetson - Collier barque S.M. Stetson left Newcastle with 1150 tons of coal on 10 March 1877 bound for San Francisco. Sprang leak at sea. Captain Curtis beached vessel at entrance to North Passage. All made the shore safely on 25 March.

Sylph - The Sylph foundered at sea, with a cargo of onions, after departing Lord Howe Island for Sydney on 20 April 1873. All eight crew and passengers were drowned. A timber ketch of 17 tons gross and length of 13.10 metres.

Viking - A wooden double-ender, island boat lost between Sydney and Lord Howe Island in November 1936 with the loss of 6 lives.

Whangaroa - Abandoned at sea about 20 June 1911 after becoming unseaworthy. Departed Mokau, New Zealand for Sydney with cargo of hardwood. Crew spent four days clinging to vessel before making Lord Howe Island. Wreckage later sighted ashore. A three-masted timber topsail schooner.

Wolfe - The whaler Wolfe wrecked near Lord Howe Island in 1837. At sea for eighteen months with 1700 barrels of sperm whale oil aboard. Exhausted crew went ashore for water and food. Wolfe blew against near-shore reefs and fatally holed, eventually sinking within ten miles of shore.

Zeno - Abandoned off Lord Howe Island on a voyage from Newcastle to Wellington, New Zealand with coal. Foundered on 6 September 1895, with ten crew making the safety of the island. Timber brigantine of 407 tons gross.



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