
RESEARCH WORK PLAN 2006-07

Lord Howe Island Marine Park



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INTRODUCTION

The Lord Howe Island Marine Park (LHIMP) is located approximately 590 km east of the Yamba on the NSW North Coast and covers around 460 km² and consists primarily of a shallow marine plateau atop an eroded seamount. The plateau varies in depth from intertidal to about 50 m at the plateau's edge, from where depths plunge abruptly to over 2000 m. The park includes the most southerly coral reef in the world and is listed as a world heritage site. The marine environment is biologically diverse and contains a unique mix of tropical, subtropical and temperate species. Ecological processes throughout the Marine Park are interconnected with both resident and migratory marine species relying on specific habitats for breeding, feeding and protection. The marine park also caters for a wide range of user groups and is of social, cultural and economic importance to the area.

Research is a key component in the management of Lord Howe Island Marine Park and the research program seeks to expand our knowledge and understanding of the marine environment, provide a regular update on the health of marine ecosystems and the nature and extent of activities occurring in the Marine Park, and indicate the effectiveness of zoning and other management actions. Assessment of the marine biodiversity and presence of marine pests is critical to the conservation and protection of habitats and species found in the Marine Park.

As identified in the NSW Marine Parks Authority Strategic Research Plan (2005-10), there are a number of key research areas covering a wide range of issues relevant to the ongoing management and assessment of Lord Howe Island Marine Park. The plan also lists a range of priority research issues and these relevant issues are identified under each project.

This Research Work Plan aims to outline the research and monitoring operations that the Marine Parks Authority intends to undertake directly or through collaboration with external research providers during 2006-07 to provide for the conservation and sustainable use of Lord Howe Island Marine Park to attain the objects of the *Marine Parks Act 1997*. It refers specifically to projects funded by the Marine Parks Authority and does not include research conducted within the Marine Park that is funded from other sources. Additional projects may be added to the plan during the year as further resources become available.

The research and monitoring projects are categorised under five overall areas.

- 1. Biodiversity and ecological processes**
- 2. Indigenous and non-Indigenous culture and heritage**
- 3. Ecologically sustainable use**
- 4. Specific impacts**
- 5. Socio-economic impacts**

Habitat mapping of Lord Howe Island Marine Park

Background

The planning framework for marine parks in NSW requires that activities be regulated to ensure ecological sustainability. The sustainability of activities can not be ascertained without information on the resilience and spatial extent of impacted habitats. Habitats within the Lord Howe Island Marine Park will be classified using a combination of physical and biological attributes, sampled at varying scales using both direct and remote visual census techniques. A range of data sources have been collated to provide a comprehensive bathymetric coverage of nearshore waters of the island.

Shallow water habitats will be mapped from aerial photography and ground-truthed by targeted sampling. Deeper water habitats will be sampled using diver-operated video or remotely operated video at replicate locations representing homogenous bottom characteristics such as depth, slope and substrate type. All video data is archived to facilitate future detailed analysis and time series monitoring. Information is incorporated into the park's GIS system and will continue to be collected opportunistically for the foreseeable future.

Objectives

- Collect opportunistic information on the distribution and extent of seabed habitat types throughout the LHIMP
- Maintain and improve the parks GIS/resource inventory database to include bathymetric, habitat and community assemblage, and species information.

Contacts

Alan Jordan

NSW Department of Environment and Conservation

This project aims to address the following specific research issues identified in the Strategic Research Plan:

Biodiversity and Ecological Processes

- Map and assess the spatial extent and structure of seabed habitats and key taxa
- Identify appropriate indicator species or taxa

Ecologically Sustainable Use

- Examine the optimum design of marine parks: size, patterns of zoning

The life-history and ecology of Bluefish (*Girella cyanea*) at Lord Howe Island

Background

Knowledge of the ecology of a population is crucial for the informed management and conservation, although effective management of fish is especially difficult and near-impossible since many species are considered data deficient. Few studies have focused on species in the family Girellidae in situ, or examined aspects of their ecology such as reproduction, life history or age. *Girella cyanea* is one of sixteen species belonging to the genus, and is considered to be data deficient.

Historically an important fish species for residents of Lord Howe Island, the continued popularity of angling on the island indicates a need for targeted research on the basic ecology and biology of the species. Despite its importance to the residents of Lord Howe Island, no comprehensive study has been attempted for the species, its life history parameters are very poorly understood, and there are no formal data on the reproductive ecology and/or ontogeny for the species. Furthermore, there are few data on the ecology of the genus.

Data being used to surmise the biology (e.g. feeding, life history, ecology) of the genus in Australia and New Zealand have often been based on one or a few studies carried out on related taxa on the other side of the world (e.g. *G. nigricans*). Moreover, there are currently no formal monitoring efforts in place, with only fishing catch rates and incidental observations during other research used to assess the status of the species. This research project aims to investigate the population biology, structure and ecology of the Lord Howe Island population of *G. cyanea*.

Objectives

- To provide quantitative baseline data on the nearshore distribution, abundance and population composition of *G. cyanea* at Lord Howe Island
- To determine basic life-history parameters of age, growth, size-at maturity and temporal patterns of spawning
- To describe the level of connectivity between habitats for different life stages of *G. cyanea* as a basis for effective management at key life stages.

Contacts

Melanie Lewis
Prof. David Booth

University of Technology Sydney
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This project aims to address the following specific research issue identified in the Strategic Research Plan:

Biodiversity and Ecological Processes

- Examine species connectivity at multiple scales

Ecologically Sustainable Use

- Determine age, growth, reproductive biology of selected fish species
- Abundance of key species of fish

Assessment of baseline biodiversity survey data for Lord Howe Island Marine Park

Background

A recent survey of marine pests was conducted within LHIMP using standard port survey protocols. As these methodologies do not collect quantitative data on native species that allows direct comparisons of biodiversity among sites and between Lord Howe Island and other locations, additional biodiversity surveying methods were conducted independent of the marine pest survey. While there are pre-existing monitoring sites for coral and algal species at Lord Howe Island, the value of the biodiversity survey techniques are that they provide quantitative data on the biodiversity of fish and mobile macro-invertebrates as well as sessile species, using techniques identical to those applied in other Australian marine parks. Therefore, repetition of these surveys over time will enable a quantitative assessment of changes in biodiversity of a wide range of community types, and an assessment of these changes in the context of changes documented in marine parks elsewhere in Australia.

The protection of marine biodiversity is a key objective of the Marine Parks Authority and LHIMP is seen as an area of high biodiversity containing a unique mix of tropical, subtropical and temperate species, including the most southerly coral reef in the world. There is limited information on a wide range of marine taxa at LHI, particularly at a large number of sites and habitat types. The collection of such data during the marine pests survey has allowed a detailed assessment of diversity, and there is a need to fully analyse and report on these surveys. In addition, analysis of data on the distribution and density of fish, invertebrates and algae over various habitat types in the LHIMP is required to establish baselines for time series monitoring of population densities as they respond to zoning protection.

Objectives

- To analyse and report on the intertidal and subtidal biodiversity data collected during the LHIMP marine pest survey

Project Contacts

Dr Karen Parsons

Aquenal Pty Ltd

This project aims to address the following specific research issues identified in the Strategic Research Plan:

Biodiversity and Ecological Processes

- Conduct biodiversity assessments of selected taxa
- Identify appropriate indicator species or taxa
- Assess the spatial and temporal patterns of assemblages

Ecologically Sustainable Use

- Abundance of key species of fish and invertebrates