

Jervis Bay Marine Park



RESEARCH WORK PLAN 2008-09

Jervis Bay Marine Park

INTRODUCTION

The Jervis Bay Marine Park (JBMP), located on the south coast of NSW, covers an area of approximately 22,000 hectares and spans over 100 km of coastline and adjacent ocean extending from Kinghorn Point in the north to Sussex Inlet in the south, including most of Jervis Bay. The marine environment of the Marine Park is biologically diverse, and while dominated by temperate species, also at times contains many subtropical species that arrive with warmer subtropical waters during summer. Within the Marine Park these species are found in a variety of ecosystems and habitats, including estuaries, intertidal rocky shores, island fringing and subtidal reefs, seagrass beds, sandy beaches and subtidal soft substrates. 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. In particular it is a popular site for recreational fishing and diving and is also a key training area for the Australian Defence Force (ADF). It is culturally significant to local Aboriginal communities, with many spiritually significant sites occurring within and adjacent to the Marine Park, coupled with a continuing tradition of cultural resource use.

Research is a key component in the development of zoning arrangements within the Jervis Bay Marine Park. Monitoring and research provide information to make informed management decisions for the conservation and sustainable use of the park mandated by the *Marine Parks Act 1997*. Marine Parks Authority research and monitoring programs are guided by a strategic research framework and a strategic research plan. This provides a vision and structure for the development of research and monitoring programs that contribute to a 'whole-of-government' approach to the sustainable management of marine resources in NSW.

The strategic framework includes two overarching priorities for research and monitoring. These are the need to:

1. Identify and select the location and nature of marine parks and their zones
2. Monitor and evaluate the effectiveness of marine park zoning and related management arrangements

The program also aims to expand our knowledge and understanding of the marine environment, detect unforeseen changes to the health of marine ecosystems and also report on the nature and extent of activities occurring in the Marine Park. All of this information is essential in order to maximise the effectiveness of zoning and other management actions while minimising socio-economic and cultural impacts.

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

1. Biodiversity and ecological processes

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

This 2008-09 Research Work Plan outlines the research and monitoring projects that the Marine Parks Authority intends to undertake directly, or through collaboration with external research providers. It refers specifically to projects funded or supported by the Marine Parks Authority and does not include research conducted within the Marine Park that is funded solely from other sources. The Marine Parks Authority actively works with other government agencies and universities to identify priority projects and seek external funding for research. Additional projects may be added to the plan during the year as further resources become available.

Effectiveness of temperate Australian Marine Protected Areas as tools for biodiversity conservation and informing fisheries management

Background

The Jervis Bay Marine Park subtidal reef monitoring project is part of the first continental-scale empirical assessment of the efficacy of marine parks. Following establishment of a monitoring system in Tasmania an extensive network of 250 monitoring sites has expanded the study to measure the effectiveness of biodiversity conservation and inform fisheries management in all State waters that contain temperate marine ecosystems. This monitoring network has been designed as a large-scale manipulative ecological experiment to provide critical information for decisions relating to issues such as appropriate number, size and configuration of Marine Parks. Quantitative baseline information on densities and size frequency of reef fishes, macro-invertebrates and macroalgae have been established for a total of 30 sites at Jervis Bay Marine Park. These are surveyed each year in May-June. Surveys were conducted in 1996, 2000, 2001, 2003, 2004, 2005 and 2006. This provides a rare Before-After-Control-Impact design as the management zoning of Jervis Bay Marine Park occurred in 2002. An Australian Research Council Linkage grant was obtained in 2005 for this project. The project was also expanded in 2005 to include baited underwater video assessment of fish communities.

Objectives

- Measure direct effects of fishing on exploited populations of reef fishes and invertebrates over large spatial (continental) and temporal (inter-annual) scales
- Identify indirect effects of fishing on coastal reefs, including trophic cascades
- Quantify relationships between life-history traits, fishing, and recovery after fishing stops
- Determine relationships between relative densities of species and distance from Marine Parks
- Determine relationships between Marine Park size, boundary type and biotic response.

Project Contacts

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This project address the following 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
- Examine multi-species linkages and mechanisms determining rocky reef assemblage structure and dynamics

Ecologically Sustainable Use

- Examine the optimum design of marine parks: size, patterns of zoning
- Abundance of key species of fish and invertebrates

Mapping and classification of continental shelf seabed habitats in Jervis Bay Marine Park

Background

The primary goal of the Marine Parks in NSW is to establish a comprehensive, adequate and representative (CAR) system to protect marine biodiversity and maintain ecological processes. As detailed spatial information on the distribution of marine biota is limited, seabed habitats are increasingly being used as effective surrogates for biological diversity, provided they are appropriately validated and all representative habitats are included. Remote sensing techniques for mapping of seabed habitats are now recognised as a cost-effective method of diversity assessment for marine park planning, and an important component of the overall research required to identify the distribution and structure of marine ecosystems and habitats.

The Manning Shelf bioregional assessment provided information on the broadscale distribution of marine and estuarine ecosystems and intertidal and nearshore habitats. While some species and assemblage data was available for marine mammals, threatened birds and estuarine fishes, overall there was little data available on the distribution of subtidal habitats and their associated biota. The exception is within estuaries where there is detailed information on the distribution of seagrass, mangroves and saltmarsh. Such information was identified as important to provide a more comprehensive assessment of marine biodiversity in the region.

To meet the primary objectives under the *Marine Parks Act* all major benthic habitats within a marine park should be represented within higher protected areas (sanctuary and habitat protection zones). There is currently limited knowledge of deep subtidal habitats (i.e. >10 m depth) within the Batemans Shelf Bioregion, with only small areas of rocky reef mapped from existing aerial photographs, and even less information available on the structure and distribution of subtidal soft-sediment habitats. There is a clear need to assess the distribution and extent of subtidal habitats within the JBMP. Much of this will be conducted using acoustic swath mapping that provides detailed information on bathymetry and seabed texture and hardness.

Objectives

- Determine the distribution and extent of seabed habitats in selected areas of the continental shelf within the Jervis Bay Marine Park
- Collect detailed bathymetry and towed video data to allow ground-truthing of acoustics
- Produce a range of spatial layers of seabed habitats defined within a hierarchical habitat classification system

Contacts

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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

Ecologically sustainable use

- Identify unique & sensitive marine habitats and communities
- Examine the optimum design of marine parks