
NSW MARINE PARKS STRATEGIC RESEARCH PLAN 2005-2010

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INTRODUCTION

A NSW Government priority in establishing and managing Marine Protected Areas is evaluating their effectiveness in conserving marine biodiversity. Knowledge of spatial distributions and changes in species, habitats, and ecosystem processes is crucial to effective conservation planning, and information on social, economic and cultural values assists in understanding and managing conflict, improves consultation education and compliance, and optimises benefits to the community.

The research planning structure outlined in this 5 year Strategic Research Plan builds on the Strategic Framework for Evaluation and Monitoring of NSW Marine Parks, the purpose of which was to provide a vision and structure for the development of research and monitoring programs which represents a 'whole-of-government' approach to the sustainable management of marine resources in NSW.

The two over-arching priorities for research and monitoring in NSW Marine Parks in identified in this framework includes 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.

There are two main types of research and monitoring programs for Marine Parks in NSW: those which directly address questions of importance to ongoing management, and those which provide relevant information about biotic or abiotic patterns or processes in a marine park. In general, projects of the first type will have highest priority, but other research will be facilitated and encouraged whenever possible. Therefore, in addition to ongoing assessment through core research activities, specific projects will be developed in collaboration with external research providers to strategically address marine park objectives, review progress and improve marine conservation in NSW.

Research and monitoring are categorised under five overall areas, that include subgroups. This classification system forms the basis for developing research plans and helping to identify information gaps.

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

Marine environments are characterised by large variations in the spatial and temporal patterns of biodiversity driven by variability in factors such as habitat availability, recruitment, regional and local oceanography and competition. Spatial and temporal variation in human impacts adds extra complexity to the already difficult task of assessing variable marine environments. Impacts may be episodic (short-lived) or sustained (long-term), operate over a range of spatial scales (m's to 100's km), and affect ecosystems in ways that are difficult to predict or detect beyond that of natural variability. Often, determining the extent of natural variation is a key priority for research programs, and important if results are to be meaningful. Long-term studies are necessary but, in the short-term, decisions will need to be precautionary and reviewed regularly as more scientific information becomes available.

Given the limited amounts of time and money available for effective monitoring of biodiversity, it is important to identify surrogate (indicator) measures that reflect patterns of biodiversity over large, continuous areas. This reflects the current poor knowledge of marine and estuarine ecosystem patterns and processes, and for many species, taxonomic problems in identification. In identifying suitable indicators, it will be crucial to examine their resilience and stability and further examine how well they reflect changes in ecosystems, habitats within the marine park.

A range of biodiversity indicators has already been suggested for reporting the state of the environment at a national level and appropriate indicators will be incorporated in the monitoring of NSW Marine Parks. It is clear that the ability to reliably predict patterns of biodiversity from survey data will depend on the careful choice of measures and sampling designs.

Identification and management of threats will also require information on cultural, social and economic values in marine environments. Research and monitoring of human use will also help provide for the sustainable use and public appreciation, understanding and enjoyment of marine parks. Anticipating and managing these impacts is a major challenge for marine park management.

Monitoring to assess the effectiveness of management will be one of the most important mechanisms for feedback, though in many cases this monitoring can only be useful on timescales of at least 5 to 10 years. This feedback will enable alternative management strategies to be implemented if existing actions are found to be ineffective in providing adequate protection. For example, zoning in marine parks is a fundamental tool to manage and reduce activities that threaten biodiversity. However, zoning may be ineffective in achieving their desired outcomes, especially the adequate protection of the full range of processes, habitats and species in the region, due to a design fault or compliance issue indicating the need for other management action, including revised zoning. It is anticipated that research and monitoring will provide indications of which ecosystems, habitats or species require protection, identify how to increase compliance from marine park area users and show which broader ecosystem processes need protection in areas surrounding the marine park.

Assessing the effectiveness of the NSW Representative System of Marine Protected Areas in meeting its goal will need to be scaled, ranging from national and international significance down to State, bioregion and individual marine parks. Evaluation of comprehensive, adequate and representative (CAR) criteria at all scales will be fundamental to determining the effectiveness of the marine park system and its management and will largely depend on the design of the system and the management of each area. Accordingly, detailed performance criteria will be developed to evaluate the effectiveness of individual marine parks in achieving their respective biodiversity conservation objectives. These criteria will be factored into the research and monitoring programs for each marine park and provide significant inputs into the review of operational and zoning plans.

Overall, the research and monitoring will be used to:

- establish a CAR system of marine parks that includes a full range of marine biodiversity at ecosystem, habitat and species level
- provide baseline estimates of natural variation
- monitor impacts on these natural conditions
- trigger and prioritise management responses
- determine strategies for managing specific areas, ecosystems, species and threats
- determine strategies for integrated management of wider issues
- monitor the success of management in conserving biodiversity
- direct future management, research and monitoring.

RESEARCH COORDINATION

Marine park agencies, universities, local government, consultants, and the local community will be encouraged to participate to ensure effective research and monitoring of NSW marine parks. However, it is important to coordinate this effort. The time and resources required for effective research are considerable. Marine parks research must be cost-effective, focus on marine park objectives and reviewed regularly. It is also important that research and experience in related fields is made available to marine park managers. Integrating research expertise from various agencies will make the best use of the available information.

As research and monitoring is integral to marine park management, monitoring programs must have strict standards of design and execution. Studies need to address management objectives as closely as possible and use the most reliable, cost-effective scientific methods. Designs should account for short and long-term variation at different spatial scales and should clearly recognise underlying assumptions and design limitations. Marine park research and monitoring proposals will be tested and peer reviewed before committing resources, and final outputs will also be reviewed. This role is undertaken by the NSW Marine Parks Research Committee (MPRC).

Whenever possible, research and monitoring outputs will be tailored to link closely with marine park management needs. For example, impacts of a specific magnitude may be used to trigger management intervention and research may be used to predict and minimise future impacts or remediate the effects of severe disturbances. Management will also make the best use of information from previous and related studies through an adaptive management process. Existing expert knowledge, literature, surveys, databases, records, maps, photographs, public submissions, local and Indigenous knowledge will all be collated and used in guiding research and management decisions.

All research will adhere to the ASTEC guidelines for the ethical conduct of research in protected and environmentally sensitive areas.

ASSESSMENT & REPORTING

Reporting time frames for research and monitoring activities will depend on State Government requirements, but will include:

- annual performance information for Government annual reports
 - annual milestone reporting on individual projects
 - annual financial reporting on projects, aligned with park budgets and work plans
 - regular updates to stakeholders and marine park users, relevant committees and agencies
 - information to assist with the review of zoning and operation plans every five years
 - formal review of strategic research plans every five years.
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KEY RESEARCH AREAS

In order to improve the long-term planning and co-ordination of research and monitoring activities within the marine parks in NSW, a five-year Strategic Research Plan (2005-10) has been developed by the MPRC. This plan is structured around the five overall key areas identified earlier that include the specific subgroups listed below.

Given the broad nature of many of these sub-groups, a range of research issues have also been included in the plan that provides further details on the specific component of research that have been identified as important to marine park managers. The classification system is used to identify research gaps within each marine park and forms the basis for developing annual Research Work Plans.

Biodiversity and Ecological Processes

- Habitat knowledge
- Ecological biodiversity
- Ecosystem dynamics

Indigenous and Non-Indigenous Culture and Heritage

- Aboriginal culture
- Heritage

Ecologically sustainable use

- Assessment of marine park zoning
- Population biology and assessment
- Fishing and collecting
- Recreation and tourism

Specific impacts

- Development and infrastructure
- Visual amenity
- Pollution
- Pests and disease

Socio-economic influences

- Socio-economics
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