



SEWPaC/CERF Marine Biodiversity Hub Workshop:

Understanding SEWPaC's strategic research needs in managing the Commonwealth marine reserve estate.

Date and Location: 16th November, Southern Cross Club, Woden

Attendees: Nic Bax, Tara Anderson, Piers Dunstan, Brendan Brooke, Neville Barrett, Keith Hayes, Tony Smith, Michaela Guest (CERF). Stephen Oxley, Nicole Middleton, Andrew Zacharek, Ray Kidd, Rod Atkins, Jeremy Smith, Jason Passioura, Chris Marshall, Gareth Evans (DSEWPaC). Invited experts: Belinda Brown, Doug Brown (Parks Australia), Jon Day (GBRMPA), Natalie Ban (JCU), Julian Caley (MBH/MTSRF).

Outcomes

- The CERF Hub to work with DSEWPaC staff to capitalize on opportunities where this workshop agreed there was scope for science to inform the future management of the CMRE. These opportunities relate to:
 - Ensuring objectives of the CMRE are measurable (MPA Futures and MPA Operations Sections);
 - Developing a national monitoring strategy to describe biodiversity and monitor resource condition (MPA Futures and MPA Operations MBP Strategy Sections,);
 - Developing approaches for evaluating management effectiveness over annual and longer-term business cycles (MPA Futures and MPA Operations Sections).
- If successful in securing funding through the NERP, the Hub will establish a number of small working groups to refine research projects taking into account the outcomes of this workshop. If the Hub is unsuccessful in the NERP, the Hub Director would seek to have further discussions with the Senior Executive of DSEWPaC to ensure the continued engagement between scientists and managers to achieve improved conservation outcomes.
- Agenda, notes and where possible, presentations from this workshop will be made available through the CERF Marine Biodiversity Hub website:
www.marinehub.org

Presentations and Discussion

Session 1: Marine Biodiversity Hub Overview. Nic Bax

- Research completed by the CERF Marine Biodiversity Hub to date includes the prediction of biodiversity, understanding connectivity of marine ecosystems and developing surrogates for marine biodiversity, monitoring of deepwater MPAs and development of monitoring methods, and development of off-reserve management options.
- Predictions of biodiversity are probabilistic and include uncertainty of prediction. Probabilistic predictions provide the potential for a greater variety of management options to achieve declared goals, including integrated on- and off-reserve management. Biodiversity predictions were used in marine bioregional planning.



- Research on understanding potential connectivity within the South-west Marine Region has helped to define the relationship between the Areas for Further Assessment in the South-west Marine Region and has contributed to the design of new marine reserves.
- The CERF Hub has used multi-beam acoustics to develop surrogates for marine biodiversity. Multi-beam acoustics provides spatial environmental data at a range of spatial scales. This information has been used in the management of NSW Marine Parks.
- The Hub has established Australia's first deep water MPA monitoring sites in the SE Marine Region. The sites compare recovery rates of biota in adjacent trawl-impacted and unimpacted sites on the same seamount. The Hub has developed cost effective methods for monitoring in the marine environment.
- The Hub has completed research on off-reserve management including approaches to expert elicitation and stakeholder consultation, and application of offsets and incentive-based measures. This information has informed the design and management of marine reserves and development of SEWPaCs structural adjustment package.
- Future research proposed under the NERP is focused on supporting the move from planning to implementation of marine bioregional plans in the following key areas: national monitoring, evaluation and reporting; prioritisation and response to threats; ecosystems knowledge to support implementation of Marine Bioregional Plans; biodiversity discovery to support implementation of Marine Bioregional Plans; prioritisation and improved management of listed species and communities.

Issues/questions

- SEWPaC expressed interest in understanding the social science capacity of the Hub. SEWPaC notes importance of understanding social impact/perspective of MPA establishment and management. The Hub notes interest and some capacity to examine social issues in the NERP, and build on existing capacity of CERF demonstrated in work done on understanding stakeholder preferences in the Eastern Tuna and Billfish Fishery. Social Science capacity would fall into the integrated management project of the NERP proposal.
- SEWPaC expressed an interest in extended geographical focus of CERF to include the tropics under NERP. The CERF Hub note that the NERP proposal included additional partners from Charles Darwin University, James Cook University and University of Western Australia, and has several projects that have a tropical focus.
- SEWPaC expressed opportunities to further refine the scope of future research projects under the NERP. The CERF Hub indicated that a series of small working groups will be established if the NERP is successful to refine research projects in collaboration with SEWPaC.

Session 2: SEWPaC context objectives and challenges for managing the CMRE.

Stephen Oxley

- The EPBC Act provides the basis for integrated oceans management that is being delivered through the Marine Bioregional Planning (MBP) program. The



establishment of Commonwealth marine reserve networks is being undertaken through the MBP program. The EPBC Act and MBP provide the legislative and policy context for oceans management.

- The existing Commonwealth marine reserve estate (CMRE) is comprised of a small number of 'iconic' reserves most of which are assigned a high conservation status (IUCN I or II), and the SE network currently under interim management arrangements. The establishment of reserves networks through the MBP Program will considerably expand the CMRE in both area and number of reserves. Reserves will be a mix of IUCN categories, multiple use in the first instance and over-time incorporate higher levels of conservation.
- The establishment of MPA Operations and MPA Futures Sections is in recognition of the need to shift from a regional focus to a policy development and operations focus across the CMRE.
- The challenges in managing the CMRE is the increased scale of the reserve network, and the management of multiple use zones including the integration of off-reserve and on-reserve management to achieve ecosystem conservation outcomes, increase in stakeholder interaction.
- The challenge is also to establish a body of evidence to identify the right level of protection in the Australian context that is required to achieve marine conservation outcomes. This includes providing evidence to demonstrate efficacy of current levels of conservation in multiple-use areas, and if appropriate, the need to establish higher levels of protection. This is an opportunity for science to guide decision-making and inform adaptive management over a minimum 10-year time frame.
- There are considerable budgetary constraints in managing the CMRE in the short to medium term and these dictate what is considered an appropriate framework for marine reserve management. First priority for funding will be to ensure effective management through compliance, enforcement, community education.
- Note: SEWPaC is not an operational environment but outsources activities. SEWPaC focus is in project management and the knowledge interface between science providers and stewards of marine environment.

Issues/Questions

- SEWPaC interested in building capacity to respond to pressures on conservation values of marine reserves within a 10 year time-frame.
- Scientists indicate the value of scientific reference areas in order to understand how activities impact the marine environment and note the importance of these in the new CMRE. SEWPaC indicate an opportunity for scientists to provide evidence about the size/scale of scientific reference areas required within MPAs and the network.
- Petroleum industry recognises the need for environmental data. Data from industry can inform conservation management.
- Environmental data in Marine Bioregional Plans will guide decision-making and be presented as an on-line resource that can be updated as new information becomes available.

Session 3: Short talk Series

a) Marine ecosystem health monitoring: Keith Hayes

- Uses qualitative methods to identify ecosystem health indicators for key ecological features (KEFs) within the marine environment. KEFs were identified by SEWPaC, and the values of KEFs verified by workshops with scientists.
- Identification of indicators depends upon being able to identify ecological values/objectives.
- The basic framework for indicator development included identifying drivers, values and pressures, mapping the spatial relationship between them, constructing conceptual model of value-pressure interaction, predicting KEF response, identifying indicators, measuring indicators and pressures and comparing predictions with observations, assessment and reporting. Note inclusion of feedback loop that allows testing and adjustment of conceptual model.
- Mapping and pressure scenarios can identify locations for monitoring and contributes to SOE reporting. Techniques can be modified to test efficacy of management approaches.
- Future opportunities in NERP to test veracity of models through empirical testing.

Issues/Questions

- Need to consider transferability of indicators on KEFs for CMRE. Possible to use existing approach to develop indicators for CMRE.
- The process of verifying ecological values, processes and threats associated with key ecological features was useful in helping SEWPaC identify where SEWPaC was unclear of clear objectives for KEFs.

b) Technical opportunities for cost-effective monitoring of MPAs: Neville Barrett

- A long history of monitoring in MPAs has led to the development of a range of approaches to increase the capacity for cost-effective monitoring of MPAs over a range of spatial scales.
- Approaches include: Underwater visual census (SCUBA) and establishment of volunteer diver network; multi-beam surveys; towed or baited videos; and an autonomous underwater vehicle. Survey data has been used in combination with physical surrogates such as wave exposure, temperature etc to predict patterns of biodiversity.
- These approaches can be used independently or in combination at different scales and depths to provide cost-effective information necessary to inform conservation management.

Issues/Questions

- Opportunities to apply these approaches to the expanded network of reserves within the CMRE.

c) A spatial context for marine reserve monitoring: Brendan Brooke

- Management of any natural resource requires reliable spatial environmental data at useful scales.
- Multi-beam acoustics have the capacity to provide continuous spatial data for mapping marine biodiversity or assessing resource condition. It can provide fine-scale (m' s) and large-scale coverage (100's km).
- Multi-beam surveys and the enhanced capabilities of the new marine national facility (MNF) vessel provide SEWPaC with a means to establishing a national monitoring program of MPAs as a key function of the MNF.
- There are also opportunities to exploit existing data sources and up-coming programs through other agencies, industry (petroleum and fisheries), navy, IMOS. There is capacity for NERP to follow on from CERF MB Hub National Marine Data project & Transition project (data gap analysis).

Issues/Questions

- OPSAG is the Oceans Policy Science Advisory Group and promotes co-ordination and information sharing between Australian Government marine science agencies and the broader Australian marine science community. They are the body through which SEWPaC can influence use of MNF.

d) Estimating costs of MPA management: addressing issues of scale. Natalie Ban

- This project outlined the predictors of MPAs management costs using a global model and using Australian Commonwealth MPAs.
- Predictors of management cost in the Global model were MPA area, distance from inhabited land and purchasing power with parity. These were not good predictors for Australian MPAs.
- Predictors of management costs in Australian MPAs were: area - management cost per unit area decreases with size up to a point; years since gazettal - management cost decreases as more time since gazettal passes; percentage no-take - management cost increases slightly as proportion of no-take increases, 100% no-take cheapest to manage; number of zones - management cost increases with number of zones.

Issues/Questions

- There is scope to refine the cost of management models to address other management scenarios. Also need to understand the detail of compliance and enforcement costs to consider where savings could be made.
- Interest expressed in understanding industry response to conclusion of 100% no take cheapest to manage.

Session 4: Managing the management effectiveness of multi-use MPAs. Jon Day

- The Great Barrier Reef is not a typical MPA in terms of its size or its complexity but the experience gained in the GBR over past 35 years is useful for ecosystem-based management and MPA management at large-scales elsewhere.
- GBRMPA is a multiple use park with a diversity of stakeholder interests. Other Federal and State agencies assist with co-management. The costs of co-



management are often 'unseen costs'. Activities in MPAs can generate a lot of revenue e.g. tourism in GBR.

- The GBR is under pressure from climate change, downstream effects of land use impacting water quality, coastal developments, some remaining impacts of fishing, shipping, and pollutants etc.
- Essential requirements for effective marine conservation include: regulation of land-based and maritime sources of pollution; direct regulation of marine resource use (especially fishing); establishment/management of effective network of MPAs; and integrated coastal zone/ocean management.
- Integrated coastal zone/ocean management includes intergovernmental, interagency, land-water interface, intersectoral, interdisciplinary and inter-generational considerations.
- Advantages of multiple use approach are that it is effective ecologically, practically and socially. Zoning of activities is effective but is just one of a suite of tools in conservation management. Also use legislation, permits, education, surveillance and enforcement and other spatial management tools.
- GBRMPA was established in 1975 and took 30 years to reach the current no-take area of 33%. Setting clear longer-term conservation objectives and allowing time to plan and engage stakeholders offers a realistic and achievable approach to conservation management.
- This forward planning also allows management to respond to the changing environmental, social, political and technological climate. We need management systems that can help us respond to these changes.
- The Outlook Report is a legal requirement but is an important reporting tool that facilitates adaptive management. It has 3 value-based assessments, 4 risk-based assessments and an outlook assessment. It is led by GBRMPA and has contributions from a range of other agencies and 4 external reviewers. On-line access to evidence base supporting the development of the Outlook Report.
- Main reasons for effective management of GBR are: political and stakeholder support, good governance and legislative framework, ecosystem-level and integrated management, zoning plan providing sound management framework, integrated with other spatial and temporal management tools, effective research and monitoring tailored to provide information for management.
- The success of GBR rezoning was dependent upon using best available scientific knowledge, high level of public participation, effective leadership (both within agency & political), consequent socio-political support.
- Lessons for effective management are: management of users, rarely the environment; set clear objectives; 'one size does not fit all'; it's not about percentages but about an integrated CAR approach to management; effective monitoring; ecosystem-based management; set up and ongoing costs need to be considered.

Issues/Questions

- 10+ year plus timeframe to reach current level of protection as that currently experienced by the GBRMPA is reasonable for proposed MPAs in the CMRE.
- Costs cannot easily be partitioned into reef and non-reef areas.

Session 5: Defining management objectives: lessons from fisheries. Tony Smith

- The Common Assessment and Reporting Framework (CARF) is a synthesis of the monitoring, evaluation and reporting (MER) frameworks used in environmental management across fisheries, conservation, and marine bioregional planning for commonwealth, regional, state and territory frameworks. It's principles are consistent with ecologically sustainable development, ecosystem based management, ecosystem based fishery management, and ecosystem services approaches. CARF is endorsed by MACC.
- CARF shows that agreement upon objectives is at beginning of adaptive management cycle (see slides).
- Science has been integral in informing fisheries management and has evolved over time. E.g. Science informed MSY, transformed from a target to a limit. More information was needed to better define biomass limits to prevent overfishing and stock collapse.
- Operational objectives require defined indicators, associated reference points and performance measures. Examples of successful use of science to determine objectives through Commonwealth harvest strategy, and ecological risk assessments. Must be able to identify tradeoffs against multiple objectives.
- Difficult process with lots of considerations including: Link to legislation and policy; multiple and (often) conflicting objectives; integrating across space; integrating across ecological components.
- Need scientific input (but objectives not science-determined).
- Need to match operational objectives to likely data availability and (cost effective) monitoring strategies

Issues/Questions

- Long-term engagement with stakeholders and fisheries managers provided the opportunity for science contribution to fisheries policy.
- Science can reveal the uncertainty associated with the indicator.

Session 6: Working groups

What lines of evidence do you think are needed to demonstrate that reserves are effectively managed?

- Measures of short and long-term goals (reducing impacts: short-term, resource condition: long-term);
- Indicators at ecosystem scale (iconic to network);
- Clear measurable, achievable objectives;
- Identification and capacity to respond to future challenges including climate change;
- Set clear objectives for comprehensive, adequate and representative network (as distinct from iconic MPAs) and define how to measure them;
- Stakeholder participation and support;
- Prioritised use of resources for management;

Session 7: Open discussion

- Need to understand what the national context is for individual MPAs.
- Need scientific reference sites (IUCN category 1A) to evaluate magnitude of threats on marine environment and the effects of management.
- Science to inform management over 10-year time-scale to provide evidence for adaptive management including potential re-zoning/change of boundaries if required.
- Science to inform management over annual cycles to evaluate effectiveness of management measures.
- Science can help clarify what management levers can be adjusted over different time-scales to provide effective management.
- Need to use data to inform management. At present only management failures are well recorded.
- Need to understand transferability of management options to achieve short and long-term goals.
- Need to establish baseline data for CMRE.
- Need to understand how spatial scale informs objectives.
- In absence of explicit goals as per iconic reserves, there is a need to measure management effectiveness against activities allowed under management plans.
- Management measure tied to tangible improvement in ecosystem health rather than simply improved understanding-this depends on context of MPAs and potential threats/use.
- Recognise where level of information is not adequate to apply more interventionist management approaches.