

Towards a value based approach to cumulative risk and impact analysis

Why do we care about cumulative impacts?

Understanding the pressures and impacts on Australia's marine environment is critical to effective biodiversity conservation and sustainable resource use. The marine environment in Australia is influenced by a wide range of different pressures that impact on different parts of the marine ecosystem in different ways. Managers, regulators and proponents are grappling to provide practical approaches that can effectively assess the cumulative risks and impacts to ecosystems. Such approaches must be able to respond to a diversity of uses and provide:

- 1) an understanding of the state and trends of shared values of the marine environment,
- 2) an understanding of the state and trends of the pressures and uses acting on values and
- 3) options for assessing cumulative risks to environmental values that can accommodate a range of spatial and data contexts.
- 4) Practical and repeatable guidance for how to conduct an assessment of cumulative risk and impact

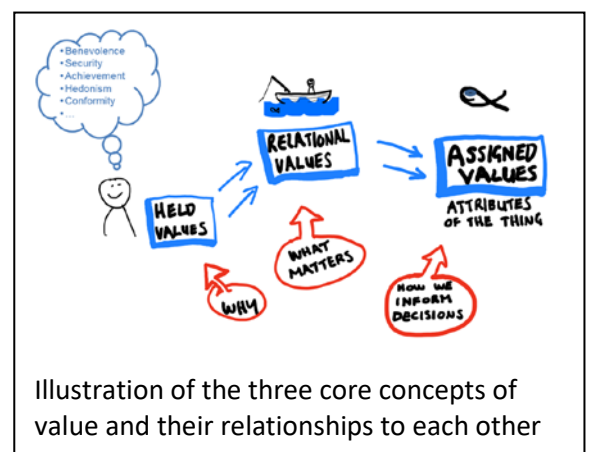
The NESP Marine Biodiversity Hub has been progressing research to establish understanding in first three of requirements to support Australia's marine managers, regulators and proponents by providing. This document provides a snapshot of our progress to delivering on these requirements.

1. Understanding the values of the marine environment (Project C1)

Understanding the range of values that are held and ascribed to the marine environment is key to supporting sustainable management across environmental, social and economic dimensions. This builds on a wide range of literature on values in environmental management and experiences in addressing the importance and role of values (individuals, communities and industry) in marine environments. The report focuses on presenting a conceptual and analytical framework designed to help stakeholders understand 1) the concept of held and ascribed values; 2) the dependence of values on the magnitudes of environmental change and the decision-making context of stakeholders; 3) the roles that values do, can or should play in environmental research, management and governance.

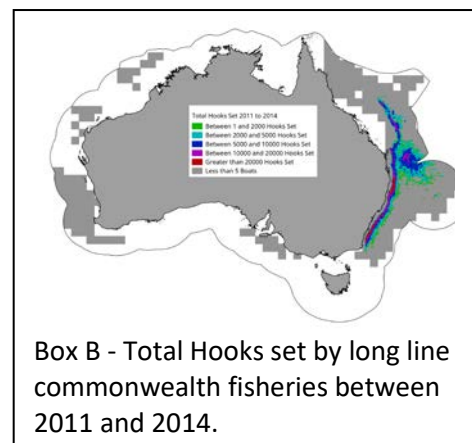
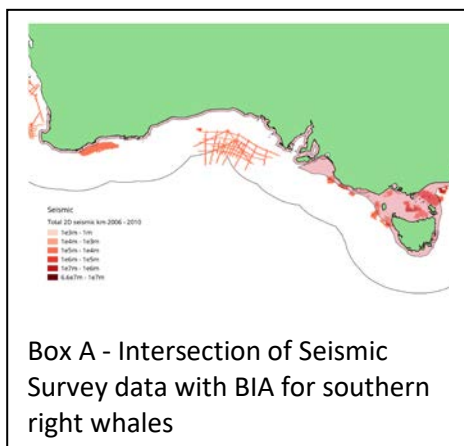
This allows different stakeholder groups (eg scientific, industry, community, government) to communicate using a shared understanding of what a value is and how different values relate to each other.

Report will be published on Hub Website by 30 November 2017.



2. Understanding the state and trends of the pressures acting on values in Australia's EEZ (Project C1)

To understand the distribution and intensity of pressures on the marine environment it is necessary to have access to standardised information that is presented in a consistent way that can be accessed by managers, regulators and proponents. This component of our research has collated pressure data at a national scale for 7 different activities with a total of 44 different summaries in Australia's marine environment. Summaries of the pressure are available through a range of websites, including the [Marine Biodiversity Hub](#), AODN Portal, eAtlas, and SeaMap Australia and data.gov.au. This data has also been made available the Australian Government Department of the Environment and Energy (DOEE) for integration into their information systems. The pressures are summarised at 0.1 degrees for the Australian EEZ, over either a 1 year or 5 year time period. The data is presented for the primary industries operating in the Commonwealth Marine Area (see examples below in boxes A and B), and presents summaries for many pressures occurring in within State waters.



Informing the 2016 State of the Environment Report

Our research informed pressure assessments completed for the 2016 [State of the Environment](#) report, including assessment of pressures attributed to commercial fisheries, shipping and transport, oil and gas production, marine debris and seismic surveys. The time series data on pressures was used to understand how pressure have changed from the 2011 report and trends over longer time periods.

Informing planning and management for the EEZ

The utilisation of the Australia's marine environment has changed markedly over the previous 30 years. Historically, the utilisation of the Australian EEZ was primarily through fisheries. However, the implementation of fisheries harvest management strategies and increasing investment in oil and gas production, with its associated industries, has changed the utilisation to primarily industrial production of oil and gas. The distribution of pressures between Commonwealth Marine Regions is uneven, with different marine regions showing significant increases in some pressure and decreases in others. The Matter of National Environmental Significance (MNES), and other important places like marine parks, in each region will be affected in different ways, depending on their vulnerability to pressures. This highlights the need to move from understanding the intensity and distribution of pressure to understanding the distribution and intensity of impact on MNES and the cumulative impact and relative contribution to this for different human activities and climate variability.

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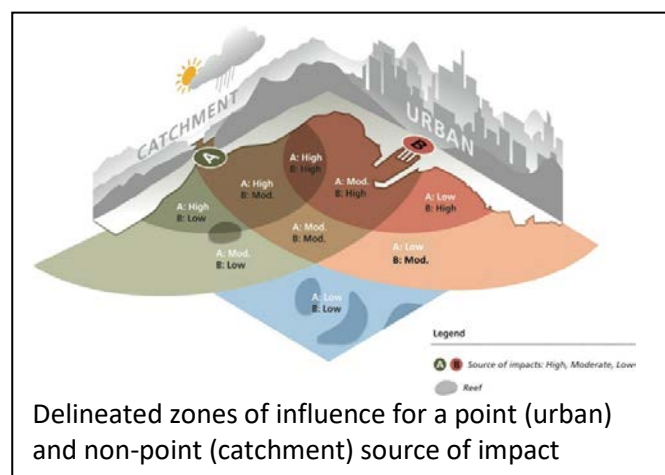
Informing other Marine Hub research projects

Our research was set up to act as a data feed project to provide pressure data and expertise to number of projects, these include:

1. Providing data and expertise on a broad range of pressures to inform project A12 - Northern seascapes scoping phase.
2. Providing data and expertise on a broad range of pressures to inform Project D1 – National collation, synthesis and visualisation of data.
3. Provided data on shipping and recreational boat use to project C5: Quantification of risk from shipping to large marine fauna.

3. Options for assessing cumulative risks to environmental values (Project C1)

Understand the existing impacts and the risks of new impacts on Matters of National Environmental Significance (MNES) and Commonwealth Marine Reserves (CMRs) remains a significant challenge for all stakeholders who have an interest in the Marine Environment. Australia's Significant Impact Guidelines for Matters of National Environmental Significance essentially require assessment of an action's total or cumulative impact, which accounts for all direct and indirect effects (including pre-existing effects) that may occur in space (*i.e.*, both on- and off-site) and time. In estimating the risk of a potential impact to a value from a given pressures or activity, one is quickly confronted with a series of decisions regarding scope, context and appropriate means of analysis. A central issue in making these decisions is how to understand and approach the complexity of the ecological, economic and socio-cultural systems in which the value is embedded and how it can be threatened by a pressure or activity. Our research provides insights to options for how cumulative impact (defined as the change in a value) and risk (defined as the probability of that impact occurring) might be estimated to assist proponents and regulators to understand how these risk and impacts might be avoided.



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4. Practical guidance for assessing cumulative risk and impacts (proposed research - project E1)

The project will build on the previous research to develop guidance to improve the analysis of cumulative impacts and risks to the environmental, social and economic values of the GBR. The project will use existing information to develop guidance for use by GBRMPA, the Queensland Government and proponents of future development proposals. The project will build on the work undertaken in the GBR Strategic Assessment and support works undertaken under the Reef 2050 plan. The guidance will provide a practical science-based approach to assessment of cumulative risks to the Reef. Research will focus on providing a general and repeatable approach to be applied at the whole-of-reef scale (to meet the assessment and reporting requirements of the GBRMPA) and also at the development-site-scale (to meet the environmental assessment requirements of the GBRMPA and future proponents). The guidance will be developed in close collaboration with the GBRMPA and DoEE to ensure it is practical and compatible with relevant regulation and policy. The project will include a case study focused on attributing impacts of pressures and their cumulative impacts on shallow-water coral reefs of eastern Australia (including cumulative impacts for the whole-of-GBR). Research is primarily designed to meet the specific needs of GBRMPA and future proponents. NSW DPI, QLD Government and Parks Australia, will also benefit from the case study and insights to assessment of cumulative impacts.



The NESP Marine Biodiversity Hub is funded by the Australian Government's National Environmental Science Programme. Our goal is to assist decision-makers to understand, manage and conserve Australia's environment by funding world-class biodiversity science.

November 2017

Further information:

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