

National Environmental Science Program Marine and Coastal Hub Research Plan version 2021



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Introduction

The National Environmental Science Program

The National Environmental Science Program (NESP) is a long-term commitment by the Australian Government to environment and climate research. The first phase of the NESP invested over **\$145 million** (2014-15 to 2020-21) into 6 research hubs and emerging priority research projects. The second phase will invest **\$149 million** (2020-21 to 2026-27) into 4 new research hubs.

The program:

- provides evidence for the design, delivery and on-ground outcomes for environmental programs
- helps decision-makers, including from Indigenous communities, build resilience
- supports positive environmental, social and economic outcomes.

More information on the NESP is available at http://www.environment.gov.au/science/nesp.

Hub role

The NESP will assist decision-makers to understand, manage and conserve Australia's environment by funding world-class biodiversity and climate science. The NESP Marine and Coastal (MaC) Hub will research applied issues related to Australia's marine and coastal zone. In close collaboration with the Department and stakeholders the MaC Hub will focus on research that supports decision-makers in addressing environmental protection needs, whilst supporting planning for future needs of the nation and addressing the overwhelming impact of the key pressures.

Each of the four Hubs in the NESP have a cross-Hub Initiative where they lead research and engagement activity across all four Hubs. For the MaC Hub, the cross-Hub Initiative is Protected Places. The MaC Hub will coordinate cross-Hub activity in this space, working with researchers form the other three Hubs.

Purpose of Research Plan

This Research Plan was developed by the Marine and Coastal Hub, in consultation with the Department of Agriculture, Water and the Environment and other key stakeholders.

The purpose of the Research Plan is to outline:

- the research priorities the hub is funded to investigate, including those related to the cross-cutting Initiative the hub is funded to lead on
- the research projects that will address these priorities
- how the research projects will be co-designed and delivered to research end-users
- how the outputs of the research will be communicated and brokered to key stakeholders
- how the impact of the research will be measured
- how hubs will work collaboratively within and across hubs.



This Research Plan also provides appropriate detail on the management and governance of the hub, including outlining the broader funding profile, key staff and research organisations, and the risks needing to be monitored to ensure success.

Research

Research priorities

The Marine and Coastal Hub is committed to a body of activity that includes short and long -term research projects. Each activity year the department will work with the minister, the hubs and other key stakeholders to identify and refine research priorities and develop projects that align with these priorities.

This research prioritisation is a rolling process and key milestones in each activity year, like the Annual Progress Report and submission of the next Research Plan, will inform the process.

The ongoing consideration and evaluation of research outputs and impact builds confidence in the performance of the Hub and the effectiveness of the program. It also provides the basis for the flexibility needed in the Marine and Coastal Hub to engage in new themes of research in an adaptive manner, and ensures that the Hubs' focus is fixed on the delivery of relevant and practical research.



Broadly, the research priorities of the Marine and Coastal Hub are:

• Applied research to support management of Australia's marine and coastal environments including estuaries, coast, reefs, shelf and deep-water:

- Threat abatement and recovery actions for estuaries, coasts, reefs, shelf and deep-water
- Ecosystem recovery after extreme events such as cyclones, storm surge and marine heatwaves
- Support delivery of the Reef 2050 Long-Term Sustainability Plan and Australian Marine Park Management Plans
- Support management of Ramsar sites to maintain their ecological character
- Traditional ecological and cultural knowledge built into resource management

- Indigenous communities able to apply shared knowledge in the management of their lands
- Social and economic information on processes that influence conservation
- Targeted biodiversity and taxonomy products to support efficient system monitoring:
 - Support environmental offsets policies, management approaches, tools and outcomes
 - Improved monitoring for biodiversity and marine and coastal ecosystem function
 - Protect listed migratory species and reduce impact of human interactions with marine systems
 - Support environmental impact assessments, strategic regional planning assessments and cumulative analysis of impacts
- Environmental monitoring systems and decision support tools:
 - Cost-effective marine and coastal monitoring systems, methods and technologies
 - Map the extent and assess the condition of Australia's wetlands
 - Quantification of the economic, social and cultural value of ecosystem functions
 - Improved end-user engagement in co-design and co-delivery of practical science that supports on-ground/sea management

Initiative Research:

The Marine and Coastal Hub will ensure the delivery of Protected place management Initiative via a focus on:

- Supporting the management of natural, cultural and Indigenous values in protected places, including Australian Marine Parks, Ramsar sites and World Heritage Areas;
- Identifying key drivers of resilient populations and ecosystems across protected areas; and
- Supporting the improvement of governance mechanisms for protected places.

Research projects

The Research Plan 2021 has supported three types of projects which will all feed into the future planning and prioritisation of Marine and Coastal Hub funding rounds via the annual Research Plan. The different studies and project focus outcomes will be:

Scoping study:

- Co-design and co-development workshops in identified themes with research endusers engagement.
- Prioritisation of future research questions and areas
- Delivery of these priority research questions and areas for annual Research Plan alignment.

Bridging studies:

- Deliver outputs and outcomes that support continuity for critical work that was initiated under the first phase of NESP and will continue into the new hub
- Delivery of priority research questions and areas for annual Research Plan alignment.

Small projects:

- Align under current themes and identified priority areas
- Will provide smaller scale but highly significant research into priority threatened and migratory species, and threatened ecosystems or ecosystem restoration and protection.
- Will feed up to further inform scoping study findings and has allowed for a transparent and open research call.

A list of research projects to be funded under the Marine and Coastal Hub are presented in the table below. For more detail on each specific project, please refer to the MaC Hub website. Studies and projects have been placed within large thematic areas to better explain how they will contribute to the overall research program and outcomes.

Theme: Protected Places
Scoping projects
1.1 Scoping study: Protected Places Initiative
 1.2 Scoping study: National Areas of Interest for Seabed Mapping, Characterisation and Biodiversity Assessment
Small scale and Bridging projects
 1.3 Support for Parks Australia's Monitoring, Evaluation, Reporting and Improvement System for Australian Marine Parks
 1.4 Characterising values and identifying indicators and metrics of fish and benthic assemblages within the Capes region of the South-west Corner Marine Park
Theme: Ecosystem restoration and protection
Scoping projects
 1.5 Scoping Study: Identify knowledge gaps and solutions for extent mapping of Australian marine and coastal wetlands
Small scale projects
1.6 A roadmap for coordinated landscape-scale coastal and marine ecosystem restoration

- 1.7 Towards a consolidated and open-science framework for restoration monitoring
- 1.8 A national framework for improving seagrass restoration
- 1.9 Quantifying the ecosystem services of the Great Southern Reef
- 1.10 A national inventory of implemented nature-based solutions to mitigate coastal hazards
- 1.11 OzSET: Integration and publication of the Australian Surface Elevation Table dataset
- 1.12 Mapping critical seagrass habitat in Yanyuwa Sea Country
- 1.13 Synthesizing three decades of seagrass spatial data from Torres Strait and Gulf of Carpentaria
- 1.14 The role of dugong and turtle grazing in Torres Strait seagrass declines
- 1.15 Coastal wetland restoration for Blue Carbon in northern Australia

Theme: People and sustainable use

Scoping projects

- 1.16 Scoping Study: Research needs for assessment and monitoring of nutrients, chemicals and antimicrobials in the marine environment
- 1.17 Scoping Study: Research needs for a national approach to socio-economic values of the marine environment
- 1.19 Scoping Study: Horizon scan of key science questions in the decommissioning of offshore oil and gas infrastructure

Small scale projects

• 1.18 Microplastics in South Eastern Australian coastal waters: synthesising current data and identifying key knowledge gaps for the management of plastic pollution

Theme: Threatened and migratory species and ecological communities

Scoping projects

 1.20 Scoping Study: Marine and Coastal Threatened and Migratory Species and Communities

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Small scale	and Bridging	projects

- 1.21 Australia's Coastal Shorebirds: Trends and Prospects
- 1.22 A photo-identification study of southern right whales to update aggregation area classification in the southwest of Australia
- 1.23 Conservation of spotted handfish
- 1.24 A pilot study into the movement and dispersal of sawfishes
- 1.25 Sawfish bycatch mitigation workshop for northern Australian fisheries
- 1.26 Relative abundance of the 'western' population of southern right whales from an aerial survey off southern Australia
- 1.28 Future-proofing restoration & thermal physiology of kelp
- 1.33 Application of eDNA to survey Bathurst Harbour Tasmania for the endangered Maugean Skate

Theme: Knowledge systems

Scoping project

• 1.29 Scoping Study: New Approaches to Marine Monitoring

Small scale project

 1.30 National Assessment of Climate-Driven Species Redistribution using Citizen Science Data

Theme: Informing policy and decision making

Scoping projects

- 1.31 Scoping Study: Indigenous Participation and Research Needs
- 1.32 Scoping Study: Supporting Regional Planning in Northern Australia

The broader relationship and linkages across scoping and small-scale and bridging projects within themes are presented in the program schema below. This identifies that scoping projects provides the overall framework for discussing knowledge gaps and prioritising future research questions with both research partners and end-users. The project leaders of the related small-scale and bridging projects will contribute to the scoping project workshops and discussions to ensure there is clear knowledge transfer of emerging results.

There are also some clear linkages across related small-scale projects, often due to a focus on the same natural assets (e.g. seagrass, SR whales), or issues (e.g. restoration). Their inclusion reflects their complementary aspects (e.g. restoration decision tools, restoration on-ground methods and restoration monitoring) that are all key components of achieving the best restoration outcomes.



Expected outcomes and outputs

The expected outcomes of the NESP are to produce research that:

- enhances our understanding of Australia's environment, climate and weather
- is communicated clearly to relevant stakeholders and the public
- is discoverable and accessible
- informs decision-making and addresses environmental priorities.

Research under the NESP is expected to inform the policy and program delivery of the Department of Agriculture, Water and the Environment. More broadly, it will engage and inform key stakeholders with an interest in the outputs of environmental and climate science research, including state and local governments, business and industry, community groups, Indigenous land managers, Indigenous Communities, and education institutions.

Hub outcomes and outputs

The Marine and Coastal Hub will work across all marine and coastal habitats of mainland Australia and associated islands. The Hub will build on the experience of its partners to deliver a national marine research program, with an overall vision to ensure:

- Australia's coastal and marine assets are managed and conserved such that Australians derive maximum social, cultural and economic benefit; leading coastal communities and industries to view effective marine and coastal management, and the relationship with their catchments, as a positive pathway to sustained economic growth and recovery.
- The environmental information/solutions requested by the Australian Government and the community are delivered by a responsive, flexible and highly skilled national coastal and marine research capability that is transdisciplinary, solution-focused, respectful of tradition and local knowledge and capable of equipping the nation to better respond to challenge and change.

Delivering the Outcomes

- The Marine and Coastal Hub will be fundamentally driven by stakeholder needs across the national coastal and marine estate
- Extensive multi-level consultation with stakeholders (governments, industry, communities and Indigenous) will be used to assist the Department in the defining the Hub's project portfolio
- Research programs will be co-designed with research users to maximise research impact
- The Hub will draw on the leadership team's experience in stakeholder engagement, including in highly contested environments and poorly resourced remote and regional communities
- Cross-hub collaboration and multi-disciplinary expertise will build capacity and connections across Australia's marine researchers and research users
- Outcomes will be delivered through a number of specific program themes that align with the broad for marine and coastal management needs of the Australian Government.

The Hub research themes collectively and collaboratively deliver applied scientific knowledge, decision support and practical management options to support the Australian Government's priorities. The NESP MaC Hub will provide innovative research for practical solutions to

maintain and improve our understanding and management of marine waters under six research themes as outlined in the Hub Vision Statement:

- Informing Policy and Decision-Making
- Protecting Places
- Threatened and Migratory Species and Ecological Communities
- People and Sustainable Use
- Ecosystem Restoration and Protection
- Knowledge Systems



Marine and Coastal Hub goals for RP2021

During the establishment phase of the Marine and Coastal Hub, which will span 2021/2022, the main goals are:

- To build awareness of the Marine and Coastal Hub, its goals, outputs and outcomes within the researcher and research user communities through communication and media specialist and knowledge broker
- To work with DAWE to increase the awareness of NESP research and impact at a local, regional and national scale
- To re-establish and build partnerships and relationships with previous and new networks as the co-design and co-delivery elements of scoping and bridging projects are undertaken with the assistance of the knowledge broker and indigenous facilitator
- To deliver priority research areas and questions to be addressed in future Research Plans through engagement, consultation and co-design with research users and indigenous landholders
- To make all outputs and products publicly available and accessible

Collaboration and partnerships

The NESP encourages a collaborative, multi-disciplinary approach to environmental and climate research. Key to the success of the hub will be the capacity to foster partnerships across hubs and with a wide range of decision makers across the Australian community, including Indigenous communities, to achieve positive environmental, social and economic outcomes.

Multi-disciplinary and multi-institutional teams from the following research institutions will contribute to the Hub as research partners: James Cook University, University of Tasmania, Reef and Rainforest Research Centre, CSIRO, Australian Institute of Marine Science; Integrated Marine Observing System, Deakin University, University of Wollongong, University of NSW, University of Technology Sydney, University of Sydney, Sydney Institute of Marine Science, Museums Victoria, University of Melbourne, Bureau of Meteorology, NSW Department of Primary Industries, NSW Department of Planning, Industry and Environment, Geoscience Australia, Macquarie University, University of Queensland, Griffith University, Central Queensland University, Charles Darwin University, Murdoch University, Edith Cowan University, University of Adelaide, Flinders University, SARDI, University of Western Australia and Bioplatforms Australia. Other research institutions may be included where their expertise is relevant to emerging priorities.

The Hub's partners represent the key national and regional research institutions in Australia, and have the capability and resources needed (people, time, access to major equipment) to deliver across the identified Hub priorities at both national and regional scales, and across all regions. Some of the key skills, capabilities and infrastructure that will be available to support projects including field technologies, laboratory and aquarium facilities, computer technologies and socio-economic tools.

The Hub's partners will continue to engage during the life of the program, initially through the contribution to the scoping projects and identified small-scale and bridging project collaborations, and in the longer term through regional partnerships facilitated through existing arrangements such as the Sydney Institute of Marine Science, Marine Innovations SA and the Indian Ocean Marine Research Centre. The Hub is also represented on the National Marine Science Committee which includes representation from many of the Hub's partners. The knowledge brokers, communication managers and data wranglers will also work across all partners to ensure ongoing engagement and consistency of approach for all aspects of Hub engagement and outputs.

In addition to Australia's research agencies, the Hub will undertake significant engagement and co-design with Traditional Owner groups across the country. The MaC Hub has developed an Indigenous Partnership Strategy. This document outlines in more detail our approach to Indigenous engagement and participation. It is expected that this strategy will require updating during the course of the Hub. This Research Plan includes several projects (1.12, 1.13, 1.14) that have been explicitly co-designed with Indigenous partners, and a Scoping Study (1.31) that will specifically engage with Indigenous groups across the country to develop high priority research directions for funding under future Research Plans. Wherever possible, this engagement will be undertaken collaboratively with other NESP Hubs, especially the Resilient Landscapes Hub. This is important to avoid engagement fatigue and to gain the benefit of cross-Hub fertilisation of ideas.

We will make use of the NESP Indigenous Facilitation Network (IFN) for this engagement but given the national scale of engagement required, we will also have to utilise a wide network of Indigenous leaders throughout the country. Through the Hub Leadership, the IFN and other networks, we already possess many, though certainly not all of the required contacts. During the Marine and Coastal Hub bid, there was formal support of >40 Indigenous organisation around the country. We will activate and utilise this extended network as part of our Indigenous engagement and help other Hubs with Indigenous engagement where required.

The key objectives of our Hub Indigenous engagement and participation are:

- 1. To conduct research that is co-created, co-designed and co-delivered
- 2. To conduct research according to the highest ethical standards
- 3. To provide opportunities for employment, skills transfer, sharing of knowledge and the increase of cultural awareness amongst all parties
- 4. To recognise and protect Indigenous cultural and intellectual property
- 5. To ensure repatriation of Hub research knowledge to Indigenous peoples, communities and organisations
- 6. To provide for effective Indigenous participation in Hub governance.

In relation to cross-Hub coordination, the Marine and Coastal Hub has responsibility for the Protect Place Initiative, and Initiative leads will progress this component of the program, initially through the related scoping project (project 1.1). Both the Initiative leaders and Hub leaders will contribute to the Cross-Hub Senior Governance Committee which aims to provide oversight of activities at the program level and across Hubs, and to agree on Initiative deliverables and cross-hub collaborative opportunities. In addition, informal mechanisms will be established to ensure regular cross-hub engagement in order to deliver knowledge exchange and collaborative research outcomes.

The Hub will adopt a co-design and co-delivery approach to research collaboration and partnerships that includes the following features: 1) developing a shared understanding about research-user needs and priorities; 2) engaging research-users engaged in the design and implementation of research projects; and 3) delivering fit for purpose research outputs. Central to the overall approach is the development and maintenance of networks and trusted relationships with researchers and research end-users, including Indigenous communities and organisations.

The Hub will develop shared understanding about research needs and priorities to inform the development of annual research plans. Regional Reference Groups and the Indigenous Facilitators Network provide important mechanisms for understanding regional information needs and priorities. Understanding of national and regional research needs will be updated annually to ensure understanding is current and responsive. The project leaders and knowledge brokers will work closely to ensure the Hub implements effective participatory approaches to engage research-users in project design and implementation. The Hub will work with research users and project leaders to identify project contacts. The project leaders will be the default Hub project contact. Project leaders will identify contacts for relevant research-users and stakeholders.

The Hub's project leaders, knowledge brokers, Indigenous facilitators and data wranglers will work closely with research-users to develop fit-for-purpose products. In some cases, research-users will need detailed or specific information (e.g. species distribution maps or estimates of species populations), in other cases they will need plain-English summaries or high-level synthesis products designed to efficient knowledge transfer. Project leaders and knowledge brokers will also create opportunities for co-development and co-authoring of research outputs to maximise research impact.

The Hub's Knowledge Brokering Strategy provides more information on project co-design and co-delivery, including guiding principles for knowledge brokering, information on the role of the knowledge broker and the approach to monitoring and evaluating the Hub's approach to knowledge brokering. The Communication Strategy provides information on the Hub's approach to communicate our research approach, outcomes and impacts to research end-users and other stakeholders.

The Marine and Coastal Hub has produced a Data Management Strategy. This Strategy enables the Hub to take a systematic and standards-based approach to identifying, cataloguing, packaging, and presenting its research outputs to stakeholders and the public. The strategy is a living document that describes:

- 1. who will be responsible for data management related activities
- 2. data management practices used
- 3. who owns and can access and use the Hub's data and products
- 4. metadata standards used
- 5. products and data storage, security, privacy and unique identifiers
- 6. product legacy planning
- 7. facilities and equipment used or required.

The Strategy is supported by resources and infrastructure, such as:

- 1. Hub Data Wranglers, who have a role to work with the Hub researchers, the Department and other stakeholders, to translate data and information into relevant outputs that align with these guidelines.
- 2. allocation of resources to support data management, from the initial data capture through to ongoing delivery and curation.
- 3. information technology infrastructure: hardware, software and other facilities that underpin data-related activities.
- 4. support services: resources allocated to support implementation of metadata management so that data records can be used for both internal and external purposes.

The Hub will have Data Wrangler's. Their activities include working with the Hub, researchers, the Department and other stakeholders to translate data and information into relevant data products and tools and to help integrate research outputs into national information repositories, digital systems and decision support tools. This includes ensuring data management aligns with the FAIR data principles to maximise the use and reuse of public data. The Data Wrangler is responsible for coordinating and conducting data discussions with research projects, providing guidance to projects on best practice data management,

reviewing project data management plans, tracking data management milestones, and the review of final datasets.

In order to ensure its sustainability for the long term, the Hub will take advantage of, and contribute to, existing institutional and national data management infrastructure. This will function as a distributed data network to make Hub information publicly and freely accessible via automated workflows.

The <u>Australian Research Data Commons</u> (ARDC) provide a helpful overview of data management plans and the FAIR data principles. Many Australian Universities have <u>data</u> <u>management policies and tools</u> available for use by researchers to create a data management plan at the start of a research project. All data (via metadata records) will be aggregated to the <u>AODN</u>, <u>eAtlas</u> and <u>Research Data Australia</u> (RDA) national information repositories to maximise discoverability and access. Linked Hub- and Project-level metadata records will be created to facilitate organisation of Hub content and will follow ARDC's best-practice for linking publications and grants.

NESP adheres to the objectives of the <u>Global Indigenous Data Alliance</u> (GIDA) with respect to Indigenous data, especially in relation to access of data by non-Indigenous users. Although the *NESP data and information guidelines* follow the FAIR data principles, when working with Indigenous data these guidelines require the complementary use of GIDA's <u>CARE principles</u> for data governance, which consider both people and purpose as part of open data and information.

Knowledge held by Indigenous peoples will be recognised, valued, and protected throughout any partnerships struck with First Nations People throughout the operations of the Marine and Coastal Hub. This will be guided by the CARE principles for Indigenous data governance: Collective benefit, Authority to control, Responsibility, and Ethics.