National Environmental Science Program

Marine and Coastal Hub Research Plan 2023

Contents

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 program:

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

The first phase of NESP invested over **$145 million** (2014–15 to 2020–21) into six research hubs and emerging priority research projects. The second phase is investing **$149 million** (2020–21 to 2026–27) into four new research hubs. These hubs are:

- Resilient Landscapes Hub
- Marine and Coastal Hub
- Climate Systems Hub
- Sustainable Communities and Waste Hub

NESP is administered by the Department of Climate Change, Energy, the Environment and Water (the department). More information on NESP is available at dcceew.gov.au/science-research/nesp

Department role

The four NESP hubs have been formed to conduct applied research within their specific themes. 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 annual review and evaluation of research outputs and impact provides the flexibility needed for the hubs to engage in new themes of research in an adaptive manner, and ensures that the focus is on the delivery of relevant and practical research. Hubs are responsible for co-design of the research projects in consultation with research-users and in partnership with relevant Indigenous communities. Hubs are also responsible for monitoring and evaluating the research project outcomes during the life of the hub.

The research prioritisation is a rolling process and will be informed by key milestones in each activity year, such as the annual progress report and submission of the next research plan.

Hub role

The NESP will assist decision-makers to understand, manage and conserve Australia's environment by funding world-class biodiversity and environmental research. The NESP Marine and Coastal Hub will research applied issues related to Australia's marine and coastal zone. In close collaboration with the Department and stakeholders the Marine and Coastal 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.

The Hub will work annually with partners and research users to identify and prioritise research needs for Marine and Coastal systems in Australia. Each Annual Research Plan will fund a portfolio of projects which will reflect these needs and concerns for applied use by research users. Each Research Plan will include the consideration of cross cutting Hub research, where appropriate, as well as research that responds to the Protected Places Initiative.

The national Marine and Coastal Hub will deliver applied scientific products and advice to meet end-user requirements including:

* synthesis reports of current and emerging knowledge for senior decision makers
* applied science research, analysis, process studies and models to support policy makers, program managers and regulators
* integrated management decision tools inclusive of scalable state of the environment monitoring and evaluation systems
* long-term foundational science to support end-users understand and adapt to our climate.

The Hub will support the two-way communication of this research and research needs to research users via knowledge brokers and communication officers. The Hub will work with the Indigenous Facilitator to maximise the inclusion of Indigenous peoples and Traditional Owners in co-creation, co-design and co-delivery of research needs and the repatriation of this knowledge to communities. The Hub, via the Data Wrangler, will ensure the longevity of this data and information through the delivery of outputs in publicly available data portals.

Purpose of research plan

This research plan was developed by the Marine and Coastal Hub, in consultation with the department 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 crosscutting initiative the hub is funded to lead
* the research projects that will address these priorities.
* how the research projects will be co-designed and delivered to research-users
* how the outputs of the research will be communicated with key stakeholders
* how hubs will work collaboratively within and across hubs.

This research plan also provides summary information on the management and governance of the hub, including the broad funding profile, key staff and research organisations, and the risks that need to be monitored to ensure success.

Initiatives

In addition to its hub-level research projects, each hub is also responsible for delivering a cross-cutting initiative and contributing research to other initiatives where appropriate. The initiative includes cross-hub collaboration and may include multiple projects to deliver management options, data and information for the themes listed below. The four initiatives are:

Initiative	Lead hub
Protected place management	Marine and Coastal
Threatened and migratory species and threatened ecological communities	Resilient Landscapes
Waste impact management	Sustainable Communities and Waste
Climate adaptation	Climate Systems

Emerging priorities

Each year, specific emerging priorities may be identified by the department, hubs or third parties for delivery as research projects. If endorsed by the department, the hub will develop research project/s to address the emerging priority.

Hubs will be flexible and adaptable to respond to emerging priorities, with the ability to rapidly scale output, bring in external expertise or respond if additional resources are made available. Hubs are required to set aside 10% of NESP funding being spent per calendar year (in any category) so they can respond to emerging priorities; these funds can be rolled into the subsequent year if they are not used.

Emerging priority projects will be developed outside the hub's annual research proposal process. Once emerging priority projects have been approved, the hub's research plan and activity budget for the relevant calendar year will be amended, and emerging priorities will be included in the hub's annual progress reports.

Research

Research priorities

The Marine and Coastal Hub is committed to a body of activity that includes short- and long-term research projects, initiatives and emerging priorities.

Broadly, the research priorities of the Marine and Coastal Hub are categorised across six broad themes that reflect the research needs and pressure points of research users in relation to marine and coastal systems.
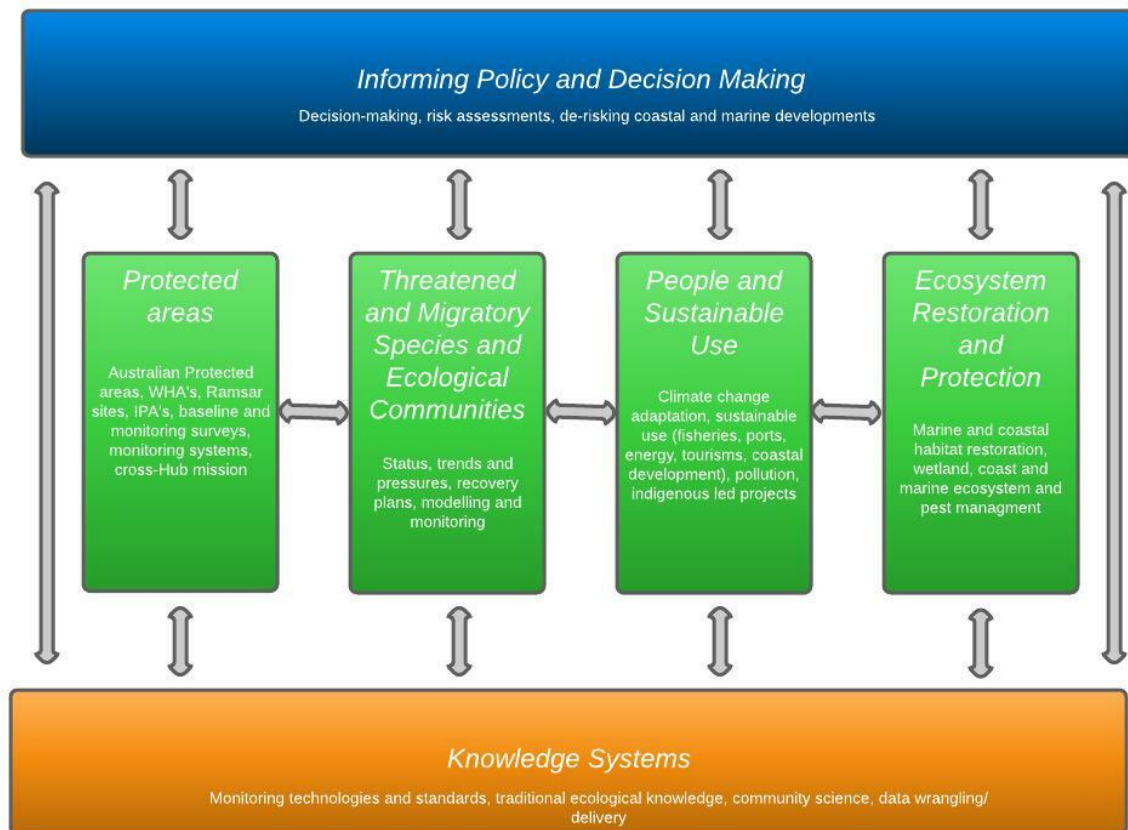
Broadly, the research priorities of the Marine and Coastal Hub are:

- 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

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.

Marine and Coastal Hub goals for RP2023

During the launch and execution phase of the Marine and Coastal Hub, which will span 2023/2025, the main goals are:

- To continue to build awareness of the Marine and Coastal Hub, its goals, outputs and outcomes within the researcher and research end-user communities through communication and media specialists and knowledge brokering
- To work with DCCEEW to increase the awareness of NESP research and impact at a local, regional and national scale
- To continue to build and establish partnerships and engagement with networks as the co-design and co-delivery elements of scoping and developing of annual research projects is undertaken with the assistance of the Knowledge Broker and the Indigenous Facilitator
- To deliver priority research areas and questions to be addressed in future Research Plans through engagement, consultation and co-design with research end-users and Indigenous landholders
- To make all outputs and products publicly available and accessible

Hub research projects

A list of research projects to be funded under the Marine and Coastal Hub Research Plan 2023 can be found at Attachment A – research projects list, and in the table below. For more details on each specific project, please refer to the hub website
www.nespmarinecoastal.edu.au

Project no.	Project partners	Project title
3.1	JCU	Building a northern Australian community of practice and sentinel case studies for supporting improved regional planning to achieve Ecologically Sustainable Development
3.2	NAILSMA	Developing a National Indigenous Environmental Research Network
3.3	AIMS, GA, UWA, Deakin Uni	Progress research on values and pressures, data standards and delivery to support sustainable development of offshore renewables and other emerging marine industries
3.4	GU, CDU, JCU	Better Management of Catchment Runoff to Marine Receiving Environments in northern Australia
3.5	CDU, JCU, ECU	Supporting regional planning in northern Australia: Building knowledge, skills and partnerships for understanding seagrass distribution
3.6	UTas, Deakin Uni, UQ	Improving knowledge on the distribution and value of temperate seagrass in the Furneaux Group of Islands, Tasmania
3.7	JCU, CSIRO, Uni Melbourne, UoA	Identifying and overcoming barriers to coastal and marine habitat restoration and Nature based Solutions in Australia
3.8	UQ	Carbon abatement and biodiversity enhancements through controlling disturbances in wetlands from feral ungulates
3.9	NAILSMA	Establishing an Indigenous led approach to coordinated vertebrate pest management in northern Australia.
3.10	JCU, WA DBCA	A partnership approach to filling key knowledge gaps on dugong in northern Australia using novel technologies
3.11	CSIRO, CDU	Multi-fishery collaboration to assess population abundances and post release survival of threatened sawfish captured in commercial fishing operations in northern Australia
3.12	UoA, AIMS	Closing the gap in bycatch reporting and population assessment of sea snakes in northern Australia
3.13	CSIRO, NSW DPI	Eastern Grey Nurse Shark population abundance and trend
3.14	NSW DPI	Assessing changes in black rockcod abundance and size
3.15	Murdoch University, ECU, CSIRO, Flinders Uni	Informing southern right whale management through continued monitoring, determination of aggregation areas and development of approaches to increase data flow efficiencies and utility
3.16	UTas, CSIRO	Delineation and estimation of Maugean skate populations in Macquarie Harbour, Tasmania
3.17	AIMS, UQ	Locating Unidentified Reef and Habitat Features in the northern Australian Seascape
3.18	UQ	Robust citizen science for reef habitat assessment in support of management
3.19	CDU	Addressing Kakadu's strategic marine research needs

Initiative projects

The Marine and Coastal Hub is leading the Protected Place Management initiative. Broadly, the research priorities of the initiative are:

- To improve support for Indigenous communities and organisations to determine, lead and disseminate Indigenous knowledge and science
- To increase the evidence base through consistent approaches to collect, analyse and report relevant data for adaptive management of protected places.
- To increase understanding of options for effective interventions and approaches to management

Initiative Outcomes	Relevant projects for Marine and Coastal Hub
To improve support for Indigenous communities and organisations to determine, lead and disseminate Indigenous knowledge and science	**RP 2021** Scoping study: Indigenous partnerships and research needs **RP 2023** Developing a National Indigenous Environmental Research Network
To increase the evidence base through consistent approaches to collect, analyse and report relevant data for adaptive management of protected places.	**RP 2021** Characterising values and identifying indicators and metrics of fish and benthic assemblages within the SW Corner Marine Park **RP 2022** Mapping continental shelf seabed habitats across southern Australia Advancing national standards and best practices to monitor key marine values and pressures Status and condition of values in Australian Marine Parks and development of information systems to evaluate management effectiveness **RP 2023** Eastern Grey Nurse Shark population abundance and trend Assessing changes in black rockcod abundance and size
To increase understanding of options for effective interventions and approaches to management	**RP 2021** Support for Parks Australia's Monitoring, Evaluation, Reporting and Improvement System for Australian Marine Parks **RP 2022** Evaluation of recreational fishing behaviour, use, values and motivations that relate to compliance **RP 2023** Progress research on values and pressures, data standards and delivery to support sustainable development of offshore renewables and other emerging marine industries Addressing Kakadu's strategic marine research needs

Research projects falling under the initiatives are also identified in Attachment A – research projects list. Some projects will be initiative-specific, and some hub research projects will contribute partly to an initiative; these are distinguished in Attachment A. For more detail on each specific project, please refer to the hub website www.nespmarinecoastal.edu.au.

Expected outcomes and outputs

The expected outcomes of NESP are to produce research that:

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

Research under NESP is expected to inform the department's policy and program delivery. More broadly, it will engage and inform key research users 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.

Protected places management initiative

The Initiative will set out to determine if Australia's protected places are able to deliver the desired outcomes for the long-term conservation of nature with associated ecosystem services, cultural values and sustainable use of these areas. It will work to identify the opportunities to improve outcomes and where pressures and threats to values can be avoided, mitigated or adapted to. The Initiative will engage across all 4 hubs to deliver this research and will work with all stakeholders of protected places through a co-design process to determine the research needed to deliver this goal.

Research projects and programs will be co-designed with the relevant stakeholders from across governments, industry, and community (including Traditional Owner groups). The primary places considered by the Initiative are Commonwealth National Parks, Australian Marine Parks, the Great Barrier Reef Marine Park, World Heritage and other listed Heritage areas, RAMSAR sites and Indigenous Protected Areas, but the Initiative will work across the entire marine and terrestrial Protected Areas networks as appropriate.

The Protected Places initiative will facilitate the research to enable three main outcomes:

1. Management of Australia's protected places is supported by building capacity of Indigenous communities and organisations to determine, lead and disseminate Indigenous knowledge and science to support protected place management.
2. Adaptive management of protected places is supported by building the evidence base including capacity for consistent, standards-based approaches to collecting, analysing, managing, and reporting social, economic, cultural, heritage and environmental data to identify the key drivers of resilient populations and ecosystems in protected places, particularly climate change and impacts from multiple drivers.
3. Governance of Australia's protected places is improved by identifying effective interventions and approaches to management and highlighting opportunities to develop complementary approaches between programs and across land sea/nexus.
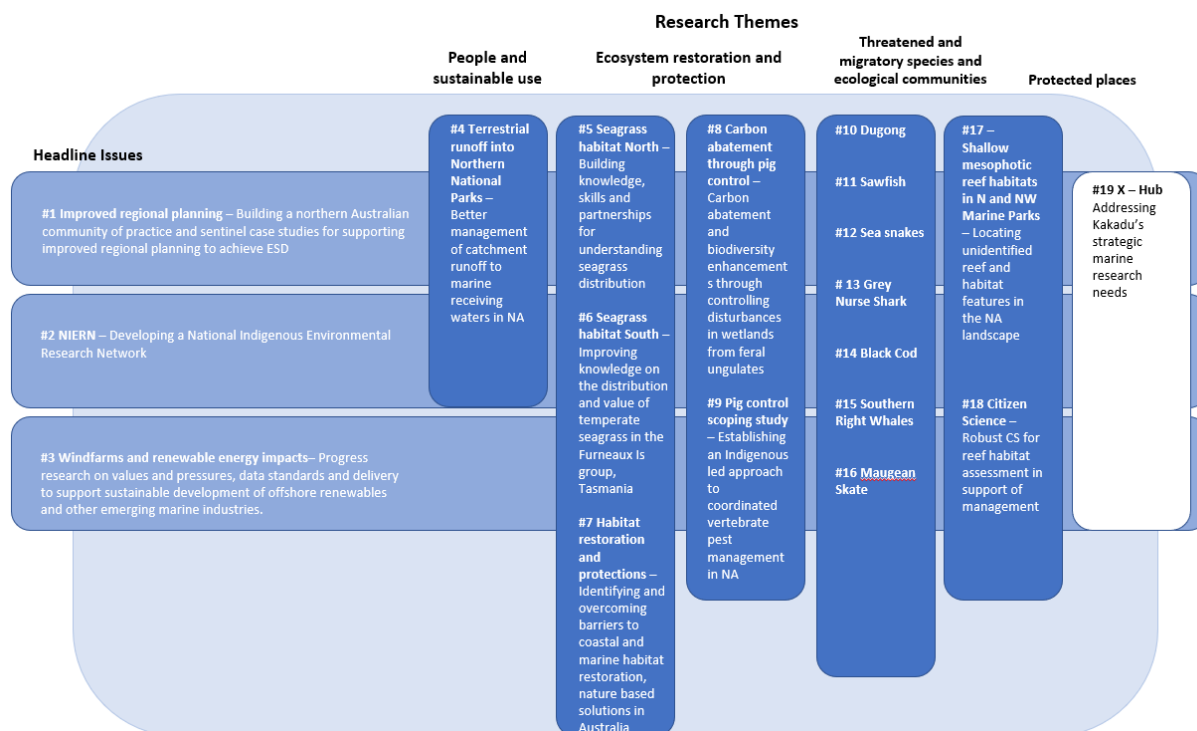
Delivering the outcomes

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 Marine and Coastal Hub Research Plan 2023 will provide innovative research for practical solutions to maintain and improve our understanding and management of marine waters under six defined research themes. Some key principles that will ensure effective delivery of outcomes include:

- 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 end-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 end-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 portfolio of projects in Research Plan 2023 reflects the high priority research needs identified through engagement between Hub research partners and research-users in RP2021 projects, particularly scoping projects, or other relevant research-user input. The projects are also those that could deliver a process or outcome to address the high priority needs within the timeframe and available budget, had capacity for co-design to address research-user needs, and more broadly addressed the defined NESP project assessment criteria.

To assist in understanding the proposed project portfolio in line with the MaC Hubs' strategic guidance, the projects have been grouped as follows:
- Headline issues – Projects 3.1 to 3.3
- People and Sustainable Use – Project 3.4
- Ecosystem Restoration and Protection – Projects 3.5 to 3.9
- Threatened and Migratory Species and Ecological Communities – Projects 3.10 to 3.16
- Protected Places – Projects 3.17 to 3.19 (including one Cross Hub project).

Research Themes

| People and sustainable use | Ecosystem restoration and protection | | Threatened and migratory species and ecological communities | | Protected places |

Headline Issues

#1 Improved regional planning – Building a northern Australian community of practice and sentinel case studies for supporting improved regional planning to achieve ESD

#2 NIERN – Developing a National Indigenous Environmental Research Network

#3 Windfarms and renewable energy impacts– Progress research on values and pressures, data standards and delivery to support sustainable development of offshore renewables and other emerging marine industries.

#4 Terrestrial runoff into Northern National Parks – Better management of catchment runoff to marine receiving waters in NA

#5 Seagrass habitat North – Building knowledge, skills and partnerships for understanding seagrass distribution

#6 Seagrass habitat South – Improving knowledge on the distribution and value of temperate seagrass in the Furneaux Is group, Tasmania

#7 Habitat restoration and protections – Identifying and overcoming barriers to coastal and marine habitat restoration, nature based solutions in Australia

#8 Carbon abatement through pig control – Carbon abatement and biodiversity enhancements through controlling disturbances in wetlands from feral ungulates

#9 Pig control scoping study – Establishing an Indigenous led approach to coordinated vertebrate pest management in NA

#10 Dugong

#11 Sawfish

#12 Sea snakes

13 Grey Nurse Shark

#14 Black Cod

#15 Southern Right Whales

#16 Maugean Skate

#17 – Shallow mesophotic reef habitats in N and NW Marine Parks – Locating unidentified reef and habitat features in the NA landscape

#18 Citizen Science – Robust CS for reef habitat assessment in support of management

#19 X – Hub Addressing Kakadu's strategic marine research needs

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Across the nineteen projects in Research Plan 2023 (detailed in the project list table on page 5-6), the expected high-level outcomes for the consecutively numbered projects include:

- Building a northern Australian community of practice, using the network foundations established in Project 1.32, and focus on scanning best practice approaches across the north, exploring innovative ways to communicate these approaches, and ensuring this network is strengthened.

- Experiment with conceptual models for establishing a working NIERN to provide evidence that will guide Indigenous organisations, policy makers and researchers that aim to support Indigenous leadership and participation in environmental research.

- Research relating to offshore renewable energy that enable regulatory decisions to be compliant with EPBC Act and OEI Act requirements, identify existing data and best-practice monitoring standards, and identifying where knowledge gaps exist.

- Fast-tracking understandings and management about the potential impacts of development, in northern Australian catchments, to improve the quality of decision-making around the impact of terrestrial runoff on the marine environment, to provide a template for decision-makers.

- Establishing seagrass habitat monitoring programs with coastal Indigenous communities to better understand habitat health in a both-ways knowledge framework and apply adaptive management to species and resources on sea country.

- Improved understanding of the extent and ecological composition of the seagrass habitats around the Furneaux group of Islands, Tasmania, including evaluation of the blue carbon value of these habitats and their cultural significance to local Indigenous communities.

- Research that aims to address implementation barriers to coastal and marine restoration, including those associated with policy & permitting issues, understanding and up-take of Nature-based solutions (NbS) by the engineering sector; and promoting inclusion of Aboriginal and Torres Strait Islanders in habitat restoration and NbS.

- Working with Traditional Owners, academics and governments to characterise the benefits of feral ungulate control in wetlands, providing science that will underpin

development of an Emission Reduction Fund method, where payments for carbon credits and biodiversity enhancements would fund management of feral ungulates on Country.

- Explore common methods, skills and experience in management of feral animal management without impacting local decision making and participation in the socially and environmentally diverse Indigenous managed landscapes of northern Australia.

- Addressing key knowledge gaps about the spatial and temporal patterns in the distribution, abundance, connectivity and health of dugong populations.

- Improving the reporting of sawfish along with other EPBC listed species in northern Australian fisheries.

- Improve safety, accuracy, and consistency of sea snake bycatch reporting and the generation of broadscale data to assess species- and fisheries-specific population status for at least 20 species of sea snakes, two of which are EPBC-listed as critically endangered.

- Improved abundance and trend estimates for the eastern Australian population of grey nurse shark and the potential for range expansion into Victorian waters, information important to inform the assessment of current conservation arrangements such as spatial closures.

- Add significantly to a 13-year time series of black cod to evaluate changes in abundance, distribution and length to assess effectiveness of recovery actions, including protected areas

- Improved information on population trends, determination of aggregation areas and movement, and development of approaches to increase data flow efficiencies required to assess the Conservation Management Plan for Southern Right Whales and development of future management plans.

- Improved knowledge base on population abundance of the endangered Maugean skate in Macquarie Harbour, Tasmania to inform conservation strategies.

- Using satellite imaging techniques to map northern Australia region based on methods consistent with existing reef mapping of the Great Barrier Reef, Torres Strait, and the Coral Sea.

- Maximising the quality of data, collected by citizen scientists, on key habitats by combining machine and human learning while conducting a rigorous testing of data quality and operationalising a field deployment strategy that maximises the value of citizen data for management and mapping.

- Delivering a marine and coastal research strategy that will provide guidance on both *what* research needs to be done and *how* it should be conducted in Kakadu.

These projects deliver outcomes to a wide range of Australian Government research-users, as well as relevant State agencies, stakeholders and the broader community. A number of projects are nationally focussed (3.2, 3.3, 3.7), developing approaches that can be applied in different regions (3.1, 3.4, 3.8, 3.17), or focussed regionally reflecting the distribution of the environmental asset (3.5, 3.6, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.18, 3.19).

Collaboration and partnerships

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, Museums Victoria, Sydney Institute of Marine Science, 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, NAILSMA 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 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.

The partners contributing to projects in Marine and Coastal Hub Research Plan 2022 are identified in the project table above, and reflects the specific skills and capacity for co-investment required to deliver the outcomes across the diversity of projects. Several of the research projects also involve the contribution of external collaborators that provide specific skills and co-investment into the projects, such as the Clean Ocean Foundation that is contributing to project 2.4. For more details on Hub partners and external collaborators for each specific project, please refer to the hub website - www.nespmarinecoastal.edu.au.

The Hub continues to develop and implement a co-create, 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 involved 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 continues to develop a 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 end-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.

Indigenous engagement

The Hub continues to undertake significant engagement and co-design with Indigenous people and Traditional Owner groups across the country. The Marine and Coastal Hub has developed an Indigenous Partnership Strategy which will be reviewed annually.   This document outlines in more detail our approach to Indigenous engagement and participation (Marine and Coastal Hub - www.nespmarinecoastal.edu.au). Each annual Research Plan will specifically engage with Indigenous groups, where appropriate, across the country to develop high priority research directions, ensuring co-create, co-design and co-delivery of relevant project funding under current and 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 elements of our Hub Indigenous engagement and participation aim to:

- Provide support to the Hub Indigenous Facilitators with research brokering, development and implementation for identified Indigenous research needs.
- Drive adoption of best practice Indigenous engagement (United Nations Declaration on the Rights of Indigenous Peoples – UNDRIP/ Free, Prior and Informed Consent-FPIC) to ensure NESP2 research is relevant, innovative, measurable, and delivering enduring economic, social and cultural benefits that are currently being missed.
- Ensure the research paradigm is compatible with culturally based (collective consensus) decision making and is ethical and recognises the ownership of natural resources (land, biota, knowledge and Indigenous cultural and IP.
- Create efficient governance reflecting local and regional input into program co-design, co-implementation and knowledge repatriation.
- Amplify the recognition, use and value of Traditional knowledge, customs and practice while increasing the opportunity for intergenerational knowledge transfer in the Indigenous community.
- Create succession and leadership pathways for the Indigenous research sector, including training early career researchers.

Specific details on the level of Indigenous consultation and engagement on each project in Marine and Coastal Hub Research Plan 2023 are provided in the individual project proposals available in attachment B and within the hub website (Marine and Coastal Hub - www.nespmarinecoastal.edu.au).

Knowledge brokering, communication and data management

The department expects that each hub will engage and communicate research outcomes with research-users and the wider public to facilitate uptake and adoption. As part of this, the program is committed to promoting open access to public sector and publicly funded information, including optimising the use and reuse of data. The department expects that each hub will implement its data management plan to provide timely, open access to the data products and research outputs.

Knowledge Brokering and Communications

In the Marine and Coastal Hub knowledge brokers facilitate the exchange of information between researchers, policy makers, managers and Indigenous organisations to generate shared understanding and to capture and transfer knowledge about:

- information needs and priorities of targeted research-users
- available research options for meeting the needs of research-users
- requirements for co-design of projects including research-user engagement and participation to maximise research impact
- packaging research outputs to ensure knowledge is effectively captured and transferred to meet the specific needs of research-users.

Knowledge brokering in the Marine and Coastal Hub is a team effort involving Hub directors, initiative leaders, project leaders, Indigenous facilitators, communication and media specialists and data wranglers. Specialist knowledge brokers are tasked with developing, coordinating delivery and periodic review of the Strategy. The Marine and Coastal Hub has developed a Knowledge Brokering Strategy which will be reviewed annually (Marine and Coastal Hub - www.nespmarinecoastal.edu.au).

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. For communications the hub will implement five broad actions to enable knowledge sharing and engagement via:

- Working with researchers, knowledge brokers and other members of the hub executive team to identify and prioritise communication needs.
- Developing and using the right mix of content, activities, channels and tools to address communication priorities.
- Encouraging, enabling and building the capacity of Marine and Coastal Hub researchers and partner agencies to participate in Hub communication activities.
- Developing, maintaining and implementing an annual schedule of communication priorities and activities.
- Modifying the communication strategy where required in response to the monitoring, evaluation and reporting process.

The Marine and Coastal Hub's Communications Strategy will be reviewed annually (Marine and Coastal Hub - www.nespmarinecoastal.edu.au).

Data Management

The Marine and Coastal Hub has produced a Data Management Strategy which will be reviewed annually (www.nespmarinecoastal.edu.au). 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:

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

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

- 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.
- allocation of resources to support data management, from the initial data capture through to ongoing delivery and curation.
- information technology infrastructure: hardware, software and other facilities that underpin data-related activities.
- 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 two Data Wranglers. 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 Wranglers are 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 [Australian Research Data Commons](#) (ARDC) provide a helpful overview of data management plans and the FAIR data principles. Many Australian Universities have [data management policies and tools](#) 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 [AODN](#) and [Research Data Australia](#) (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 [Global Indigenous Data Alliance](#) (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 [CARE principles](#) 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.

Specific details on the approach and expected data outputs on each project in Marine and Coastal Hub Research Plan 2023 are provided in the individual project proposals available in attachment B and on the hub website - [www.nespmarinecoastal.edu.au](#)).