National Environmental Science Program

Marine and Coastal Hub research plan 2025

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 6 research hubs and emerging priority research projects. The second phase is investing **$149 million** (2020–21 to 2026–27) into 4 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 www.dcceew.gov.au/science-research/nesp

Department role

The four NESP hubs have been formed to conduct applied research within their specific themes and lead a cross cutting functional initiative in their area of expertise. 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 current and future 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 researchers and communities. Hubs are also responsible for monitoring and evaluating the research project outcomes during the life of the hub in line with the NESP program evaluation framework.

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 following 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 the future needs of the nation and addressing the overwhelming impact of the key pressures.

The Hub works annually with partners and research users to identify and prioritise research needs for marine and coastal systems in Australia. Each annual research plan funds a portfolio of projects that reflect these needs and concerns for applied use by research users. Each Research Plan includes 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 delivers 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, and
- long-term foundational science to support end-users in understanding and adapting to our climate.

The Hub supports the two-way communication of this research, and research needs to research users via knowledge brokers and communication officers. The Hub works 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, ensures 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 cross-cutting 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 the hubs will work collaboratively within and across hubs.

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

During the development and implementation phases of the Marine and Coastal Hub research plan, which will span 2025-2026, the main goals are to:

- co-design and co-deliver research to be applied to key challenges and priorities for research-users and Indigenous people

- identify 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.
- continue to build and establish partnerships and engagement with networks as the co-design and co-delivery elements of scoping and developing annual research projects are undertaken.
- continue 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 specialists and knowledge brokering.

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 (EP) 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 were required to set aside 10% of NESP funding being spent per calendar year up to and including RP2024 so they could respond to EP; these funds can be rolled into general project revenue in subsequent years if they are not used.

In RP2025, hubs will be required to set aside the following for EP:

- 10% EP funds for 2024 (as per their approved RP2024 Attachment C budget)
- 5% for 2025 **PLUS** funds to make any difference in existing EP budgets **IF** 5% does not cover projected spends on EP projects in 2025
- Nil EP funds in 2026 and 2027 **EXCEPT** to cover projected spends on EP projects as approved

There is a separate process for any EP project proposals, and projects approved during that process will then need to be added to future research plans Attachments A and C. EP projects must also be included in subsequent annual progress reports.
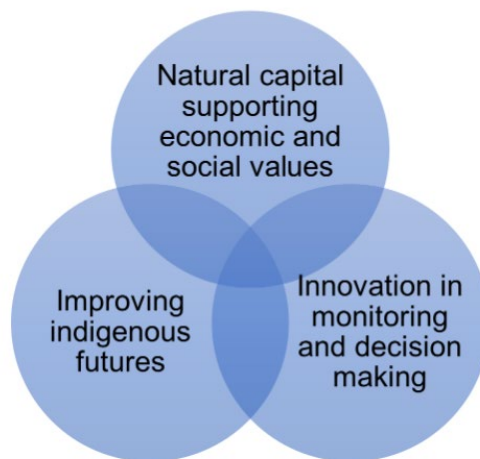
Research

Strategic Research Areas

The Marine and Coastal Hub has defined three key integrating areas of strategic focus to describe the Hub's 'narrative'. This narrative links the range of research projects across the lifetime of the Hub to ensure impact in key areas for Australia's marine and coastal systems. It also broadly reflects the objectives of the NESP program. These strategic research areas are:

- Natural capital supporting economic and social values,
- Improving Indigenous futures, and
- Innovations in monitoring and decision-making.

All Hub projects aim to address at least two, if not all, of these strategic research areas as a way of 'scaling up' the Hub's research impact.

Research priorities areas

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

In response to research-user and stakeholder needs, the Hub's narrative has provided a framework for identifying a number of priority research areas that have guided the development of Research Plan 2025, and those before it. Broadly, the research priorities areas that support the two-way communication of this research Hub are:

Natural capital supporting economic and social values

#1 Improve regional planning in Northern Australia by assessing the extent, condition and vulnerability of key environmental resources at regional scale

This research area aims to support effective regional planning, which requires an understanding of the abundance and distribution of key resources. To support this process, our aim is to provide an understanding of the distribution of key resources at relevant regional or national scales and improve regional capacity for managing these.

This research area was initially funded in RP2021 as scoping project 1.32 on supporting regional planning in Northern Australia. This project examined current planning frameworks; interviewed planners and others with specific interests; identified information deficits;

assessed data storage and access issues; and reviewed planning case studies. This resulted in the development of Project 3.1 in RP2023 which aims to build a community of practice and generate knowledge; via consultation with practitioners and stakeholders to collate ideas and experience; and provide input into the design of knowledge management systems.

In RP2024, we expanded our work under this strategic foci to include: producing a consolidated inventory of seagrass across northern Australia (Project 4.1); assessing the entire Australian population of dugong (Projects 4.2 in the Gulf of Carpentaria and 4.6 in the Kimberley); assessing the condition of mangroves across the Gulf of Carpentaria (Project 4.12); conducting an inventory of shellfish reefs across northern Australia (Project 4.13); and measuring for the first time, the population size of sawfish populations across Qld and NT (Project 4.18).

Our proposed RP2025 investment; making marine data 'investment ready' (Project 5.9) is national in scope but by making large data sets more readily available in usable formats for a range of decision-makers, will play an important role in improving environmental assessment and reporting.

#2 Offshore 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

Current projects in RP2023 and RP2024 in this area include: cataloguing existing environmental data to inform decision making for development of Australia's offshore wind farm (OWF) industry (Projects 3.3 and 3.21), estimating risks or offshore renewable energy development to priority cetaceans, pygmy blue whales (Project 4.8), and southern right whales and blue whales (Project 4.9), and a comprehensive regional modelling and risk assessments to inform offshore renewable decision-making (project 4.7). A number of other projects provide supporting information to understanding risks, including Project 3.15 (southern right whales), Project 4.15 (grey nurse shark), Project 4.3 (Indigenous knowledge of sea-kin), and Project 4.23 (eDNA in Bass Strait region).

The proposed RP 2025 investment (Project 5.3) is based on gaps identified in Hub OWF projects 3.3 and 3.21, specifically for priority species of birds and cetaceans listed as threatened or migratory under the EPBC Act. It aims to improve the quality of data required to support assessment of offshore windfarm proposals, and inform management and mitigation strategies for this rapidly developing industry.

Improving Indigenous Futures

#3 Continue to advance identified Indigenous research and monitoring priorities for Sea Country and approaches for coordinated monitoring across regional groups

Indigenous Australians own or have other rights over 60% of Australia's land, and large tracts of ocean. This vast resource should bestow great economic, social and cultural advantage. However, for many communities this is not the case. Progress is hampered by inadequate research into Country and culture-based economic opportunities, and relevant ecosystem science.

The Marine and Coastal Hub supports a collaborative and inclusive approach to Indigenous research needs and co-ordination by supporting the development and implementation of the National Indigenous Environmental Research Network (NIERN) (Project 1.31, 3.1). The

NIERN, comprising a community of Indigenous-led practitioners, is considered the best way to advance, enable and prescribe research participation, influence the Australian research agenda, and oversee relevant governance for Indigenous Futures. Other research investments in this area include: supporting the development of Indigenous led Healthy Country Planning in north-east Tasmania (Project 4.4), collating and sharing Indigenous ecological knowledge of threatened and migratory whales and dolphins in relation to human and kin (Project 4.3), and our work toward developing an Integrated Pest Management framework for feral pigs (Project 4.5), which is one of the highest priorities of Indigenous groups in northern Australia and which is Indigenous led by the Northern Australian Land and Sea Management Alliance - NAILSMA.

The investment in Indigenous monitoring methods in RP2025 (Project 5.2) builds upon the extensive work the Hub has undertaken with Indigenous communities on seagrass and benthic habitat assessments. This project will provide standardised monitoring and assessment methods for Indigenous groups, to ensure that the data they collect in the future is comparable with extensive existing datasets. Another investment in RP2025 (Project 5.1) is mapping Sea Country and investigating conservation and restoration opportunities along the coast of Kakadu National Park and Garig Gunak Barlu National Park, which share the same embyament. This builds upon our extensive seagrass and benthic habitat work and comes out of our previous investment (Project 3.19) in developing a strategic research plan for Kakadu National Park, which involved extensive engagement with Traditional Owners and Parks Australia on research priorities for Kakadu National Park. The Hub is also deepening its partnership with the Esperance Tjaltjraak Native Title Aboriginal Corporation (ETNTAC) in southern Australia to include collaboration to improve understanding about the location of white shark nursery areas in Western Australia (Project 5.7). This builds existing Hub collaborations with ETNTAC to monitoring Australian Marine Parks and Australian Sea Lions.

Innovations in monitoring and decision-making

#4 Review the barriers to implementation of coastal and marine restoration and nature-based solutions, with an aim to increase the coordination and transparency of restoration and facilitate uptake and adoption of best practice across all tiers of governments and stakeholders

Large-scale restoration is necessary and is prominent in high-level declarations such as CITES, the UN Sustainable Development Goals (2030), and the UN Decade of Ocean Science for Sustainable Development (2020-2031). Marine restoration projects in Australia, as in most countries, have typically been small-scale, experimental, and lacking coordination. The Hub investments in restoration research in RP2021 included several smaller investments (Project 1.6,1.7, 1.8, 1.10, 1.15), with investments in RP2023 (Project 3.7) focusing on understanding barriers to effective restoration. Investments in RP2024 focus on de-risking Australian nature repair activities in coastal and marine ecosystems (Project 4.10), including identifying metrics for successful restoration. RP2024 also includes specific restoration case studies, all of which build on related work in this and previous NESP Hubs – evaluating impacts, recovery and intervention options 10 years after the world's largest mangrove dieback (Project 4.12) - creating an inventory of shellfish reefs in northern Australia in collaboration with recreational fishers (Project 4.13), and options for reversing seagrass and turtle health decline in Pulu-Keeling National Park (Project 4.11). Other projects on feral pig control and seagrass are relevant to this priority area.

The RP2025 investments in restoration focus on coral reefs with a project to improve the efficiency of crown-of-thorns starfish control through adaptive management (Project 5.4) and a project assessing restoration needs of coastal benthic habitats after Cyclone Jasper floods of Dec 2023 (Project 5.5).

#5 Develop better, more cost-effective approaches to monitoring priority threatened and migratory species and ecological communities to improve reporting on condition and trend

Australia has 1890 threatened species and ecological communities listed as Matters of National Environmental Significance (MNES). There are also additional species listed because of Australia's responsibilities under migratory species and bilateral agreements. Whilst most of these are terrestrial, hundreds occur in the marine and coastal environment. The program of work will focus on researching priorities, needs, and gaps, such as those outlined in the Australian Government Threatened Species Strategy, to help focus the efforts of the Australian Government and partners on threatened species recovery actions.

This research priority area includes by far the largest number of projects, approved in RP2022, RP2023 and RP2024, with the majority of these projects strongly related to other priority areas, specifically Northern Australia, Indigenous Futures, Offshore Renewables and protection and recovery of marine mammals. The Hub is making a major contribution to the Threatened and Migratory Species and Ecological Communities Initiative led by the Resilient Landscapes Hub.

RP2025 includes proposed investment to improve knowledge of white shark populations and biologically important areas in southern Australia (Project 5.7), building on substantial past NESP investments to estimate status and trends of Australia's white shark populations. Investment is also occurring to improve knowledge of the distribution of key threatened species that are expected to interact with developing offshore wind infrastructure and activities (Project 5.3). As part of identified emerging priorities funding, DCCEEW identified the need for further immediate investment on Maugean skate, and the new emerging priorities proposal is based on advice from the Maugean skate Taskforce (EP Project 4.25). This EP project has been submitted separate to the RP2025 package as it is proposed to commence in 2024, and hence is part of RP2024.

#6 Develop approaches to determine status of values and pressures and measure effectiveness of marine protected places. Includes the Protected Places Initiative

The Hub has established a long-term research collaboration with Parks Australia to progressing build knowledge systems that support the effective management of Australian Marine Parks. These collaborations are evident in research investments in all previous research plans. Current investments in RP2024 included several projects aimed at supporting the evaluation of the management effectiveness of the Australian Marine Park network (Project 4.20) - delivery of science to support the implementation of a National Marine Park Management Effectiveness system, and - assessing the key natural values within priority temperate Australian Marine Parks to evaluate management effectiveness (Project 4.21). Outcomes defined with the cross-Hub Protected Places Initiative are also identified within the deliverables of Project 4.20.

Other investment in protected places are relevant to this priority area e.g. shallow reef and seagrass projects in Northern Australia (see above), and the proposed assessment of the

ecological and cultural values of reefs in the southern Gulf of Carpentaria including the Gulf of Carpentaria Marine Park (Project 4.24).

The RP2025 investments aim to deepen the collaboration with Parks Australia by providing AMP network knowledge syntheses for natural values and pressures to support the 2027 statutory review of management plans required under the EPBC Act (Project 5.6). It also includes a proposal to repeat and improve the national-scale socio-economic, attitudes and practice (KAP) surveys of AMPs (Project 5.10). This research is key to understanding how KAP has changed since 2019 to inform the coming statutory review of management plans.

Hub research projects for Research Plan 2025

Research projects proposed for the Marine and Coastal Hub RP2025 are listed below and can also be found at Attachment A – research project list. For more detail on projects funded in previous research plans, please refer to the hub website www.nespmarinecoastal.edu.au.

Project no.	Project partners	Project title	Priority research area as numbered above
5.1	CDU, JCU, UQ	Mapping sea country and investigating conservation and restoration opportunities along the Kakadu coast and Garig Gunak Barlu National Park	3, 1
5.2	JCU, CDU, ECU	A toolkit for ranger-led seagrass monitoring in northern Australia sea country	3, 1
5.4	CSIRO, JCU, QUT, UQ	Increased impact and efficiency of crown-of-thorns starfish control through adaptive management	4, 5, 6
5.5	JCU	Assessing impacts of extreme events on inshore benthic habitats in the northern Great Barrier Reef	6, 1, 3
5.6	UTAS	Synthesis of environmental values information to support review of Australian Marine Park Management Plans	6,
5.7	NSW DPI, Flinders Uni, CSIRO, DPIRD WA	Updating knowledge of Australian white sharks	5,
5.9	IMOS/AODN, CSIRO, UQ, UNSW	Making marine environmental data 'assessment ready'	1, 2, 6, 5
5.10	UWA	Improving socio-ecological understanding of natural values of the Australian Marine Parks	6

Note that the proposed project 5.8 has been deferred to RP2026 to allow further scoping and co-design.

Initiative projects

The Marine and Coastal Hub is leading the Protected Places Management initiative.

Broadly, the research priorities of the initiative are:

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

A large number of projects support the delivery of the identified outcomes across RP 2021 to RP 2024 and now with additional projects proposed in RP2025, as identified below:

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 RP 2024 • An Indigenous-led approach to advance health and wellbeing of Tebrakunna Country, Coastal Plains nation, North-east Tasmania • Unbroken whispers – The ripples connecting sea kin RP2025 • Mapping sea country and investigating conservation and restoration opportunities along the Kakadu coast and Garig Gunak Barlu National Park • A toolkit for ranger-led seagrass monitoring in northern Australia sea country
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 RP 2024 - Development of regional modelling and risk assessments to inform offshore renewable decision-making - Potential impacts of offshore wind developments on eastern Indian Ocean pygmy blue whales (*Balaenoptera musculus brevicauda*)

	- Enhancing monitoring approaches to evaluate the abundance, life history and critical habitats of the endangered Australian sea lion - Grey Nurse Shark Aggregations - Coastal seagrass of the Gulf of Carpentaria: building knowledge and capacity as a foundation for long-term monitoring - Assessing dugong distribution and abundance across the southern Gulf of Carpentaria - Developing Traditional Owner community-led dugong monitoring in the Kimberley region - Supporting recovery and management of migratory shorebirds in Australia - Assessing the condition of natural values within priority temperate Australian Marine Parks to evaluate management effectiveness - Environmental DNA for measuring offshore marine biodiversity: what can DNA in water collected from the RV Investigator tell us? - Towards assessing the values of reefs in the southern Gulf of Carpentaria RP2025 - Improving socio-ecological understanding of natural values of the Australian Marine Parks
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 RP2024 - Developing an Integrated Pest Management framework for feral pigs in coastal environments - Delivery of science to support the implementation of a National Marine Park Management Effectiveness system RP2025 - Assessing impacts of extreme events on inshore benthic habitats in the northern Great Barrier Reef - Synthesis of environmental values information to support review of Australian Marine Park Management Plans

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 stakeholders 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 stakeholders with an interest in the outputs of environmental and climate science research, including state and local governments, business and industry, community groups, Indigenous and non-Indigenous land managers, Indigenous communities and education institutions.

Hub outcomes and outputs for Research Plan 2025

To assist in understanding the proposed project portfolio in line with the MaC Hubs' strategic guidance, the expected high-level outcomes and outputs for the 9 projects in Research Plan 2025 have been categorised according to the strategic research areas.

Improving Indigenous Futures

- Project 5.1: Traditional Owners have identified a desire for participatory research along the coastlines of Kakadu National Park and Garig Gunak Barlu National Park, which share the same embayment, to better document and understand marine resources in that under-studied location to inform and improve park management decisions.
- Project 5.2: Coastal monitoring is increasingly being done by Indigenous Ranger groups. This project provides a toolkit of methods to ensure consistency for monitoring programs conducted across northern Australia.

Natural capital supporting economic and social values

- Project 5.3: Providing quantitative models of species distributions and uncertainties will improve risk assessment and risk management for select EPBC-listed threatened and migratory marine species affected by offshore renewable energy industry development in Australia. This improved information on threatened species distribution will support the assessment of offshore wind farm proposals, inform management and mitigation strategies, and identify knowledge gaps. It will also assist industry proponents in developing more robust environmental management plans.
- Project 5.5: This project will examine the impacts of the record flooding from Tropical Cyclone Jasper upon nearshore coastal habitats (mangroves, seagrass, corals) of the GBR coast and prioritise where the greatest recovery actions and needs are in order to advise the allocation of disaster recovery funding.
- Project 5.10: Evaluating existing Australian Marine Park socio-economic benchmarks to reflect Parks Australia's new Sentinel Park approach and network scale reporting, including changes in public awareness, attitudes, and usage patterns since a 2019/20 benchmark is key information to support upcoming AMP management plan review in

2028. This information will support further integration of socio-economic and natural values data to improve broader socio-ecological values of Australian Marine Parks.

Innovations in monitoring and decision-making

- Project 5.4: This project will utilise control program data and research data, to illustrate improvements to the $161M crown-of-thorns starfish (CoTS) control program. In addition, we aim to identify source and refugia coral reefs for CoTS and coral recruitment to prioritise key reefs for management focus.

- Project 5.6: This project is focused on synthesising all existing information on Australian Marine Park natural values and pressures to inform decadal statutory reviews, with evidence focused on the purpose-built management effectiveness program developed through collaboration between Parks Australian and the Marine and Coastal Hub. It will provide network-level assessments and summaries of natural and socio-economic values, contributing to the AMP management plan reviews and supporting national State of the Environment and State of Parks reporting.

- Project 5.7: This project provides a quantitative assessment of population trends and evidence of any recovery of the white shark in Australian waters to inform the species recovery plan and determine an appropriate and cost-effective assessment cycle for ongoing monitoring and assessment of the species Australian populations. This includes efforts to identify critical habitats and biologically important areas for white sharks and improve the understanding of population structure. It will also include Indigenous engagement on white shark knowledge which will guide the On-Country participation in fieldwork activities.

- Project 5.9: This project will develop and test an improved method of lifting large amounts of scientific data into formats suitable for use by decision-makers and planners, using a selected range of existing data on key species and habitats.

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 focused (Projects 5.3, 5.6, 5.7, 5.9), developing approaches that can be applied in different regions (Projects 5.2, 5.4) or focussed regionally reflecting the distribution of the environmental assets (Projects 5.1, 5.5).

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, and Bioplatforms Australia. Other management and research institutions, such as the North Australian Indigenous Land and Sea Management Alliance (NAILSMA), Clean Ocean Foundation and Western Australian Department of Primary Industries, Resources and Development, are included where their expertise is relevant to specific priorities.

The Hub's partners represent 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 include field technologies, laboratory and aquarium facilities, computer technologies and socio-economic tools.

The Hub's partners have continued 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 2025 are identified in the project table above and reflect 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 who provide specific skills and co-investment into the projects. 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 of 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 of 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 was reviewed in mid-2023. 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 provides for engagement 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.

Through the Hub's leadership 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 the research is relevant, innovative, measurable, and delivers 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, cultural, Indigenous knowledge 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 2025 are provided in the individual project proposals available in Attachment B and on 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 co-leads, initiative leaders, project leaders, Indigenous facilitators, communication and media specialists and data wranglers. Specialist knowledge brokers are tasked with developing and coordinating delivery and periodic review of the strategy. The Marine and Coastal Hub has developed a Knowledge Brokering Strategy which was reviewed in mid-2023 (Marine and Coastal Hub - www.nespmarinecoastal.edu.au).

The Communication Strategy provides information high-level on the Hub's approach to communicating 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). The Hub also produces a Communication Plan designed to provide more specific direction for the Hub's investments in

communication. The Communication Plan is a living document that is reviewed and updated periodically.

Data Management

The Marine and Coastal Hub has produced a Data Management Strategy which was reviewed in mid-2023 (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 the implementation of metadata management so that data records can be used for both internal and external purposes.

The Hub has two 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 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 reviewing final datasets. The Data Wranglers have also produced guidance for researchers working on Hub funded projects. The guidance covers the Hub expectations on data management and general guidance on how research data should be managed and published, in line with the Australian Code for the Responsible Conduct of Research.

To ensure its long-term sustainability, 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) provides 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 to 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 2024 are provided in the individual project proposals available in attachment B and on the hub website - www.nespmarinecoastal.edu.au.