National Environmental Science Program
Marine Biodiversity Hub
2020 INTERIM REPORT

Hub Name (full activity title): Marine Biodiversity Hub

Host organisation: University of Tasmania

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Other consortium partners/subcontractors/research organisations:

Australian Institute of Marine Science
CSIRO
Geoscience Australia
Charles Darwin University
University of Western Australia.
Integrated Marine Observing System
Museums Victoria
New South Wales Government

Main Subcontractors (2019/20)
Clean Ocean Foundation
James Cook University
WA Museum
University of Melbourne
Curtin University
Murdoch University
Western Australian Department of Primary Industries and Regional Development
North Australian Indigenous Land and Sea Management Alliance (NAILSMA)
Tasmanian Department of Primary Industries, Parks, Water and Environment
Sea Mammal Research Unit, University of St Andrews
Claire Charlton Environmental Consulting
Macquarie University

Hub Leader Certification

As Hub Leader, I certify that I have taken adequate steps to reasonably assure myself that:

- each required report component is attached;
- the contents of each component of the report are complete and accurate in all material respects;
- funds have been used for the purpose for which they were provided and all funding conditions have been met, Recipient and Other Contributions have been received, and appropriate oversight has been maintained of Hub projects, their progress, performance and budgets during the reporting period;
- all relevant risks to project delivery have been notified to the Department in this and previous reports and that appropriate steps are being taken to manage those risks;
- the Hub and its sub-contractors have current workers compensation and public liability insurances, as required under the Funding Agreement; and
- any remaining funds have been allocated towards Hub activities or identified for refund to the Department.

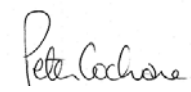
Signed: 

Hub Leader Name: Alan Jordan

Date: Oct 6 2020

Hub Steering Committee Chair Certification:

As steering committee chair, I certify that any issues of concern or matters raised during Steering Committee meetings where the Interim Report was discussed have been adequately resolved, amended or incorporated into the Interim Report submitted to the Department.

Signed: 

Hub Steering Committee Chair Name: Peter Cochrane

Date: Oct 6 2020

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Letter from the Hub Leader

Despite the challenges faced during the first half of 2020 associated with COVID-19 restrictions, Hub researchers have adapted to the current circumstances and maintained a busy schedule to deliver on project milestones and maintain a steady stream of outputs and end-user engagement. The Hub Executive have continued to focus on implementing Research Plan Version 6 (2020) (including synthesis projects), managing program level risks, and completing the interim progress report. The re-designed Marine Biodiversity Hub website was made live in May in order to make research outputs, stories and links to data and imagery more accessible to research-users and stakeholders (https://www.nespmarine.edu.au/). It includes landing pages for Australian Marine Parks and World Heritage Areas, threatened and migratory marine species, restoring coastal habitat, Indigenous engagement and science for sustainable use.

One of the Hub's key products, the Shark Action Plan (to be published in October 2020), aims to provide a comprehensive and consistent review of the extinction risk of all Australian cartilaginous fishes (Class Chondrichthyes: sharks, rays, and chimaeras); provide a benchmark from which changes in population and risk can be measured; and to help guide management for their conservation. The Shark Action Plan also serves to raise the profile of their diversity and conservation needs.

The Hub has continued to progress its focus on marine restoration, recognising it as an important option for climate mitigation and adaptation. An 'Australian Coastal Habitat Restoration' webinar was held with Department of Agriculture, Water and Environment (DAWE) end-users in June led by Dr Ian McLeod from JCU and Dr Piers Dunstan from CSIRO. Presentations were provided on the following topics: UN Decade of Ecological Restoration 2021-30, progress with restoring giant kelp in waters off South-east Tasmania and seagrass in Shark Bay, advances with rebuilding shellfish reefs, costs and benefits of agricultural land conversion to coastal wetlands, return on investment for blue restoration projects, and the role of restoration for matters of national environmental significance. The presentations (these are available on the Hub's website) and the question and answer session that followed generated a shared understanding among the 40 attendees about advances, challenges and opportunities with coastal and marine habitat restoration in Australia and oversees.

Extending the Hub's earlier work to develop national field standards, Version 2 of the *Field Manuals for Marine Sampling to Monitor Australian Waters* was released in July 2020. The manuals aim to ensure that data collected by marine sampling platforms at different times and places across Australia are directly comparable. The manuals are accessible through the website at: https://marine-sampling-field-manual.github.io. Major changes to the entire field manual package for Version 2 include amalgamation of the original Version 1 multibeam manual with the Australian Multibeam Guidelines from AusSeabed and the inclusion of a new manual for data collection with remotely operated underwater vehicles.

There are 26 active Hub research projects, with 35% of 2020 milestones completed. Around 25% of the 2020 milestones have been flagged as amber because they have not been delivered on the date specified in the research plan. One milestone has been flagged as red (A10 – spotted handfish) signifying it will not be delivered, noting other arrangements have been made to redirect funds (see attachment A for further details). Delayed milestones are spread across 16 projects (A8, A11, A13, A14, A15, C1, C4, D2, D3, D4, D5, D6, E1, E2, E3, and E7). Milestone delays for most of these projects are minor in nature and not anticipated to have a material impact on research-users.

Delays or risks of not delivering milestones for remaining projects have been examined closely to ensure milestones/deliverables are effectively reviewed/refined/approved due to the effects of COVID-19 (projects A10 - spotted handfish, A12 - field work and molecular sequencing in labs, A15 - review of conservation status of tropical inshore dolphins, D3 - SW Corner survey and Arafura survey, and D6 - social-economic benchmarks for AMPs), or because of extended delays with milestone delivery (C1 - state/territory fisheries data summaries, and E2 - underwater noise map). These delays have been discussed with the relevant research end-users and extensions for

the following two projects have already been approved by DAWE; project A13 to complete Southern Right Whale population estimates, and project D3 to complete Australian Marine Park surveys. Requests for extensions for the remaining four projects are included in Attachment A, they are; project A11 to complete the Shark Action Plan, project A15 to review the conservation status of tropical inshore dolphins, project C1 to deliver output for state and territory fisheries data, and project D6 to complete boat ramps surveys.

Additional project oversight has been commenced for projects D3 and E2, including ongoing formal meetings with project leaders and DAWE representatives where relevant. The Research Leadership Team have moved from monthly to fortnightly meetings for the rest of the Hub in order to manage the increase in oversight required for all projects during the final year.

In relation to Hub finances, the Hub remains on track to ensure all NESP funds are spent or committed by 30 June 2021 and is monitoring the budget regularly to identify potential savings for reallocation. This includes some savings in administration and research facilitation budgets due to travel savings in 2020. Savings are expected to be within the Hub category limits of 10% of budget or $50,000. The commitment to support an Indigenous Workshop at the Australian Marine Science Association 2020 conference has been carried-over to the 2021 conference which is scheduled to be held in Sydney in June.

All partners have been informed that project funds held at partner organisations must be spent by 31 Dec 2020, with the only exception being for projects where DAWE have approved an extension to the project end date beyond December 2020. The following points have also been communicated with partners:

- All partners will be required to report grant funds spent, cash and in-kind contributed by project for 2020 activity as usual, due on 21st February 2021.
- For those projects with approved extensions to 2021, there'll be an additional acquittal required covering 2021 activity due 22 April 2021.
- In addition, the Hub will require *whole of life acquittals* for each project covering grant funding received, cash and in-kind contributed.

In relation to end of Hub reporting and communications, it is anticipated that a Hub glossy final report on projects, outcomes and outputs will be produced by June 2021, and aims to be shorter than previous Marine Biodiversity Hub final reports, reflecting the publication of the Hub Impact Report in September 2020. The Hub is regularly reviewing and updating its approach to knowledge brokering and communication, and will continue to develop opportunities for producing non-technical communication material, Hub showcase webinars, media stories and end-user engagement.

Research

Attachment A lists the projects funded under the Marine Biodiversity Hub and provides detailed information on the project status, information on outputs and links to products for all projects (where available) as at 30 August 2020. Exceptions to the NESP Data Management and Accessibility Guidelines are also noted here.

Marine Biodiversity Hub Research Plan Version 6 - Attachment A										
Project Number/ID	Project Name/Title	Project Summary	Project Leader	Lead Organisation	Approved Funding Research Plan Versions 1-6			Start Date	Completion Date	Status
					NESP Funding	Total Other Contributions	Total Budget			
A1	Northern Australian hotspots for the recovery of threatened euryhaline species	Euryhaline elasmobranchs represent over half of the EPBC-listed threatened sharks and rays, with northern Australia of national importance for this threatened species community. Critical information gaps remain, limiting the implementation of Recovery Plan objectives. This project will fill many data gaps through the application of acoustic telemetry, traditional and advanced molecular research (population genetics and close-kin mark-recapture), life history studies and Indigenous knowledge and education. The focus is to improve management and facilitate recovery of these threatened species, through three research themes: 1) monitoring and understanding euryhaline species; 2) Indigenous partnerships for management of euryhaline species; and 3) knowledge for the reassessment of river shark status.	Peter Kyne	Charles Darwin University	846,509	890,346	**1,736,855**	1.7.2015	29.07.20	Completed
A2	Quantification of National Ship Strike Risk	See Project C5	David Peel	CSIRO	-	-	-	01.07.15	30.6.2018	Completed
A3	A national assessment of population status of white sharks	White sharks are listed as Vulnerable under the EPBC Act and the subject of a national recovery plan, yet there is still no effective way to assess their population status and thus no way of determining the efficacy of conservation actions. Recent debate due to various human-shark interactions has highlighted the need for further information. This project will provide a national assessment of population size and status in order to establish the efficacy of existing recovery actions and provide a scientifically sound and rational basis from which to develop policies that balance conservation objectives and public safety.	Barry Bruce	CSIRO	764,000	808,336	**1,572,336**	01.07.15	28.02.18	Completed
A4	The Status of Human-Shark Interactions and Initiatives to Mitigate Risk in Australia	Considerable political, public and media attention have recently been focused on human-shark interactions, specifically surrounding shark attack and ways to mitigate this risk. Finding the most appropriate policy balance between conservation of sharks, maximising public safety and understanding the broader social and economic ramifications/drivers for doing so is a continuing challenge for Government. To deliver this need the project has reviewed the status of human-shark interactions in Australia, provided a synthesis of current initiatives to reduce risk, reviewed recent international efforts to address these issues and identified knowledge gaps to provide an informed base to determine the most appropriate future research and policy support.	Barry Bruce	CSIRO	50,000	42,359	**92,359**	01.06.15	15.12.15	Completed
A5	Defining Connectivity of Australia's hammerhead sharks	Hammerhead sharks are the focus of conservation management through recent listing on CITES and CMS. The clear data gap for DOE and GBRMPA is connectivity of populations across national and international jurisdictions. This project applies genetic and satellite telemetry to examine the movement and connectivity of hammerhead sharks. This will help refine use of CMRs and the GBRMP, and define BIAs where possible. These data will be assimilated with current research to provide a more comprehensive understanding of the status of hammerhead shark populations to inform species listing and assist management and conservation policies at national and international levels.	Michelle Heupel	Australian Institute of Marine Science (AIMS)	742,852	767,344	**1,510,196**	01.07.15	31.12.19	Completed
A6	Prioritisation of research and management needs for Australian elasmobranch species	NERP successfully demonstrated new ways to get the raw ingredients for evidence-based management of previously intractable species: abundance, survival, connectivity. But there is still a need to explore/demonstrate how management can use these tools (e.g. adaptive control of bycatch, or deciding if more monitoring is needed), and which species are suitable. This project comprised (i) a workshop to re-assess Australian shark and ray species in terms of degree-of-concern, state-of-knowledge-for-management, and feasibility-of-filling-knowledge-gaps; and (ii) a desk study exemplifying one pathway to management use. In 2016, we have worked with DAWE to prioritise species for research and explore more management pathways.	Michelle Heupel	Australian Institute of Marine Science (AIMS)	88,493	94,516	**183,009**	01.05.15	31.12.15	Completed
A7	Monitoring population dynamics of 'Western' right whales off southern Australia	Continuation (since 1993) of annual aerial surveys, to include counts and identification photographs, of Southern Right Whales between Cape Leeuwin (WA) and Ceduna (SA), where wintering animals come close to the coast – adult females to calve, at approximately three-year intervals, other adults and juveniles less regularly. The area is the main wintering ground of a major 'western' subpopulation of 'Australian' right whales, differing in number and extent of recovery (from 19th century hunting) from an 'eastern' subpopulation which so far shows little if any recovery. Counts allow estimation of population trend and current numbers; identification photographs allow estimation of life history parameters.	Diana Jones	The Western Australian Museum	249,000	30,000	**279,000**	15.08.15	30.03.21	Ongoing
A8	Exploring the status of Western Australia's sea snakes	All sea snakes are listed marine species under the EPBC Act and three Australian endemic species are listed as Critically Endangered or Endangered, and as such are a national conservation priority. This project examines sea snake abundance and diversity from broad-scale and targeted surveys at reef and coastal sites to update Conservation Advices, refine status within CMRs and inform policies of DoEE, DPaW, PA and others. This research will improve our understanding of population status to guide on-ground conservation to reduce population declines.	Michelle Heupel	Australian Institue of Marine Science (AIMS)	453,015	477,429	**930,444**	01.02.16	30.06.2020	Ongoing
A9	Grey Nurse Shark Ck-MR Population Estimate - East Coast	A review of the 2002 National Recovery Plan for Grey Nurse Shark (DEWHA 2009) concluded it was not possible to determine if the east coast population had shown any signs of recovery (DoE 2014). Action 1.1 of the new recovery plan (DoE 2014) is to resurvey Grey Nurse Shark populations to assess population trends and dynamics. This project will resample the east coast population and use genetic SNP data to inform close kin-mark recapture analysis to estimate population size and trend, and provide guidance on future monitoring strategies for the east coast population of Grey Nurse Shark.	Russell Bradford	CSIRO	115,000	106,174	**221,174**	01.01.16	20.06.18	Completed
A10	Conservation of spotted handfish and their habitat	Spotted handfish are critically endangered and in accordance with the signed recovery plan we will conserve them through various direct conservation actions guided by research. This includes replanting of the degraded plastic artificial spawning habitats (ASH) with a re-designed array of ceramic units, assessment of taut eco-friendly moorings in critical spotted handfish habitat, genetic and capture mark recapture studies, a population viability analysis (PVA) and performance assessment of management actions. We will also continue our captive breeding project with industry and engagement with the broader community through talks, outreach and publications and re-establishment of the handfish recovery team.	Tim Lynch	CSIRO	633,743	1,470,328	**2,104,071**	01.03.16	31.12.20	Ongoing
A11	Shark action plan	Conservation of elasmobranch species (sharks and rays) is an increasing priority globally, including Australia, as evidence of overexploitation of some species becomes apparent. Common issues and threats among elasmobranch species may improve management if considered holistically. This project will produce a Shark Action Plan assessing requirements for improved management including a summary of current status across the taxa, guidelines for reducing impacts and improving management, and identification of key knowledge gaps impeding conservation and management. This Plan will help guide policy for Australian elasmobranchs developed by DoEE and fishery managers. On-ground conservation will be developed from recommendations in this plan.	Michelle Heupel	Australian Institue of Marine Science (AIMS)	235,092	319,724	**554,816**	10.01.17	31.10.2020	Ongoing

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A12	Australia's Northern Seascape: assessing status of threatened and migratory marine species	Northern Australia has a relatively untouched natural environment and is the current focus of substantial economic development, which has the potential to impact biodiversity and cultural values. The Northern Seascapes Project Phase 2 will map the distributions of several *EPBC*-listed threatened and migratory marine species at a broad-scale, and develop and trial a cost-effective rapid assessment approach ('SeaBlitzes') to gather finer-scale spatial data on priority marine species of the northern seascape, including the critical habitats they depend on. SeaBlitzes will survey selected hotspots determined through scoping undertaken in Phase 1 of the Northern Seascapes Project (to be delivered end 2017). The data and knowledge generated by the rapid assessments will establish baselines, and grow the information base for decision-making on proposed activities under Commonwealth and Territory environmental regulations. This approach will deliver on actions in threatened species Recovery Plans, Sea Country Plans, and management plans for protected areas (e.g. Indigenous Protected Areas and Marine Reserves), and will develop capacity for continued data collection through a community-based participatory approach.	Peter Kyne	Charles Darwin University	1,347,105	1,448,603	**2,795,708**	01.01.17	31.03.2021	Ongoing
A13	Estimation of population abundance and mixing of 'Southern' right whales in the Australian and New Zealand regions	This project will provide, for the first time, an abundance estimate of the total Australian population of southern right whales. It will also investigate the movement and connectedness of whales that utilise breeding areas on the eastern, southern and western coasts of Australia. Information on the population abundance and movements of southern right whales provided by this project will allow the Australian government to better evaluate progress made against the Conservation Management Plan for the species and ensure conservation efforts for the species are effectively coordinated at the regional level.	Karen Evans	CSIRO	297,374	149,661	**447,035**	01.04.18	30.03.21	Ongoing
A14	Identification of near-shore habitats of juvenile white sharks in Southwestern Australia	There is credible evidence that juvenile white sharks are present in a relatively restricted region between the head of the Great Australia Bight (GAB) and Ceduna, which encompasses the boundaries of State and Commonwealth managed marine parks and reserves, some of which are accessed via Indigenous Protected Areas. This pilot project is to undertake visual surveys (using Unmanned Aerial Vehicle – UAV) for juvenile white sharks during spring and summer. The on-land surveillance approach outlined in this proposed pilot project will inform decision makers on the efficacy of supporting subsequent on-water activity to capture and electronically tag juvenile white sharks to assess habitat use in the Great Australian Bight Marine Park (Commonwealth waters) and Far West Coast Marine Park (State waters).	Russell Bradford	CSIRO	50,000	100,500	**150,500**	14.01.19	01.03.20	Ongoing
A15	Conservation status of tropical inshore dolphins	The Conservation Status of Tropical Inshore Dolphins project will entail the compilation and review of the results of numerous research projects completed under the Whale and Dolphin Protection Plan, as well as monitoring and offset programs associated with port developments. The aim is to provide a synthesis of scientific information to inform assessments of the conservation status of the: Australian snubfin dolphin, Orcaella heinsohni; Australian humpback dolphin, Sousa sahulensis; and Indo-Pacific bottlenose dolphin, Tursiops aduncus.	Simon Allen	UWA	35,000	35,000	**70,000**	01.01.2020	28.02.21	Ongoing
B1	Road testing decision support tools via case study applications	This project will deploy tools from economics and decision science to identify sound investments within constrained budgets for: 1. Ecological monitoring of Commonwealth Marine Reserves 2. Management actions for threatened and migratory species or threatened communities, and 3. Restoration of saltmarsh and shellfish habitats. The three case studies involve coherent integration of ecological understanding, social and organisational value judgements, and economic analysis.	Terry Walshe	Australian Institue of Marine Science (AIMS)	452,099	432,591	**884,690**	01.07.15	31.12.2019	Completed
B2	Analysis and elicitation to support State of the Environment reporting for the full spectrum of data availability	The availability and quality of observation data that may be used to support State of the Environment reporting lies on a spectrum from: (i) high quality (e.g. Reef Life Survey, Long term reef monitoring programme, Temperate Reef Monitoring programme, state-based MPA monitoring programmes); (ii) moderate quality (e.g. continuous plankton recorder, occasional by catch surveys); (iii) low quality (anecdotal information) to (iv) expert beliefs but no empirical observations. The project has been completed, and provided direct input to the marine chapter of the 2016 State of the Environment report, by providing expert assessment of environmental status indicators defined for the 2011 State of the Environment report.	Simon Barry	University of Tasmania, CSIRO	62,942	63,640	**126,582**	01.07.15	30.06.17	Completed
B3	Enhancing access to relevant marine information – developing a service for searching, aggregating and filtering collections of linked open marine data	This project aims to improve the searchability and delivery of sources of linked open data, and to provide the ability to forward collections of discovered data to web services for subsequent processing through the development of a linked open data search tool. The work will improve access to existing data collections , and facilitate the development of new applications by acting as an aggregator of links to streams of marine data. The work will benefit managers (i.e. Department of the Environment staff) by providing fast and simple access to a wide range of marine information products, and offering a means of quickly synthesizing and aggregating multiple sources of information.	Johnathan Kool	Geoscience Australia	91,750	47,749	**139,499**	01.07.15	31.12.16	Completed
B4	Underpinning the repair & conservation of Australia's threatened coastal-marine habitats – phase II.	The objective of this research is to support the scaling-up of repair efforts for two threatened nearshore marine ecological communities, shellfish reefs and salt marshes. Both habitats harbour significant marine biodiversity and play a critical role in supporting healthy estuarine and nearshore systems. The research synthesis will be used to guide the development of more effective policy on coastal-marine repair, improve community education on the importance of habitats to estuary health and develop a detailed business case to support investment in marine repair activities for private industry stakeholders.	Colin Creighton, Ian McLeod, Chris Gillies	James Cook University	520,000	616,569	**1,136,569**	01.07.15	30.06.18	Completed
C1	Improving our understanding of pressures on the marine environment	The marine environment in Australia is impacted by a wide range of different pressures. This project aims to assist DoE, and other research users, to improve understanding of the potential impacts of anthropogenic disturbance to marine conservation values by providing up-to-date data and analyses on the spatial distribution of pressures and trends. The research is designed to inform decision making under the EPBC Act (acceptability of proposed activities, evaluation of effectiveness of mitigation measures) on NMES (including Key Ecological Features), implementation of multiple strategies in four Marine Bioregional Plans management of Commonwealth Marine Reserves and State of the Environment reporting.	Piers Dunstan	CSIRO	551,278	568,387	**1,119,665**	01.07.15	20.12.20	Ongoing
C2	Continental-scale tracking of threats to shallow Australian reef ecosystems	The project will integrate Australia's largest, most detailed datasets of shallow-water tropical and temperate marine biodiversity, and assess how pollution, fishing, rising sea temperatures and introduced species are impacting associated natural values. An initial outcome will be the identification of state-of-the-environment indicators for inclusion in the 2016 State of the Environment report, with subsequent activities aimed at contributing additional data products needed for other NESP projects, Parks Australia, and the Essential Environmental Measures initiative. The project will also describe a national shallow-water baseline of biodiversity in Commonwealth Marine Reserves for assessment of change through the long term.	Graham Edgar	University of Tasmania	807,147	1,628,563	**2,435,710**	01.07.15	31.12.17	Completed

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C3	Change detection and monitoring of key marine and coastal environments – application of the Australian Geoscience Data Cube	This project aims to leverage the extensive time-series of earth observation image data in the Australian Geoscience Data Cube (AGDC) by developing change detection algorithms to analyse key environmental parameters in the coastal and marine zone. Spatial information produced by this project can inform management decisions, and assist in evaluating management action outcomes, by providing a quantifiable measure of historical change and ongoing monitoring and change detection capabilities. Phase 1 of this project aimed to demonstrate the capability of using the AGDC through the development of an inter-tidal zone change detection algorithm and data set, with a view to developing and implementing an expanded range of stakeholder targeted algorithms to inform decision making processes in Phase 2.	Stephen Sagar	Geoscience Australia	56,500	42,790	**99,290**	01.05.15	01.12.16	Completed
C4	The National Outfall Database project (Clean Ocean Foundation)	NOD addresses the need of government and community to understand the impacts on health and the ocean environment that occur from sewerage outfalls around Australia. The project will be delivered over a three year time frame and will provide: 1) A publicly accessible national outfall database and reports. 2) A ranking of the outfalls (and sewerage treatment systems) according to health and impact criteria with peer review of the ranking system and resulting ranking outcomes. 3) Comparison of geographical regions in sewerage volume and pollution impact. 4) Mapping of the database 5) Community engagement in conduct of this research and consumption of the outcomes.	John Gemmill	Clean Ocean Foundation	520,000	520,000	**1,040,000**	01.07.15	31.03.2021	Ongoing
C5	Quantification of risk from shipping to large marine fauna across Australia	Given the substantial and ongoing increases in coastal and port development along the Australian coastline, and an associated increase in recreational and commercial shipping, there is an increasing potential for adverse interactions with marine species. Two risks associated with these activities for large marine fauna are ship collisions (particularly relevant for marine mammals, turtles and whale sharks) and the impact of chronic ocean noise (across a wide range of species). This project aims to provide directed and robust science (species- and area-specific) to inform management and administrative decision-making by the Department of Environment in its application of the EPBC Act.	David Peel	CSIRO	367,000	392,000	**759,000**	01.07.15	30.06.18	Completed
D1	National Data Collation, Synthesis and Visualisation to Support Sustainable Use, Management and Monitoring of Marine Assets	Effective management of marine assets requires an understanding of ecosystems and the processes that influence patterns of biodiversity. Through collaboration and synthesis of existing data this project will improve access to, and usability of, marine data to better inform management and improve public understanding of biodiversity in the marine estate. End-users and stakeholders will benefit from improved regional and national descriptions of biodiversity assets for the Commonwealth marine estate, including Commonwealth Marine Reserve network and other high-priority marine areas. In turn, this will inform prioritisation of future investments in monitoring marine ecosystems and State of the Environment reporting.	Karen Miller	Australian Institue of Marine Science (AIMS)	1,595,900	1,653,812	**3,249,712**	01.07.15	30.06.19	Completed
D2	Standard Operating Procedures (SOP) for survey design, condition assessment and trend detection	Understanding of the status and trends of indicators in Australia's marine environment requires standardised monitoring. This project will develop Standard Operating Procedures (SOP) in the planning, collection, analysis, and reporting of monitoring data. In particular, the project will: 1) provide guidance on what kind of monitoring is required (and where and when), 2) provide a simple yet powerful survey design tool, 3) provide two worked SOP examples (one benthic and one pelagic), 4) develop field manuals for some high priority sampling platforms (e.g. underwater video) with prioritisation stemming from a comparative analysis, and 5) assess approaches for monitoring pelagic ecosystems.	Scott Foster	CSIRO	837,712	939,130	**1,776,842**	01.07.15	15.12.2020	Ongoing
D3	Implementing monitoring of AMPS and the status of marine biodiversity assets on the continental shelf	New [RPv3] - There is a significant need to support Parks Australia in the establishment of a baseline inventory and monitoring program for CMR networks, and ensure it is integrated within a broader national monitoring framework. This project will provide the science support for program development, and a prioritisation framework for implementation. By facilitating national approaches, including a standards-based approach to collecting new marine data, project outcomes will include key steps to assist Parks Australia to implement and initiate a CMR monitoring program, new knowledge to inform CMR management, a national integrated framework for SOE reporting, and collaboration between State-based and Commonwealth-based programs.	Neville Barrett	University of Tasmania	4,829,464	4,897,964	**9,727,428**	01.01.17	20.03.21	Ongoing
D4	Expanding our spatial knowledge of marine biodiversity to support future best-practice reviews	This project will fill data gaps and evaluate methods relevant to the ongoing spatial management of seafloor biota across the Australian marine domain. The objective is to prepare Australian, State and Territory governments for future best-practice reviews of Australia's marine bioregionalisation that can be used to improve marine spatial planning and management initiatives (e.g. marine bioregional plan and marine protected area reviews, environmental impact and natural heritage assessments). The project will incorporate results from field trips to unexplored offshore areas of Australia's marine domain and communicate biodiversity values of the CMR network to the Australian public.	Tim O'Hara	Museum Victoria	770,000	1,638,774	**2,408,774**	01.07.17	31.12.20	Ongoing
D5	A standardised national assessment of the state of coral and rocky reef biodiversity	This project will involve integration of a national suite of reef biota Underwater Visual Census (UVC) monitoring datasets (Reef Life Survey, UTas, AIMS, Parks Victoria, SA DEWNR) to provide a comprehensive update to the state of Australian Reefs report for the next national State of the Environment Report. Maps and indicator trends will show changes in the health of rocky and coral reefs nationally from 2005 to 2020. The update will include addition of a new index which summarises the population trajectories for 600-1000 reef species nationally. Individual species trajectories will provide the only threat status information for the majority of these species, assisting future listing of previously unassessed species if significant declines are detected.	Rick Stuart-Smith	University of Tasmania	199,233	538,889	**738,122**	01.01.2019	31.12.2020	Ongoing
D6	Socioeconomic benchmarks	Social and economic values are key drivers for marine science and marine policy but are too rarely integrated with marine biodiversity monitoring programs. In close consultation with PA we will review existing metrics used to survey social and economic values associated with marine parks. This review will include consulting with national and international expertise and actively consulting with State and other Commonwealth agencies, some of whom are currently conducting reviews or have existing frameworks for surveying social and economic values (e.g GBRMPA, NSW DPI and Vic Parks). In collaboration with national partners and PA we will organise a national methods workshops to discuss and refine metrics and methods to quantify social and economic benchmarks for State and Australian Marine Parks (AMPs) and produce an SOP relevant to AMPs taking into consideration the DoEE's environmental accounting processes and PA's Monitoring, Evaluation, Reporting and Improvement (MERI) framework.	Tim Langlois	University of Western Australia	281,902	501,754	**783,656**	10.01.2019	01.03.2021	Ongoing

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D7	NESP Hub support for Parks Australia's Monitoring, Evaluation, Reporting and Improvement System for Australian Marine Parks	This application is to facilitate Hub engagement with Parks Australia during development and initiation of their Monitoring, Evaluation, Reporting and Improvement (MERI) System for Australian Marine Parks. A key priority for the Marine Parks Branch over the next 18 months is finalising the Australian Marine Park MERI System. The Marine Biodiversity Hub will play an important role in development and implementation of this system. Hub partners have had previous experience in developing the integrated monitoring framework for the Great Barrier Reef, developing a process for identifying indicators for monitoring Key Ecological Features, and also have collected much of the ecological data that exists within Australian Marine Parks.	Neville Barrett/Piers Dunstan	University of Tasmania/CSIRO	100,000	100,000	**200,000**	02.01.2020	20.12.2020	Ongoing
D8	Canyon mapping & biodiversity in Gascoyne Marine Park	The approved survey to the Gascoyne canyons aims to map the surrounding marine park using multibeam sonar and to characterise the biodiversity of North-West canyon fauna, using an ROV to undertake a comprehensive taxon inventory and eDNA analyses to provide a methodological comparison. The proposed project will extend the survey's capability and increase its relevance to marine park management, particularly in deep-sea and canyon habitats. The proposed project will yield communication products such as a fly-through, eco-narrative, and image library, as well as products consistent with previous NESP reporting such as a voyage plan and post-survey report.	Rachel Przeslawski	Geoscience Australia	30,000	90,000	**120,000**	01.01.2020	31.12.2020	Ongoing
E1	Guidelines for analysis of cumulative impacts and risks to the Great Barrier Reef	Existing guidance and standards for assessing impacts and risk (e.g. ISO 31000) are specified at a high-level allowing for considerable variation in approach, cost and outcomes from assessments and no guidance on direct or cumulative impacts. We will develop a national standard to support analysis of impacts and risks to the environmental, social and economic values required by the EPBC Act. The standard will be compatible with and support the process outlined in the Significant Impact guidelines for MNES and for Australian Marine Parks (AMP), including the means to calculate the impact and risk of upstream, downstream, facilitated and indirect impacts that will be presented in clear tabular and graphic formats, including maps as appropriate.	Piers Dunstan	CSIRO	400,000	669,132	1,069,132	01.01.2018	31.12.2020	
E2	Characterising anthropogenic underwater noise to improve understanding and management of acoustic impacts to marine wildlife	Shipping noise is a marine pollutant that contributes significantly to the marine soundscape and is a stressor of marine animals, particularly marine mammals. In Australia, the characterisation and actual impacts of shipping noise on species behaviour are not clearly understood and information is needed. This research will provide quantitative spatial and temporal maps of vessel noise exposure and impacts to MNES. The outputs will provide key information to marine regulators and management agencies such as DoEE, AMSA and GBRMPA, and their counterparts in state and territory governments, to help them meet responsibilities and obligations under international and national law and policy to minimise the impacts of the shipping noise on MNES.	David Peel	CSIRO	401,855	401,855	**803,710**	01.01.2018	15.12.2020	Ongoing
E3	Microplastics in the Australian marine environment	The project will inform national policy and action to reduce the release and impacts of microplastics on our environment and oceans: 1. A literature review will firstly identify key marine microplastics research and policy development internationally, with a focus on research that is contextual to microplastics in the Australian marine environment. 2. From this literature review, an options paper will be developed to explore the most feasible and impactful policy approaches for the Australian context and that can be used to form the basis for discussions at a workshop. 3. A one day workshop will draw together policy-makers, researchers and relevant industry peak bodies to discuss and recommend policy and other options to limit microplastics release into the environment. A workshop report will be drafted to summarise findings, recommendations and next steps. a. The report will provide evidence to underpin the development of national policy aimed at reducing microplastic pollution, including by identifying priority actions to deliver Australia's 2018 National Waste Policy.	Marcus Haward	University of Tasmania	50,000	50,000	**100,000**	01.02.2020	30.11.2020	Ongoing
E4	Recreational fishing in Commonwealth waters	Australia's recreational fishing sector is moving further offshore in pursuit of fishing opportunities, which places them in areas managed by the Australian Government. Most recreational fisheries research is state based and at two case study sites - Hunter Australian Marine Park (AMP) and the Ningaloo AMP - this data will be assessed for its usefulness to quantify offshore fishing. New data will also be collected will also be collected using creel, socio-economic and remote sensing techniques to better understand fisher's effort, harvest and motivations. As well, the response by fish communities to harvest and the fishery to climate change will be assessed at larger scales. As recreational fishers are key stakeholders in marine management and regulation, a better understanding of their values is required to effectively inform administration of the EPBC Act (e.g. effects of Matters of National Environmental Significance), use of Australian Marine Parks and Commonwealth managed commercial fisheries.	Tim Lynch	CSIRO	253,883	288,651	**542,534**	01.01.2018	31.12.2019	Completed
E5	The role of restoration in conserving MNES	Restoration of marine ecosystems offers the prospect of effective conservation in the face of chronic degradation and climate change. But techniques for restoration are generally in their infancy. In 2018 this project will review the capacity for recent advances in restoration of • giant kelp forests, • coral reefs, • seagrass communities, • saltmarsh communities, and • shellfish communities, to reduce conservation risks associated with matters of national environmental significance (MNES) listed under the Cth EPBC Act. In subsequent years we will trial and extend restoration techniques in the more promising habitats and develop a restoration decision framework to guide future investments.	Ian McLeod	James Cook University (JCU)	221,750	282,913	**504,663**	01.01.2018	31.12.2020	Ongoing
E6	Assisting restoration of ecosystem engineers through seed-based and shoot-based programs in the Shark Bay WHS	This project will develop community-based seeding and shoot planting restoration practices in the Shark Bay World Heritage Site (WHS). The goal is to scale up the existing restoration research to practice and assist recovery of the dominant seagrasses, Amphibolis antarctica and Posidonia australis following the 2011 marine heat wave. The Shark Bay WHS is unique globally for its natural values, including stromatolites, extensive seagrass meadow that have constructed sills and banks over 1,000s of years resulting in restricted exchange with the ocean, unique and abundant marine megafauna including 1/8th of the worlds population of dugongs, large populations of sharks and turtles, and one of the longest studied populations of dolphins in the world. The inshore waters of the WHS provides connectivity to the deeper waters of the adjacent Commonwealth Shark Bay Marine Park. Shark Bay seagrasses have recently been devastated by the marine heatwave of 2010-2011 and these events are predicted to increase in frequency and intensity with global warming. The loss of 23% of seagrass cover in the bay (860 km2) had a flow on effect to mega herbivores, fish, tourism and the commercial aquaculture and fisheries industries dependent of the ecosystem. There is a critical need to develop management actions to respond to such events and to prepare for predicted future events. Seagrass restoration has been explored at Useless Loop and on both sides of the Peron Peninsula near Denham and Monkey Mia over the past 6-8 years (3 ARC Linkage, 1 ARC Discovery Grant), resulting in an increased understanding of the factors required for successful seagrass restoration along the extreme salinity gradient found in Shark Bay. The Malgana people have responsibilities for sea country in Shark Bay and a strong tie to the land and inshore seas that make up the Shark Bay WHS. This project is a collaboration between scientists and the Mulgana community whereby methods will be jointly developed to assist natural recovery in preparation for future devastating impacts of climate change.	Gary Kendrick	University of Western Australia	200,000	216,282	**416,282**	30.01.2019	30.01.2021	Ongoing

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E7	Assessing the feasibility of restoring giant kelp beds in eastern Tasmania	The proposed research will extend on externally funded work commencing in 2018 to select for thermally tolerant and low-nutrient-tolerant giant kelp (Macrocystis pyrifera) genotypes, and which will examine effects of acclimation of selected genotypes by pre-exposure to warm, nutrient poor conditions. The project will outplant pre-exposed selected genotypes of giant kelp as micro-sporophytes in experiment providing / not providing an added source of nutrient. The work is designed to assess the feasibility of this approach as a means to develop minimum patch sizes for giant kelp that can be self-replacing and self-expanding.	Craig Johnson	University of Tasmania	150,000	446,884	**596,884**	01.01.2019	31.12.2020	Ongoing
SS1	Synthesis Project 1: Cross-Hub Integrated Assessment - Northern Australia	This project is a cross-hub research collaboration that draws on the considerable experience, regional knowledge, data and networks in the NESP Hubs to explore the potential application, and benefits, of integrated environmental assessments (IEA), focusing on Northern Australia. The project will develop a process framework to guide IEA, identifying available information and critical knowledge gaps, methods for synthesis and analysis, and participatory approaches and governance settings. The project will review the existing tools and systems to support IEA and identify opportunities and potential location/s to test implementation in Northern Australia. The project will provide decision-makers in the Department (and State and Territory regulatory and planning agencies) with pathways for undertaking IEA approaches in Northern Australia, to underpin sustainable regional development and, avoid environmental harm to internationally important biodiversity assets and cultural heritage values.	Nic Bax	CSIRO	39,593	-	**39,593**	01.10.2019	31.12.2020	Ongoing
SS2	Interpreting pressure profiles	This project has two objectives: (i) to provide a spatial explicit analysis of the relative risks posed to marine conservation values, as defined by the natural values hierarchy of Park Australia's Monitoring, Evaluation, Reporting and Improvement (MERI) framework, by pressures that operate within Australia's Exclusive Economic Zone and state/territory waters (a "hotspots" analysis); and, (ii) provide a proof of concept of an adaptive, probabilistic assessment of the cumulative risks posed to these values, in a region determined to support the Parks Australia MERI project D7, in a manner that is consistent with the seascape-scale cumulative assessment described in the "Guidelines for analysis of cumulative impacts and risks to the Great Barrier Reef" (developed and tested with Commonwealth, State and Industry stakeholders in project E1).	Keith Hayes	CSIRO	151,777	151,777	**303,554**	15.01.2020	30.12.2020	Ongoing
SS3	National trends incoral species following heatwaves	The project will engage coral taxonomic experts to annotate existing Reef Life Survey photoquadrats taken across northern Australia before and after major disturbances, to allow: •Quantification of the spatial and species-level responses of Australian corals to the 2016 and 2017 marine heatwave and mass bleaching events (and cyclones that occurred during this period). •Identification of the species most threatened by warming and cyclones, and species likely to respond best to restoration efforts. •Contribution to a coral-specific analysis to the next national State of the Environment report, through project D5.	Rick Stuart-Smith	University of Tasmania	52,000	104,850	**156,850**			
Total Project Costs					**19,900,968**	**24,025,276**	**43,926,244**			

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
A1	**Northern Australian hotspots for the recovery of threatened euryhaline species**	Euryhaline elasmobranchs represent over half of the EPBC-listed threatened sharks and rays, with northern Australia of national importance for this threatened species community. Critical information gaps remain, limiting the implementation of Recovery Plan objectives. This project will fill many data gaps through the application of acoustic telemetry, traditional and advanced molecular research (population genetics and close-kin mark-recapture), life history studies and Indigenous knowledge and education. The focus is to improve management and facilitate recovery of these threatened species, through three research themes: 1) monitoring and understanding euryhaline species; 2) Indigenous partnerships for management of euryhaline species; and 3) knowledge for the reassessment of river shark status.	Troubled waters: Threats and extinction risk of the sharks, rays and chimaeras of the Arabian Sea and adjacent waters	https://www.nespmarine.edu.au/document/troubled-waters-threats-and-extinction-risk-sharks-rays-and-chimaeras-arabian-sea-and
			Close-Kin Mark-Recapture population size estimate of Glyphis garricki in the Northern Territory	https://www.nespmarine.edu.au/document/close-kin-mark-recapture-population-size-estimate-glyphis-garricki-northern-territory
			Northern River Shark fact sheet (2020)	https://www.nespmarine.edu.au/document/northern-river-shark-fact-sheet-2020
			Northern River Shark poster	https://www.nespmarine.edu.au/document/northern-river-shark-poster
			Conservation impact scores identify shortfalls in demonstrating benefits of threatened wildlife displays in zoos and aquaria	https://www.nespmarine.edu.au/document/conservation-impact-scores-identify-shortfalls-demonstrating-benefits-threatened-wildlife
			Categorising use patterns of non-marine environments by elasmobranchs and a review of their extinction risk	https://www.nespmarine.edu.au/document/categorising-use-patterns-non-marine-environments-elasmobranchs-and-review-their-extinction
			The scientist abroad: maximising research impact and effectiveness when working as a visiting scientist	https://www.nespmarine.edu.au/document/scientist-abroad-maximising-research-impact-and-effectiveness-when-working-visiting
			Data report to synthesize the available telemetry data from this project	
			Manuscript on population structure of *G.garricki*	
			Troubled waters: Threats and extinction risk of the sharks, rays and chimaeras of the Arabian Sea and adjacent waters	https://www.nespmarine.edu.au/document/troubled-waters-threats-and-extinction-risk-sharks-rays-and-chimaeras-arabian-sea-and
			A rare contemporary record of the Critically Endangered Ganges Shark, *Glyphis gangeticus*	https://www.nespmarine.edu.au/document/rare-contemporary-record-critically-endangered-ganges-shark-glyphis-gangeticus
			Species Overview: Largetooth Sawfish *Pristis pristis* - Report	https://www.nespmarine.edu.au/document/species-overview-largetooth-sawfish-pristis-pristis
			Recreational fishing impacts on threatened river sharks: A potential conservation issue - Journal Article	https://www.nespmarine.edu.au/document/recreational-fishing-impacts-threatened-river-sharks-potential-conservation-issue
			Description of the egg cases of Dentiraja polyommata (Rajiformes: Rajidae) and Asymbolus pallidus (Carcharhiniformes: Scyliorhinidae) from Queensland, Australia - Journal Article	https://www.nespmarine.edu.au/document/description-egg-cases-dentiraja-polyommata-rajiformes-rajidae-and-asymbolus-pallidus
			Sawfishes in Papua New Guinea: a preliminary investigation into their status and level of exploitation - Journal Article	https://www.nespmarine.edu.au/document/sawfishes-papua-new-guinea-preliminary-investigation-their-status-and-level-exploitation
			Inferring contemporary and historical genetic connectivity from juveniles - Journal Article	https://www.nespmarine.edu.au/document/inferring-contemporary-and-historical-genetic-connectivity-juveniles
			Reproductive parameters of rhinobatid and urolophid batoids taken as bycatch in the Queensland (Australia) East Coast Otter Trawl Fishery - Journal Article	https://www.nespmarine.edu.au/document/reproductive-parameters-rhinobatid-and-urolophid-batoids-taken-bycatch-queensland-australia
			Urogymnus acanthobothrium sp. nov., a new euryhaline whipray (Myliobatiformes: Dasyatidae) from Australia and Papua New Guinea - Journal Article	https://www.nespmarine.edu.au/document/urogymnus-acanthobothrium-sp-nov-new-euryhaline-whipray-myliobatiformes-dasyatidae
			A new species of wedgefish, *Rhynchobatus cooki* (Rhinopristiformes, Rhinidae), from the Western Pacific - Journal Article	https://www.nespmarine.edu.au/document/new-species-wedgefish-rhynchobatus-cooki-rhinopristiformes-rhinidae-western-pacific
			Malak Malak Sawfish Patrol and Relocation Protocol	https://www.nespmarine.edu.au/document/malak-malak-sawfish-patrol-relocation-protocol
			Genetic sequencing of threatened euryhaline species	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=f7d3a11e-bd2b-4d8d-af3d-d2fc3a058339
			Acoustic telemetry tracking data	http://metadata.imas.utas.edu.au/geonetwork/srv/eng/metadata.show?uuid=8e9746ed-20f8-4c1b-9437-1fa0d5e53264
			Euryhaline elasmobranch fishing database (including images)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=a0cf8cc5-67cd-49bb-bcaa-dedf21ed3287

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			Euryhaline Elasmobranchs community communications outputs	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=2b1ebdbb-e6c5-4673-b230-d7d2b5eba819
			Every Sawfish Counts - Sawfish Rescue, Daly River, September 2017	https://www.youtube.com/watch?v=fKkvHRptWww
			Every Sawfish Counts - Sawfish Rescue, Daly River, September 2017	https://www.youtube.com/watch?v=fKkvHRptWww&t=10s
			Save a Sawfish (Kriol	https://www.youtube.com/watch?v=u22S1zVwiLE&t=5s
			Save a Sawfish (English Angelina Joshua)	https://www.youtube.com/watch?v=dESDV9A7gFs
			Tyemirerriny: looking after Daly River Sawfish	https://www.youtube.com/watch?v=o5oN7xu1ml0&t=10s
			Sawfish territory - Malak Malak rangers	https://www.youtube.com/watch?v=QxRgjRqtth0
A2	**Quantification of National Ship Strike Risk**	See Project C5	See project C5	
A3	**A national assessment of population status of white sharks**	White sharks are listed as Vulnerable under the EPBC Act and the subject of a national recovery plan, yet there is still no effective way to assess their population status and thus no way of determining the efficacy of conservation actions. Recent debate due to various human-shark interactions has highlighted the need for further information. This project will provide a national assessment of population size and status in order to establish the efficacy of existing recovery actions and provide a scientifically sound and rational basis from which to develop policies that balance conservation objectives and public safety.	Evidence of diverse movement strategies and habitat use by white sharks, Carcharodon carcharias, off southern Australia	https://www.nespmarine.edu.au/document/evidence-diverse-movement-strategies-and-habitat-use-white-sharks-carcharodon-carcharias
			Estimating growth in juvenile white sharks using stereo baited remote underwater video systems (stereo-BRUVs) - Final report	https://www.nespmarine.edu.au/document/estimating-growth-juvenile-white-sharks-using-stereo-baited-remote-underwater-video-systems
			Genetic relatedness reveals total population size of white sharks in eastern Australia and New Zealand	https://www.nespmarine.edu.au/document/genetic-relatedness-reveals-total-population-size-white-sharks-eastern-australia-and-new
			Assessing the size of Australia's white shark populations - Fact sheets	https://www.nespmarine.edu.au/document/assessing-size-australias-white-shark-populations
			A national assessment of the status of white sharks - Report	https://www.nespmarine.edu.au/document/national-assessment-status-white-sharks
			Broad-scale coastal movements of white sharks off Western Australia described by passive acoustic telemetry data - Journal Article	https://www.nespmarine.edu.au/document/broad-scale-coastal-movements-white-sharks-western-australia-described-passive-acoustic
			Juvenile white sharks Carcharodon carcharias utilise estuarine environments in south-eastern Australia - Journal Article	https://www.nespmarine.edu.au/document/juvenile-white-sharks-carcharodon-carcharias-utilise-estuarine-environments-south-eastern
			Use of stereo baited remote underwater video systems to estimate the presence and size of white sharks (*Carcharodon carcharias*) - Journal Article	https://www.nespmarine.edu.au/document/use-stereo-baited-remote-underwater-video-systems-estimate-presence-and-size-white-sharks
			Towards a national population assessment for white sharks - Fact sheet	https://www.nespmarine.edu.au/document/towards-national-population-assessment-white-sharks-fact-sheet
			White shark acoustic tracking movement data 2015, 2016, 2017	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=d4cfbedf-6a0f-44ef-b736-08974c14bbcc
			Sequence IDs for archived white shark genetics data	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=de2cb27d-ae90-476d-b609-3fd1a2f52871
A4	**The Status of Human-Shark Interactions and Initiatives to Mitigate Risk in Australia**	Considerable political, public and media attention have recently been focused on human-shark interactions, specifically surrounding shark attack and ways to mitigate this risk. Finding the most appropriate policy balance between conservation of sharks, maximising public safety and understanding the broader social and economic ramifications/drivers for doing so is a continuing challenge for Government. To deliver this need the project has reviewed the status of human-shark interactions in Australia, provided a synthesis of current initiatives to reduce risk, reviewed recent international efforts to address these issues and identified knowledge gaps to provide an informed base to determine the most appropriate future research and policy support.	The status of human-shark interactions and initiatives to mitigate risk in Australian waters	https://www.nespmarine.edu.au/document/status-human-shark-interactions-and-initiatives-mitigate-risk-australian-waters

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
A5	**Defining Connectivity of Australia's hammerhead sharks**	Hammerhead sharks are the focus of conservation management through recent listing on CITES and CMS. The clear data gap for DOE and GBRMPA is connectivity of populations across national and international jurisdictions. This project applies genetic and satellite telemetry to examine the movement and connectivity of hammerhead sharks. This will help refine use of CMRs and the GBRMP, and define BIAs where possible. These data will be assimilated with current research to provide a more comprehensive understanding of the status of hammerhead shark populations to inform species listing and assist management and conservation policies at national and international levels.	Examination of connectivity of hammerhead sharks in northern Australia	http://https://www.nespmarine.edu.au/document/examination-connectivity-hammerhead-sharks-northern-australia
			Northern Australia Hammerhead Shark Tagging Program - Fact Sheet (Update January 2019)	https://www.nespmarine.edu.au/document/northern-australia-hammerhead-shark-tagging-program-fact-sheet-update-january-2020
			Description of *Piscicapillaria bursata* sp. nov. (Capillariidae) and Redescription of *Parascarophis sphyrnae* Campana-Rouget, 1955 (Cystidicolidae), Two Nematode Parasites of Hammerhead Sharks (Sphyrna spp.) off Australia	https://www.nespmarine.edu.au/document/description-piscicapillaria-bursata-sp-nov-capillariidae-and-redescription-parascarophis
			Acanthocephalans from Australian elasmobranchs (Chondrichthyes) with a description of a new species in the genus *Gorgorhynchus* Chandler, 1934 (Rhadinorhynchidae)	https://www.nespmarine.edu.au/document/acanthocephalans-australian-elasmobranchs-chondrichthyes-description-new-species-genus
			Indigenous knowledge and cultural values of hammerhead sharks in Northern Australia	https://www.nespmarine.edu.au/document/indigenous-knowledge-and-cultural-values-hammerhead-sharks-northern-australia
			Crossing lines: a multidisciplinary framework for assessing connectivity of hammerhead sharks across jurisdictional boundaries - Journal Article	https://www.nespmarine.edu.au/document/crossing-lines-multidisciplinary-framework-assessing-connectivity-hammerhead-sharks-across
			Northern Australia Hammerhead Shark Tagging Program - Fact Sheet	https://www.nespmarine.edu.au/document/northern-australia-hammerhead-shark-tagging-program-fact-sheet
			Exploring the status of Australia's hammerhead sharks - Report	https://www.nespmarine.edu.au/document/exploring-status-australia%E2%80%99s-hammerhead-sharks
			Defining the connectivity of Australia's hammerhead sharks - Fact Sheet	https://www.nespmarine.edu.au/document/defining-connectivity-australia%E2%80%99s-hammerhead-sharks-fact-sheet
			Hammerhead connectivity metadata from tagged sharks	https://catalogue.aodn.org.au/geonetwork/srv/en/metadata.show?uuid=0b1796db-6686-4577-95fe-770e1e8ffb46
			Hammerhead connectivity movement kmz files (for mapping)	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=9a767302-742f-447c-a060-a23d9f12197c
			Description and characterisation of Terranova pectinolabiata n. sp. (Nematoda: Anisakidae) in great hammerhead shark, Sphyrna mokarran (Rüppell, 1837), in Australia	https://www.nespmarine.edu.au/document/description-and-characterisation-terranova-pectinolabiata-n-sp-nematoda-anisakidae-great
A6	**Prioritisation of research and management needs for Australian elasmobranch species**	NERP successfully demonstrated new ways to get the raw ingredients for evidence-based management of previously intractable species: abundance, survival, connectivity. But there is still a need to explore/demonstrate how management can use these tools (e.g. adaptive control of bycatch, or deciding if more monitoring is needed), and which species are suitable. This project comprised (i) a workshop to re-assess Australian shark and ray species in terms of degree-of-concern, state-of-knowledge-for-management, and feasibility-of-filling-knowledge-gaps; and (ii) a desk study exemplifying one pathway to management use. In 2016, we have worked with DAWE to prioritise species for research and explore more management pathways.	Close-Kin Mark-Recapture - Journal Article	https://www.nespmarine.edu.au/document/close-kin-mark-recapture
			Prioritisation of research and management needs for Australian elasmobranch species - Final Report	https://www.nespmarine.edu.au/system/files/FINAL%20Heupel%20A6%20report%20Prioritisation%20of%20research%20and%20management%20needs%20of%20Aust%20elasmobranch%20species_mh.pdf
A7	**Monitoring population dynamics of 'Western' right whales off southern Australia**	Continuation (since 1993) of annual aerial surveys, to include counts and identification photographs, of Southern Right Whales between Cape Leeuwin (WA) and Ceduna (SA), where wintering animals come close to the coast – adult females to calve, at approximately three-year intervals, other adults and juveniles less regularly. The area is the main wintering ground of a major 'western' subpopulation of 'Australian' right whales, differing in number and extent of recovery (from 19th century hunting) from an 'eastern' subpopulation which so far shows little if any recovery. Counts allow estimation of population trend and current numbers; identification photographs allow estimation of life history parameters.	Monitoring Population Dynamics of 'Western' Right Whales off Southern Australia 2018-2021 - Final Report on activities for 2019	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-2018-2021-final-0
			Monitoring Population Dynamics of 'Western' Right Whales off Southern Australia 2018-2021 - Progress Report on activities for 2019	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-2018-2021-progre-0
			Monitoring Population Dynamics of 'Western' Right Whales off Southern Australia 2018-2021 - Final Report on activities for 2018	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-2018-2021-final
			Monitoring Population Dynamics of "Western" Right Whales off Southern Australia 2018-2021 - Progress Report on activities for 2018	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-2018-2021-progress
			Monitoring population dynamics of Western right whales - Final Report on activities for 2017	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-final-report-0

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Monitoring population dynamics of Western right whales - Progress Report on activities for 2017	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-western-right-whales-progress-report-activities-2017
			Monitoring Population Dynamics of "Western" Right Whales off Southern Australia - final report on activities for 2016 - Report	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-final-report
			Monitoring population dynamics of Western right whales - Progress report on activities for 2016 - Report	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-western-right-whales-progress-report-activities-2016
			Population trend in right whales off southern Australia 1993-2015 - International Whaling Commission June 2016 - Report	https://www.nespmarine.edu.au/document/population-trend-right-whales-southern-australia-1993-2015-international-whaling-commission
			Monitoring population dynamics of Western right whales - Final report on activities 30 March 2016 - Report	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-western-right-whales-final-report-activities-30-march-2016
			Monitoring Population Dynamics of "Western" Right Whales off Southern Australia Milestone Report - Report	https://www.nespmarine.edu.au/document/monitoring-population-dynamics-%E2%80%98western%E2%80%99-right-whales-southern-australia-milestone-report
			Aerial survey monitors right whales off southern Australia - Fact Sheet	https://www.nespmarine.edu.au/document/aerial-survey-monitors-right-whales-southern-australia-fact-sheet
			2015 Aerial survey data of southern right whales (*Eubalaena australis*) off southern Australia	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=0c8cf643-8111-4872-9ece-7672c2ef460b
			2016 Aerial survey data of southern right whales (*Eubalaena australis*) off southern Australia	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=881d2cde-26af-44e9-b695-6c3b458fafc2
A8	**Exploring the status of Western Australia's sea snakes**	All sea snakes are listed marine species under the EPBC Act and three Australian endemic species are listed as Critically Endangered or Endangered, and as such are a national conservation priority. This project examines sea snake abundance and diversity from broad-scale and targeted surveys at reef and coastal sites to update Conservation Advices, refine status within CMRs and inform policies of DoEE, DPaW, PA and others. This research will improve our understanding of population status to guide on-ground conservation to reduce population declines.	Prioritising search effort to locate previously unknown populations of endangered marine reptiles	https://www.nespmarine.edu.au/document/prioritising-search-effort-locate-previously-unknown-populations-endangered-marine-reptiles
			Ashmore Reef and the case of the disappearing sea snakes	
			Future directions in the research and management of marine snakes	https://www.nespmarine.edu.au/document/future-directions-research-and-management-marine-snakes
			Report on surveys and analyses of data	
			Spatial and temporal patterns in sea snake populations on the North West Shelf - Progress Report	https://www.nespmarine.edu.au/document/spatial-and-temporal-patterns-sea-snake-populations-north-west-shelf-progress-report
			Exploring the status of Western Australia's sea snakes - Report	https://www.nespmarine.edu.au/document/exploring-status-western-australia%E2%80%99s-sea-snakes
			Spatial distribution map of sea snake species occurrence	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=8114ec84-7907-4ad8-8453-e0b255dc2bd7
A9	**Grey Nurse Shark Ck-MR Population Estimate - East Coast**	A review of the 2002 National Recovery Plan for Grey Nurse Shark (DEWHA 2009) concluded it was not possible to determine if the east coast population had shown any signs of recovery (DoE 2014). Action 1.1 of the new recovery plan (DoE 2014) is to resurvey Grey Nurse Shark populations to assess population trends and dynamics. This project will resample the east coast population and use genetic SNP data to inform close kin-mark recapture analysis to estimate population size and trend, and provide guidance on future monitoring strategies for the east coast population of Grey Nurse Shark.	Sizing up Australia's eastern Grey Nurse Shark population - Fact sheet	https://www.nespmarine.edu.au/document/sizing-australia%E2%80%99s-eastern-grey-nurse-shark-population
			A close-kin mark-recapture estimate of the population size and trend of east coast grey nurse shark	https://www.nespmarine.edu.au/document/close-kin-mark-recapture-estimate-population-size-and-trend-east-coast-grey-nurse-shark
			Grey Nurse Shark Tissue Sample Collection	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=fc5edda0-cd1e-462e-a610-d45106111db4
A10	**Conservation of spotted handfish and their habitat**	Spotted handfish are critically endangered and in accordance with the signed recovery plan we will conserve them through various direct conservation actions guided by research. This includes replanting of the degraded plastic artificial spawning habitats (ASH) with a re-designed array of ceramic units, assessment of taut eco-friendly moorings in critical spotted handfish habitat, genetic and capture mark recapture studies, a population viability analysis (PVA) and performance assessment of management actions. We will also continue our captive breeding project with industry and engagement with the broader community through talks, outreach and publications and re-establishment of the handfish recovery team.	Conservation of handfish and their habitats – annual report (milestone 10, 2019)	https://www.nespmarine.edu.au/document/conservation-handfish-and-their-habitats-%E2%80%93-annual-report-2019
			Conserving the Critically Endangered Red Handfish - Fact Sheet	https://www.nespmarine.edu.au/document/conserving-critically-endangered-red-handfish-fact-sheet
			Conservation of handfish and their habitats – annual report (milestone 4, 2018)	https://www.nespmarine.edu.au/document/conservation-handfish-and-their-habitats-%E2%80%93-annual-report-0
			Procedures and methods for establishment of captive breeding populations of spotted handfish	https://www.nespmarine.edu.au/document/procedures-and-methods-establishment-captive-breeding-populations-spotted-handfish

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Local densities and habitat preference of the critically endangered spotted handfish (*Brachionichthys hirsutus*): Large scale field trial of GPS parameterised underwater visual census and diver attached camera	https://www.nespmarine.edu.au/document/local-densities-and-habitat-preference-critically-endangered-spotted-handfish
			Conserving Critically Endangered spotted handfish - Fact Sheet	https://www.nespmarine.edu.au/document/conserving-critically-endangered-spotted-handfish-fact-sheet
			Monitoring of Spotted Handfish (*Brachionichthys hirsutus*) populations and on ground conservation actions - Report	https://www.nespmarine.edu.au/document/monitoring-spotted-handfish-brachionichthys-hirsutus-populations-and-ground-conservation
			Density estimates of Spotted Handfish (*Brachionichthys hirsutus*) - GPS Underwater Visual Census. 2015-2016	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=b0c79329-a480-4762-a943-a902a74fc13e
			Spotted Handfish (*Brachionichthys hirsutus*) - GPS Underwater Visual Census - 2017 resurveys of baseline sites	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=51702b57-d4e4-4477-b199-b3485675f66c
A11	**Shark action plan**	Conservation of elasmobranch species (sharks and rays) is an increasing priority globally, including Australia, as evidence of overexploitation of some species becomes apparent. Common issues and threats among elasmobranch species may improve management if considered holistically. This project will produce a Shark Action Plan assessing requirements for improved management including a summary of current status across the taxa, guidelines for reducing impacts and improving management, and identification of key knowledge gaps impeding conservation and management. This Plan will help guide policy for Australian elasmobranchs developed by DoEE and fishery managers. On-ground conservation will be developed from recommendations in this plan.	Shark Action Plan Policy Report - milestone 11, RPv3 2017	https://www.nespmarine.edu.au/document/shark-action-plan-policy-report
			The extinction risk of New Zealand chondrichthyans	https://www.nespmarine.edu.au/document/extinction-risk-new-zealand-chondrichthyans
			Shark Action Plan species assessments report	
A12	**Australia's Northern Seascape: assessing status of threatened and migratory marine species**	Northern Australia has a relatively untouched natural environment and is the current focus of substantial economic development, which has the potential to impact biodiversity and cultural values. The Northern Seascapes Project Phase 2 will map the distributions of several *EPBC* -listed threatened and migratory marine species at a broad-scale, and develop and trial a cost-effective rapid assessment approach ('SeaBlitzes') to gather finer-scale spatial data on priority marine species of the northern seascape, including the critical habitats they depend on. SeaBlitzes will survey selected hotspots determined through scoping undertaken in Phase 1 of the Northern Seascapes Project (to be delivered end 2017). The data and knowledge generated by the rapid assessments will establish baselines, and grow the information base for decision-making on proposed activities under Commonwealth and Territory environmental regulations. This approach will deliver on actions in threatened species Recovery Plans, Sea Country Plans, and management plans for protected areas (e.g. Indigenous Protected Areas and Marine Reserves), and will develop capacity for continued data collection through a community-based participatory approach.	Qualitative Models of Northern Seascapes	
			Australia's Northern Seascape: assessing status of threatened and migratory marine species	
			Lost before found: A new species of whaler shark *Carcharhinus obsolerus* from the Western Central Pacific known only from historic records	https://www.nespmarine.edu.au/document/lost-found-new-species-whaler-shark-carcharhinus-obsolerus-western-central-pacific-known
			Garig Gunak Barlu Cobourg Marine Park Green Sawfish Project: Scoping Trip Report	https://www.nespmarine.edu.au/document/garig-gunak-barlu-cobourg-marine-park-green-sawfish-project-scoping-trip-report
			The phylogenomic position of the Critically Endangered Largetooth Sawfish *Pristis pristis* (Rhinopristiformes, Pristidae), inferred from the complete mitochondrial genome	https://www.nespmarine.edu.au/document/phylogenomic-position-critically-endangered-largetooth-sawfish-pristis-pristis
			Scoping a seascape approach to managing and recovering northern Australian threatened and migratory marine species	https://www.nespmarine.edu.au/document/scoping-seascape-approach-managing-and-recovering-northern-australian-threatened-and
			Desktop review of Indigenous research and management priorities for threatened and migratory species	https://www.nespmarine.edu.au/document/desktop-review-indigenous-research-and-management-priorities-threatened-and-migratory
			Characterising northern estuaries using the Digital Earth Australia	https://www.nespmarine.edu.au/document/characterising-northern-estuaries-using-digital-earth-australia
			Northern Australia threatened species	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=47042e1d-8940-4186-8644-e6f5402574f4
			Northern Australia pressures mapping	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=ecb15d97-8deb-454e-bca8-0db634d9e29a
			Northern Australia changes in key coastal habitats	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=1ab541b2-01ce-4062-8b1d-8b5d24f7d346

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
A13	**Estimation of population abundance and mixing of 'Southern' right whales in the Australian and New Zealand regions**	This project will provide, for the first time, an abundance estimate of the total Australian population of southern right whales. It will also investigate the movement and connectedness of whales that utilise breeding areas on the eastern, southern and western coasts of Australia. Information on the population abundance and movements of southern right whales provided by this project will allow the Australian government to better evaluate progress made against the Conservation Management Plan for the species and ensure conservation efforts for the species are effectively coordinated at the regional level.	International Whaling Commission paper on southern right whales	
A14	**Identification of near-shore habitats of juvenile white sharks in Southwestern Australia**	There is credible evidence that juvenile white sharks are present in a relatively restricted region between the head of the Great Australia Bight (GAB) and Ceduna, which encompasses the boundaries of State and Commonwealth managed marine parks and reserves, some of which are accessed via Indigenous Protected Areas. This pilot project is to undertake visual surveys (using Unmanned Aerial Vehicle – UAV) for juvenile white sharks during spring and summer. The on-land surveillance approach outlined in this proposed pilot project will inform decision makers on the efficacy of supporting subsequent on-water activity to capture and electronically tag juvenile white sharks to assess habitat use in the Great Australian Bight Marine Park (Commonwealth waters) and Far West Coast Marine Park (State waters).	Story for Marine Park Science Atlas: Hunting for white sharks in South Australia	https://atlas.parksaustralia.gov.au/hunt-for-prime-white-shark-habitat
			Final report: A14 Identification of near-shore habitats of juvenile white sharks in south-western Australia	https://www.nespmarine.edu.au/document/final-report-a14-identification-near-shore-habitats-juvenile-white-sharks-south-western-0
A15	**Conservation status of tropical inshore dolphins**	The Conservation Status of Tropical Inshore Dolphins project will entail the compilation and review of the results of numerous research projects completed under the Whale and Dolphin Protection Plan, as well as monitoring and offset programs associated with port developments. The aim is to provide a synthesis of scientific information to inform assessments of the conservation status of the: Australian snubfin dolphin, Orcaella heinsohni; Australian humpback dolphin, Sousa sahulensis; and Indo-Pacific bottlenose dolphin, Tursiops aduncus.		
B1	**Road testing decision support tools via case study applications**	This project will deploy tools from economics and decision science to identify sound investments within constrained budgets for: 1. Ecological monitoring of Commonwealth Marine Reserves 2. Management actions for threatened and migratory species or threatened communities, and 3. Restoration of saltmarsh and shellfish habitats. The three case studies involve coherent integration of ecological understanding, social and organisational value judgements, and economic analysis.	Restoration Showcase June 2020 - Webinar Presentation - "How can we target investment for healthier habitats"	https://www.nespmarine.edu.au/document/restoration-showcase-june-2020-webinar-presentation-how-can-we-target-investment-healthier
			Review of decision support tools and their potential application in the management of Australian Marine Parks	https://www.nespmarine.edu.au/document/review-decision-support-tools-and-their-potential-application-management-australian-marine
			Benefit-cost analysis of the Windara shellfish reef restoration project	https://www.nespmarine.edu.au/document/benefit-cost-analysis-windara-shellfish-reef-restoration-project
			Benefit-cost analysis for marine habitat restoration: a framework for estimating the viability of shellfish reef repair projects	https://www.nespmarine.edu.au/document/benefit-cost-analysis-marine-habitat-restoration-framework-estimating-viability-shellfish
			An assessment of alternative management interventions for treatment of Tropical Fire Ants on Ashmore Reef - Report	https://www.nespmarine.edu.au/document/assessment-alternative-management-interventions-treatment-tropical-fire-ants-ashmore-reef-0
B2	**Analysis and elicitation to support State of the Environment reporting for the full spectrum of data availability**	The availability and quality of observation data that may be used to support State of the Environment reporting lies on a spectrum from: (i) high quality (e.g. Reef Life Survey, Long term reef monitoring programme, Temperate Reef Monitoring programme, state-based MPA monitoring programmes); (ii) moderate quality (e.g. continuous plankton recorder, occasional by catch surveys); (iii) low quality (anecdotal information) to (iv) expert beliefs but no empirical observations. The project has been completed, and provided direct input to the marine chapter of the 2016 State of the Environment report, by providing expert assessment of environmental status indicators defined for the 2011 State of the Environment report.		
B3	**Enhancing access to relevant marine information – developing a service for searching, aggregating and filtering collections of linked open marine data**	This project aims to improve the searchability and delivery of sources of linked open data, and to provide the ability to forward collections of discovered data to web services for subsequent processing through the development of a linked open data search tool. The work will improve access to existing data collections , and facilitate the development of new applications by acting as an aggregator of links to streams of marine data. The work will benefit managers (i.e. Department of the Environment staff) by providing fast and simple access to a wide range of marine information products, and offering a means of quickly synthesizing and aggregating multiple sources of information.	Enhancing access to relevant marine information - developing a service for searching, aggregating and filtering collections of linked open marine data - final report - Report	https://www.nespmarine.edu.au/document/enhancing-access-relevant-marine-information-%E2%80%93-developing-service-searching-aggregating-and
			Enhancing access to relevant marine information: Developing a service for searching, aggregating and filtering collections of linked open marine data - Scoping study - Report	https://www.nespmarine.edu.au/document/enhancing-access-relevant-marine-information-developing-service-searching-aggregating-and

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B4	**Underpinning the repair & conservation of Australia's threatened coastal-marine habitats – phase II.**	The objective of this research is to support the scaling-up of repair efforts for two threatened nearshore marine ecological communities, shellfish reefs and salt marshes. Both habitats harbour significant marine biodiversity and play a critical role in supporting healthy estuarine and nearshore systems. The research synthesis will be used to guide the development of more effective policy on coastal-marine repair, improve community education on the importance of habitats to estuary health and develop a detailed business case to support investment in marine repair activities for private industry stakeholders.	Estimating the value of tropical coastal wetland habitats to fisheries: Caveats and assumptions	https://www.nespmarine.edu.au/document/estimating-value-tropical-coastal-wetland-habitats-fisheries-caveats-and-assumptions
			Prospects for seascape repair: three case studies from eastern Australia	https://www.nespmarine.edu.au/document/prospects-seascape-repair-three-case-studies-eastern-australia
			Habitat value of Sydney rock oyster (*Saccostrea glomerata*) reefs on soft sediments	https://www.nespmarine.edu.au/document/habitat-value-sydney-rock-oyster-saccostrea-glomerata-reefs-soft-sediments
			Estimating the potential fishery benefits from targeted habitat repair: a case study of School Prawn (Metapenaeus macleayi) in the lower Clarence River Estuary	https://www.nespmarine.edu.au/document/estimating-potential-fishery-benefits-targeted-habitat-repair-case-study-school-prawn
			Expanding fish productivity in Tasmanian saltmarsh wetlands through tidal reconnection and habitat repair	https://www.nespmarine.edu.au/document/expanding-fish-productivity-tasmanian-saltmarsh-wetlands-through-tidal-reconnection-and
			Seven pearls of wisdom: advice from Traditional Owners to improve engagement of local Indigenous people in shellfish ecosystem restoration	https://www.nespmarine.edu.au/document/seven-pearls-wisdom-advice-traditional-owners-improve-engagement-local-indigenous-people
			Australian shellfish ecosystems: Past distribution, current status and future direction	https://www.nespmarine.edu.au/document/australian-shellfish-ecosystems-past-distribution-current-status-and-future-direction
			Underpinning the repair and conservation of Australia's threatened coastal-marine habitats: Shellfish restoration research - Mid-project update - Report	https://www.nespmarine.edu.au/document/underpinning-repair-and-conservation-australia%E2%80%99s-threatened-coastal-marine-habitats
			Repairing and conserving Australia's saltmarshes and seascapes - Report	https://www.nespmarine.edu.au/document/repairing-and-conserving-australia%E2%80%99s-saltmarshes-and-seascapes
			Sustainable management of Australia's coastal seascapes: a case for collecting and communicating quantitative evidence to inform decision-making - Journal Article	https://www.nespmarine.edu.au/document/sustainable-management-australia%E2%80%99s-coastal-seascapes-case-collecting-and-communicating
			Shellfish reef habitats: a synopsis to underpin the repair and conservation of Australia's environmental, social and economically important bays and estuaries - Report	https://www.nespmarine.edu.au/document/shellfish-reef-habitats-synopsis-underpin-repair-and-conservation-australias-environmental
			Australia's saltmarshes: a synopsis to underpin the repair and conservation of Australia's environmentally, socially and economically important bays and estuaries - Report	https://www.nespmarine.edu.au/document/australias-saltmarshes-synopsis-underpin-repair-and-conservation-australias-environmentally
			Fostering the repair of Australia's saltmarshes and shellfish reefs - Fact Sheet	https://www.nespmarine.edu.au/document/fostering-repair-australia%E2%80%99s-saltmarshes-and-shellfish-reefs-fact-sheet
			Symposium report: Inaugural Australian Coastal Restoration Symposium	https://www.nespmarine.edu.au/document/symposium-report-inaugural-australian-coastal-restoration-symposium
			Restoring Angasi oyster reefs: What is the endpoint ecosystem we are aiming for and how do we get there?	https://www.nespmarine.edu.au/document/restoring-angasi-oyster-reefs-what-endpoint-ecosystem-we-are-aiming-and-how-do-we-get-there
			Australian shellfish reef images	http://catalogue.aodn.org.au/geonetwork/srv/en/metadata.show?uuid=2ddd5dbc-cc54-4777-aa14-56c461d180f0
			Shellfish reef locations	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=8677fd3f-c640-460c-b5a9-34177884a076
			Biodiversity supported by shellfish reefs	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=5acb935b-c8da-4b2e-af38-63ac1da126be
			Saltmarsh prawn and fish species composition and production data	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=a15a9349-e357-4e0a-a8c0-8e6fcb306279
			Shellfish water filtration data	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=13682e14-1d4d-46d5-839d-8c40a3713ce6
			Restoring Shellfish Reefs (Ocean breef)	https://www.youtube.com/watch?v=nl-CzovK5pA

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C1	**Improving our understanding of pressures on the marine environment**	The marine environment in Australia is impacted by a wide range of different pressures. This project aims to assist DoE, and other research users, to improve understanding of the potential impacts of anthropogenic disturbance to marine conservation values by providing up-to-date data and analyses on the spatial distribution of pressures and trends. The research is designed to inform decision making under the EPBC Act (acceptability of proposed activities, evaluation of effectiveness of mitigation measures) on NMES (including Key Ecological Features), implementation of multiple strategies in four Marine Bioregional Plans management of Commonwealth Marine Reserves and State of the Environment reporting.	Challenges for global ocean observation: the need for increased human capacity	https://www.nespmarine.edu.au/document/challenges-global-ocean-observation-need-increased-human-capacity
			Globally consistent quantitative observations of planktonic ecosystems	https://www.nespmarine.edu.au/document/globally-consistent-quantitative-observations-planktonic-ecosystems
			Options for assessing risks to environmental values in Matters of National Environmental Significance and Commonwealth Marine Reserves – report to be uploaded to website	https://www.nespmarine.edu.au/document/options-assessing-cumulative-impact-and-risk-environmental-values-matters-national
			Reviewing the EBSA process: Improving on success	https://www.nespmarine.edu.au/document/reviewing-ebsa-process-improving-success
			Essential ocean variables for global sustained observations of biodiversity and ecosystem changes	https://www.nespmarine.edu.au/document/essential-ocean-variables-global-sustained-observations-biodiversity-and-ecosystem-changes
			Rethinking Approaches to Valuation in Marine Systems – report to be uploaded to website	https://www.nespmarine.edu.au/document/rethinking-approaches-valuation-marine-systems
			Towards a value based approach to cumulative risk and impact analysis - Fact sheet	https://www.nespmarine.edu.au/document/towards-value-based-approach-cumulative-risk-and-impact-analysis
			Changes in pressures on the Marine Environment over three decades	https://www.nespmarine.edu.au/document/changes-pressures-marine-environment-over-three-decades
			Australian Ship Reporting System and Automatic Identification System - Shipping Summaries - 1999-2015	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=b8135966-33c6-4a1c-bcbc-d797c2a1155f
			Cyclone Summaries 1900-2015	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=9fb32adf-f8e8-4b38-8e23-1c6e847b6a91
			Maritime Cables	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=b8824a13-8e0b-4172-9678-dabccdedeeb7
			Petroleum and Gas Production Facilities, Australia 2016	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=2eddbe26-0276-4468-a210-0c00ada8bf39
			Petroleum pipelines	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=19d8f59a-b918-442f-8e2c-d80125600868
			Petroleum Titles, Australia 2016	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=836b1a1d-19d8-4f66-b12f-88e4ce9ba19c
			Plastic Pollution in the World's Oceans (2007-2013)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=DA83B0E3-2B75-48A2-8FDD-874EDD9DBDBF
			Pollution Events Summary, Australia 1970-2015 (AMSA)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=2ff40822-a773-4788-aedd-232639142cde
			Population Density, Australia 2011 (ABS)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=c8b09cef-c645-48aa-8658-22ece782365f
			Seismic Surveys, Australia (2015)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=17249677-2be0-43a0-a9b5-da01e0be3fa7
			Using ecologically or biologically significant marine areas (EBSAs) to implement marine spatial planning	https://www.nespmarine.edu.au/document/using-ecologically-or-biologically-significant-marine-areas-ebsas-implement-marine-spatial
			Summaries of AFMA log book data on effort distribution for Commonwealth fisheries in the Australian Exclusive Economic Zone	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=aa53a4df-7fe6-46d1-93b7-2d3732f4883e
			Twenty years of high-resolution sea surface temperature imagery around Australia: inter-annual and annual variability	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=b8f48127-495e-42e6-8d53-db3c56ee3a7f
			State fisheries data	

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
C2	**Continental-scale tracking of threats to shallow Australian reef ecosystems**	The project will integrate Australia's largest, most detailed datasets of shallow-water tropical and temperate marine biodiversity, and assess how pollution, fishing, rising sea temperatures and introduced species are impacting associated natural values. An initial outcome will be the identification of state-of-the-environment indicators for inclusion in the 2016 State of the Environment report, with subsequent activities aimed at contributing additional data products needed for other NESP projects, Parks Australia, and the Essential Environmental Measures initiative. The project will also describe a national shallow-water baseline of biodiversity in Commonwealth Marine Reserves for assessment of change through the long term.	A global assessment of the direct and indirect benefits of marine protected areas for coral reef conservation	https://www.nespmarine.edu.au/document/global-assessment-direct-and-indirect-benefits-marine-protected-areas-coral-reef
			Moving beyond trophic groups: evaluating fishing-induced changes to temperate reef food webs	https://www.nespmarine.edu.au/document/moving-beyond-trophic-groups-evaluating-fishing-induced-changes-temperate-reef-food-webs
			Continental-scale tracking of threats to shallow Australian reef ecosystems - Indicator report	https://www.nespmarine.edu.au/document/continental-scale-tracking-threats-shallow-australian-reef-ecosystems-indicator-report
			Thermal limits to the geographic distributions of shallow-water marine species - Journal Article	https://www.nespmarine.edu.au/document/thermal-limits-geographic-distributions-shallow-water-marine-species
			Abundance and local-scale processes contribute to multi-phyla gradients in global marine diversity - Journal Article	https://www.nespmarine.edu.au/document/abundance-and-local-scale-processes-contribute-multi-phyla-gradients-global-marine
			Translating local benthic community structure to national biogenic reef habitat types - Journal Article	https://www.nespmarine.edu.au/document/translating-local-benthic-community-structure-national-biogenic-reef-habitat-types
			Ubiquity of microplastics in coastal seafloor sediments - Journal Article	https://www.nespmarine.edu.au/document/ubiquity-microplastics-coastal-seafloor-sediments
			Colours of the Coral Sea - Poster	https://www.nespmarine.edu.au/document/colours-coral-sea
			Assessing national biodiversity trends for rocky and coral reefs through the Integration of citizen science and scientific monitoring programs - Journal Article	https://www.nespmarine.edu.au/document/assessing-national-biodiversity-trends-rocky-and-coral-reefs-through-integration-citizen
			Biodiversity enhances reef fish biomass and resistance to climate change - Journal Article	https://www.nespmarine.edu.au/document/biodiversity-enhances-reef-fish-biomass-and-resistance-climate-change
			Bright spots among the world's coral reefs - Journal Article	https://www.nespmarine.edu.au/document/bright-spots-among-world%E2%80%99s-coral-reefs
			Thermal biases and vulnerability to warming in the world's marine fauna	https://www.nespmarine.edu.au/document/thermal-biases-and-vulnerability-warming-worlds-marine-fauna
			Pollution markers at ecological monitoring sites	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=11075fdf-e53e-4d8c-8999-0b239a742243
			Integration of marine biodiversity datasets and derived indicators	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=084e90fe-ef03-4b41-8991-832116db2ffb
C3	**Change detection and monitoring of key marine and coastal environments – application of the Australian Geoscience Data Cube**	This project aims to leverage the extensive time-series of earth observation image data in the Australian Geoscience Data Cube (AGDC) by developing change detection algorithms to analyse key environmental parameters in the coastal and marine zone. Spatial information produced by this project can inform management decisions, and assist in evaluating management action outcomes, by providing a quantifiable measure of historical change and ongoing monitoring and change detection capabilities. Phase 1 of this project aimed to demonstrate the capability of using the AGDC through the development of an inter-tidal zone change detection algorithm and data set, with a view to developing and implementing an expanded range of stakeholder targeted algorithms to inform decision making processes in Phase 2.	Coastal change detection tools utilising 28 years of Earth Observation data in the Australian Geoscience Data Cube (AGDC) - Report	https://www.nespmarine.edu.au/document/coastal-change-detection-tools-utilising-28-years-earth-observation-data-australian
			AGDC Time Series Video - Murray Mouth and Lower Lakes	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=a0bf5d29-0986-443a-a9e2-a9d7523c9a3c
			AGDC Time Series Video - Southern Moreton Island	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=90f1121e-b973-46d4-9a51-5f750d954319
			AGDC Time Series Video - Southern Stradbroke Island	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=67fef6b1-1540-445f-a995-71abcefeb99b
C4	**The National Outfall Database project (Clean Ocean Foundation)**	NOD addresses the need of government and community to understand the impacts on health and the ocean environment that occur from sewerage outfalls around Australia. The project will be delivered over a three year time frame and will provide: 1) A publicly accessible national outfall database and reports. 2) A ranking of the outfalls (and sewerage treatment systems) according to health and impact criteria with peer review of the ranking system and resulting ranking outcomes. 3) Comparison of geographical regions in sewerage volume and pollution impact. 4) Mapping of the database and 5) Community engagement in conduct of this research and consumption of the outcomes.	Australian coastal sewage outfalls and data transparency - Public access to government information	https://www.nespmarine.edu.au/document/australian-coastal-sewage-outfalls-and-data-transparency-public-access-government
			National Outfall Database Ranking Report 2018-2019	https://www.nespmarine.edu.au/document/national-outfall-database-ranking-report-2018-2019-financial-year
			National Outfall Database - Prospectus Report 2019	https://www.nespmarine.edu.au/document/national-outfall-database-prospectus-report-2019
			Perceptions and information disclosure of water quality issues in Australia 2019	https://www.nespmarine.edu.au/document/perceptions-and-information-disclosure-water-quality-issues-australia-2019
			National Outfall Database - Community Report for August 2018	https://www.nespmarine.edu.au/document/national-outfall-database-community-report-august-2018

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			National Outfall Database Ranking Report 2017-2018	https://www.nespmarine.edu.au/document/national-outfall-database-ranking-report-2017-2018
			2017 Data Analysis Report	https://www.nespmarine.edu.au/document/national-outfall-database-ranking-report-2017-2018
			Warriewood Monitoring Summary - Report	https://www.nespmarine.edu.au/document/warriewood-monitoring-summary
			National Outfall Database https://www.nod.org.au/	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=21448123-0170-4aff-9b56-2b6aa21c73ed
C5	**Quantification of risk from shipping to large marine fauna across Australia**	Given the substantial and ongoing increases in coastal and port development along the Australian coastline, and an associated increase in recreational and commercial shipping, there is an increasing potential for adverse interactions with marine species. Two risks associated with these activities for large marine fauna are ship collisions (particularly relevant for marine mammals, turtles and whale sharks) and the impact of chronic ocean noise (across a wide range of species). This project aims to provide directed and robust science (species- and area-specific) to inform management and administrative decision-making by the Department of Environment in its application of the EPBC Act.	Quantification of risk from shipping to large marine fauna across Australia: Final Report, Milestone 3.5, RPv3 2017	https://www.nespmarine.edu.au/document/quantification-risk-shipping-large-marine-fauna-across-australia-final-report
			Avoiding the collision course	https://www.nespmarine.edu.au/document/avoiding-collision-course
			Report from workshop on characterising underwater shipping noise in Australia - Report	https://www.nespmarine.edu.au/document/report-workshop-characterising-underwater-shipping-noise-australia
			Historical Data on Australian Whale Vessel Strikes - International Whaling Commission June 2016 - Report	https://www.nespmarine.edu.au/document/historical-data-australian-whale-vessel-strikes-international-whaling-commission-june-2016
			Scoping of potential species for ship strike risk analysis - Report	https://www.nespmarine.edu.au/document/scoping-potential-species-ship-strike-risk-analysis
			Historical Australian vessel strike data	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=78cfb62c-e8ec-4437-9113-1e1fdc523f95
			Distribution map for Western Australian Humpback whale Migration	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=40e7e293-e5e2-4d46-9611-c2db22182b24
			Relative vessel strike risk for Southern Right Whales	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=40e7e293-e5e2-4d46-9611-c2db22182b24
			Relative vessel strike risk for Eastern Australian Humpback whales	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=40e7e293-e5e2-4d46-9611-c2db22182b24
			Relative vessel strike risk for Western Australian Humpback whales	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=40e7e293-e5e2-4d46-9611-c2db22182b24
			Relative vessel strike risk for Green Turtles	https://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=40e7e293-e5e2-4d46-9611-c2db22182b24
D1	**National Data Collation, Synthesis and Visualisation to Support Sustainable Use, Management and Monitoring of Marine Assets**	Effective management of marine assets requires an understanding of ecosystems and the processes that influence patterns of biodiversity. Through collaboration and synthesis of existing data this project will improve access to, and usability of, marine data to better inform management and improve public understanding of biodiversity in the marine estate. End-users and stakeholders will benefit from improved regional and national descriptions of biodiversity assets for the Commonwealth marine estate, including Commonwealth Marine Reserve network and other high-priority marine areas. In turn, this will inform prioritisation of future investments in monitoring marine ecosystems and State of the Environment reporting.	Eco-narrative of Bonaparte Gulf Marine - Milestone 17, RPv4 2018	https://www.nespmarine.edu.au/document/eco-narrative-joseph-bonaparte-gulf-marine-park-%E2%80%93-north-marine-region
			Eco-narrative of Kimberley Marine Park - Milestone 17, RPv4 2018	https://www.nespmarine.edu.au/document/eco-narrative-kimberley-marine-park-north-west-marine-region
			An eco-narrative of Huon Marine Park - South-east marine region	https://www.nespmarine.edu.au/document/eco-narrative-huon-marine-park-south-east-marine-region
			An eco-narrative of Geographe Marine Park - South-west marine region	https://www.nespmarine.edu.au/document/eco-narrative-geographe-marine-park-south-west-marine-region
			An eco-narrative of Gifford Marine Park - Temperate East marine region	https://www.nespmarine.edu.au/document/eco-narrative-gifford-marine-park-temperate-east-marine-region
			An eco-narrative of Perth Canyon Marine Park - South-west marine region	https://www.nespmarine.edu.au/document/eco-narrative-perth-canyon-marine-park-south-west-marine-region
			Origin of high density seabed pockmark fields and their use in inferring bottom currents	https://www.nespmarine.edu.au/document/origin-high-density-seabed-pockmark-fields-and-their-use-inferring-bottom-currents
			Transferring biodiversity models for conservation: Opportunities and challenges	https://www.nespmarine.edu.au/document/transferring-biodiversity-models-conservation-opportunities-and-challenges

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Ecosystem Understanding to Support Sustainable Use, Management and Monitoring of Marine Assets in the North and North-West Regions: Final Report 2016 - Report	https://www.nespmarine.edu.au/document/ecosystem-understanding-support-sustainable-use-management-and-monitoring-marine-assets-0
			Environmental predictors of foraging and transit behaviour in flatback turtles (Natator depressus) - Journal Article	https://www.nespmarine.edu.au/document/environmental-predictors-foraging-and-transit-behaviour-flatback-turtles-natator-depressus
			Palaeoshorelines on the Australian continental shelf: morphology, sea-level relationship and applications to environmental management and archaeology - Journal Article	https://www.nespmarine.edu.au/document/palaeoshorelines-australian-continental-shelf-morphology-sea-level-relationship-and
			Ecosystem understanding to support sustainable use, management and monitoring of marine assets in the North and North-west regions - Stakeholder workshop report April 2016 - Report	https://www.nespmarine.edu.au/document/ecosystem-understanding-support-sustainable-use-management-and-monitoring-marine-assets
			Developing a toolbox of predictive models for the monitoring and management of KEFs and CMRs in the North and North-west regions - Scientific Workshop Report - Report	https://www.nespmarine.edu.au/document/developing-toolbox-predictive-models-monitoring-and-management-kefs-and-cmrs-north-and
			Sea Around Us Project - Relative pelagic fish abundance inferred from commercial catch data, Western Australia (1997-2006)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=16501b1f-4b29-4b52-82d1-2e5c4d536acc
			Sea Around Us Project - Relative demersal fish abundance inferred from commercial catch data, northwestern Australia (1997-2006)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=e90f84bd-a1c8-4943-ac6a-dbfee0cc313e
			Juvenile shark occurrence inferred from baited remote underwater video surveys Northwest Australia (2003-2013)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=5af57072-c4c2-4a5a-bc72-62486dc6d73e
			Oceanic Shoals Commonwealth Marine Reserve - Pelagic baited camera surveys (stereo-BRUVS)	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=ef452136-c42c-4f0a-98b3-f38a000a3752
			Oceanic Shoals Commonwealth Marine Reserve - Opportunistic visual surveys of marine megafauna	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=99208235-d68e-4039-bf77-362549a7aa48
			Oceanic Shoals Commonwealth Marine Reserve - Predicted pelagic diversity	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=99208235-d68e-4039-bf77-362549a7aa48
			Chlorophyll-a and ocean productivity	http://northwestatlas.org/node/27500
			Sea Surface Temperature (SST)	http://northwestatlas.org/node/27499
			Petroleum leases and offshore titles near the Oceanic Shoals as of 2016	http://northwestatlas.org/node/1651
			Biologically important areas (BIAs)	http://northwestatlas.org/node/27496
			Species richness	http://northwestatlas.org/node/27495
			RAMSAR wetlands	http://northwestatlas.org/node/27494
			World Heritage Areas	http://northwestatlas.org/node/27492
			IMCRA provincial bioregions	http://northwestatlas.org/node/27490
			IMCRA mesoscale bioregions	http://northwestatlas.org/node/27489
			Key Ecological Features	http://northwestatlas.org/node/27488
			Bathomes	http://northwestatlas.org/node/27486
			Oceanic Shoals/Wessel Islands Sponge species ids	
			Oceanic Shoals Polychaete species ids	http://www.ga.gov.au/metadata-gateway/metadata/record/102241

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Interactive map gallery 'What research has been done in the North and NorthWest regions to document megafauna, benthos, demersal and pelagic fish and megafauna?'	http://northwestatlas.org/nwa/map/gallery
			Interactive map gallery 'Benthic habitat model outputs for the Oceanic Shoals CMR'	http://northwestatlas.org/node/1710
			Most likely benthic class habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/1710
			Combined benthic class habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#indeterminant
			Hard coral probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#hard coral
			Soft coral probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#soft coral
			Filterer probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#filterer
			Gorgonian probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#gorgonians
			Alcyon probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#alcyon
			Whips probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#whips
			Sponge coral probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#sponge
			Burrowers probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#burrowers
			Macroalgae probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#macro-algae
			Seagrass probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#seagrass
			Halimeda probability habitat model for the Oceanic Shoals CMR	http://northwestatlas.org/node/5449#halimeda
			The 25%, 50%, 75% and 95% kernel utilisation distribution of telemetry data from 11 flatback sea turtles from the Lacepede Islands for each of the main turtle phases of turtle life history; inter-nesting, transit to foraging grounds and foraging	http://northwestatlas.org/node/27491
			Count of research effort across the N and NW regions: high resolution bathymetry; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1684 http://northwestatlas.org/node/1689
			Count of research effort across the N and NW regions: all bathymetry; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1685, http://northwestatlas.org/node/1688
			Count of research effort across the N and NW regions: oceanic data; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1686, http://northwestatlas.org/node/1687
			Count of research effort across the N and NW regions: hard corals; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1674, http://northwestatlas.org/node/1690
			Count of research effort across the N and NW regions: soft corals; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1682, http://northwestatlas.org/node/1691
			Count of research effort across the N and NW regions: sponges; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1683, http://northwestatlas.org/node/1692
			Count of research effort across the N and NW regions: brittle stars; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1671, http://northwestatlas.org/node/1693
			Count of research effort across the N and NW regions: marine mammals; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1675, http://northwestatlas.org/node/1696
			Count of research effort across the N and NW regions: polychaetes; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1679, http://northwestatlas.org/node/1694
			Count of research effort across the N and NW regions: molluscs; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1676, http://northwestatlas.org/node/1695

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Count of research effort across the N and NW regions: seabirds; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1681, http://northwestatlas.org/node/1698
			Count of research effort across the N and NW regions: sea turtles; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1680, http://northwestatlas.org/node/1697
			Count of research effort across the N and NW regions: demersal sharks and rays; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1673, http://northwestatlas.org/node/1700
			Count of research effort across the N and NW regions: pelagic sharks and rays; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1678, http://northwestatlas.org/node/1701
			Count of research effort across the N and NW regions: demersal fish; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1699, http://northwestatlas.org/node/1672
			Count of research effort across the N and NW regions: pelagic fish; by (1) CMR, and (2) KEF	http://northwestatlas.org/node/1677, http://northwestatlas.org/node/1702
			Bathymetry of Bremer Commonwealth Marine Reserve	https://www.youtube.com/watch?v=AgbuMT2QlRg
D2	**Standard Operating Procedures (SOP) for survey design, condition assessment and trend detection**	Understanding of the status and trends of indicators in Australia's marine environment requires standardised monitoring. This project will develop Standard Operating Procedures (SOP) in the planning, collection, analysis, and reporting of monitoring data. In particular, the project will: 1) provide guidance on what kind of monitoring is required (and where and when), 2) provide a simple yet powerful survey design tool, 3) provide two worked SOP examples (one benthic and one pelagic), 4) develop field manuals for some high priority sampling platforms (e.g. underwater video) with prioritisation stemming from a comparative analysis, and 5) assess approaches for monitoring pelagic ecosystems.	Earth Observation for monitoring of Australian Marine Parks and other off-shore Marine Protected Areas	https://www.nespmarine.edu.au/document/earth-observation-monitoring-australian-marine-parks-and-other-shore-marine-protected-areas
			Scoping of new field manuals for marine sampling in Australian waters - Milestone 29, RPv4 2020	https://www.nespmarine.edu.au/document/scoping-new-field-manuals-marine-sampling-australian-waters
			Coral reef monitoring, reef assessment technologies, and ecosystem-based management	https://www.nespmarine.edu.au/document/coral-reef-monitoring-reef-assessment-technologies-and-ecosystem-based-management
			A response to scientific and societal needs for marine biological observations	https://www.nespmarine.edu.au/document/response-scientific-and-societal-needs-marine-biological-observations
			A suite of field manuals for marine sampling to monitor Australian waters	https://www.nespmarine.edu.au/document/suite-field-manuals-marine-sampling-monitor-australian-waters
			Digital Platforms for Marine Science Data and Information (infographic)	https://www.nespmarine.edu.au/document/digital-platforms-marine-science-data-and-information-infographic
			Data Discoverability and Accessibility: Report from July 2019 Workshop on Marine Imagery	https://www.nespmarine.edu.au/document/data-discoverability-and-accessibility-report-july-2019-workshop-marine-imagery
			Field manuals for marine sampling to monitor Australian waters version 2 - Report	https://www.nespmarine.edu.au/document/field-manuals-marine-sampling-monitor-australian-waters-version-2
			Data discoverability and accessibility: report from workshops on marine imagery and biological specimen data	https://www.nespmarine.edu.au/document/data-discoverability-and-accessibility-report-workshops-marine-imagery-and-biological
			Report manuscript describing the impact of ignoring survey information and inclusion probabilities	
			Version 2 of Standard Operating Procedures for collecting marine biodiversity data	https://marine-sampling-field-manual.github.io/
			An Introduction to MBHdesign - a tutorial for R-package. Milestone 30, RPv4 2018	https://www.nespmarine.edu.au/document/introduction-mbhdesign
			Advancing marine biological observations and data requirements of the complementary essential ocean variables (EOVs) and essential biodiversity variables (EBVs) frameworks	https://www.nespmarine.edu.au/document/advancing-marine-biological-observations-and-data-requirements-complementary-essential
			Linking capacity development to GOOS monitoring networks to achieve sustained ocean observation	https://www.nespmarine.edu.au/document/linking-capacity-development-goos-monitoring-networks-achieve-sustained-ocean-observation
			Comparative assessment of seafloor sampling platforms	https://www.nespmarine.edu.au/document/comparative-assessment-seafloor-sampling-platforms

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Comparative assessment of pelagic sampling methods used in marine monitoring	https://www.nespmarine.edu.au/document/comparative-assessment-pelagic-sampling-methods-used-marine-monitoring
			Poster - Gear Up: Field manuals for marine sampling	https://www.nespmarine.edu.au/document/gear-field-manuals-marine-sampling
			Field manuals for marine sampling to monitor Australian waters - Report	https://www.nespmarine.edu.au/document/field-manuals-marine-sampling-monitor-australian-waters
			Flyer - Field manuals for marine sampling to monitor Australian waters - Fact sheets	https://www.nespmarine.edu.au/document/flyer-field-manuals-marine-sampling-monitor-australian-waters
			Spatially balanced designs that incorporate legacy sites - Journal Article	https://www.nespmarine.edu.au/document/spatially-balanced-designs-incorporate-legacy-sites
			Scoping report: Comparative assessment of benthic sampling platforms - Report	https://www.nespmarine.edu.au/document/scoping-report-comparative-assessment-benthic-sampling-platforms
			Scoping report: Comparative assessment of pelagic sampling platforms - Report	https://www.nespmarine.edu.au/document/scoping-report-comparative-assessment-pelagic-sampling-platforms
D3	**Implementing monitoring of AMPS and the status of marine biodiversity assets on the continental shelf**	New [RPv3] - There is a significant need to support Parks Australia in the establishment of a baseline inventory and monitoring program for CMR networks, and ensure it is integrated within a broader national monitoring framework. This project will provide the science support for program development, and a prioritisation framework for implementation. By facilitating national approaches, including a standards-based approach to collecting new marine data, project outcomes will include key steps to assist Parks Australia to implement and initiate a CMR monitoring program, new knowledge to inform CMR management, a national integrated framework for SOE reporting, and collaboration between State-based and Commonwealth-based programs.	A systematic review of remotely operated vehicle surveys for visually assessing fish assemblages	https://www.nespmarine.edu.au/document/systematic-review-remotely-operated-vehicle-surveys-visually-assessing-fish-assemblages
			Taking a deeper look: Quantifying the differences in fish assemblages between shallow and mesophotic temperate rocky reefs	https://www.nespmarine.edu.au/document/taking-deeper-look-quantifying-differences-fish-assemblages-between-shallow-and-mesophotic
			Differential vulnerability to climate change yields novel deep-reef communities	https://www.nespmarine.edu.au/document/differential-vulnerability-climate-change-yields-novel-deep-reef-communities
			Fish assemblages on reefs in the Hunter Marine Park and adjacent waters	https://www.nespmarine.edu.au/document/fish-assemblages-reefs-hunter-marine-park-and-adjacent-waters
			Spatial properties of sessile benthic organisms and the design of repeat visual survey transects	https://www.nespmarine.edu.au/document/spatial-properties-sessile-benthic-organisms-and-design-repeat-visual-survey-transects
			Trialling suitable indicator metrics of change for baited remote underwater video station datasets - progress report	https://www.nespmarine.edu.au/document/trialling-suitable-indicator-metrics-change-baited-remote-underwater-video-station-datasets
			Theme D Project showcase and future research prioritisation workshop report - Report	https://www.nespmarine.edu.au/document/theme-d-project-showcase-and-future-research-prioritisation-workshop-report
			ARMADA: A marine data aggregator and visualisation tool to support management of Australia's Commonwealth Marine Area - Report	https://www.nespmarine.edu.au/document/armada-marine-data-aggregator-and-visualisation-tool-support-management-australia%E2%80%99s
			Sensitivity of fine-scale species distribution models to locational uncertainty in occurrence data across multiple sample sizes - Journal Article	https://www.nespmarine.edu.au/document/sensitivity-fine-scale-species-distribution-models-locational-uncertainty-occurrence-data
			Changes in deep reef benthic community composition across a latitudinal and environmental gradient in temperate Eastern Australia - Journal Article	https://www.nespmarine.edu.au/document/changes-deep-reef-benthic-community-composition-across-latitudinal-and-environmental
			Collation of existing shelf reef mapping data and gap identification - Phase 1 Final Report Shelf reef key ecological features - Report	https://www.nespmarine.edu.au/document/collation-existing-shelf-reef-mapping-data-and-gap-identification-phase-1-final-report
			Identification and collation of Australia's shelf mapping datasets and development of a national geomorphological classification scheme for reef systems - Phase 1 Workshop Report - Report	https://www.nespmarine.edu.au/document/identification-and-collation-australia%E2%80%99s-shelf-mapping-datasets-and-development-national
			Mapping shelf rocky reef habitats in the Hunter Commonwealth Marine Reserve - Report	https://www.nespmarine.edu.au/document/mapping-shelf-rocky-reef-habitats-hunter-commonwealth-marine-reserve
			Geomorphological classification of reefs: draft framework for an Australian standard - Report	https://www.nespmarine.edu.au/document/geomorphological-classification-reefs-draft-framework-australian-standard

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
			Spatial scale and geographic context in benthic habitat mapping: review and future directions - Journal Article	https://www.nespmarine.edu.au/document/spatial-scale-and-geographic-context-benthic-habitat-mapping-review-and-future-directions
			Biological and habitat feature descriptions for the continental shelves of Australia's temperate-water marine parks- including collation of existing mapping in all AMPs	https://www.nespmarine.edu.au/document/biological-and-habitat-feature-descriptions-continental-shelves-australia%E2%80%99s-temperate-water
			Workshop report from the inaugural National MPA Science/Management Network meeting	https://www.nespmarine.edu.au/document/workshop-report-inaugural-national-mpa-sciencemanagement-network-meeting-0
			Workshop report from the National BRUV Forum – Perth, 18-19 July 2017	https://www.nespmarine.edu.au/document/workshop-report-national-bruv-forum-%E2%80%93-perth-18-19-july-2017
			Reefs on the Australian Continental Shelf	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=2ffb37a5-5c58-4ea9-a47d-5d526be31346
			Hydrographic Survey of the Boags Commonwealth Marine Reserve in Southwestern Bass Strait	http://catalogue.aodn.org.au/geonetwork/srv/eng/metadata.show?uuid=fd47612a-fb21-4459-9e3a-adf66ed8ca59
			First look at deep rocky reefs in Beagle Commonwealth Marine Reserve	https://www.youtube.com/watch?v=i2JCGR2SEAc&t=15s
			Discovering black corals in Freycinet Commonwealth Marine Reserve	https://www.youtube.com/watch?v=kgKgNgx4UP4&t=83s
			Oceans of the Unknown Exhibition - mapping the oceans	https://www.youtube.com/watch?v=vzYATX64Lng
			RV Investigator Voyage - Blogging the Seamounts voyage: 23 Nov-19 Dec 2018	https://www.nespmarine.edu.au/seamounts/landing-page
			RV Investigator Voyage - Videos from the Seamounts voyage (23 Nov - 19 Dec 2018)	https://www.youtube.com/user/NERPMarineHub/feed
D4	**Expanding our spatial knowledge of marine biodiversity to support future best-practice reviews**	This project will fill data gaps and evaluate methods relevant to the ongoing spatial management of seafloor biota across the Australian marine domain. The objective is to prepare Australian, State and Territory governments for future best-practice reviews of Australia's marine bioregionalisation that can be used to improve marine spatial planning and management initiatives (e.g. marine bioregional plan and marine protected area reviews, environmental impact and natural heritage assessments). The project will incorporate results from field trips to unexplored offshore areas of Australia's marine domain and communicate biodiversity values of the CMR network to the Australian public.	Wessel Marine Park Post-Survey Report for IN2019T02	
			Post survey report for the Coral Sea Australian Marine Park 2019	https://www.nespmarine.edu.au/document/post-survey-report-coral-sea-australian-marine-park-2019
			Deep-sea temperate-tropical faunal transition across uniform environmental gradients	https://www.nespmarine.edu.au/document/deep-sea-temperate-tropical-faunal-transition-across-uniform-environmental-gradients-0
			Contrasting processes drive ophiuroid phylodiversity across shallow and deep seafloors	https://www.nespmarine.edu.au/document/contrasting-processes-drive-ophiuroid-phylodiversity-across-shallow-and-deep-seafloors
			The eastern Australian Marine Parks: biodiversity, assemblage structure, diversity and origin	https://www.nespmarine.edu.au/document/eastern-australian-marine-parks-biodiversity-assemblage-structure-diversity-and-origin
			Regional-scale patterns of deep seafloor biodiversity for conservation assessment	https://www.nespmarine.edu.au/document/regional-scale-patterns-deep-seafloor-biodiversity-conservation-assessment
			Expanding our spatial knowledge of marine biodiversity to support future best practice reviews	https://www.nespmarine.edu.au/document/expanding-our-spatial-knowledge-marine-biodiversity-support-future-best-practice-reviews
			Polychaetes from Australia's Eastern Abyss	https://www.nespmarine.edu.au/document/polychaetes-australia%E2%80%99s-eastern-abyss
			Towards an IMCRA 5	https://www.nespmarine.edu.au/document/towards-imcra-5
			RV Investigator voyage - Blogging the Abyss (15 May - 16 June 2017)	https://www.nespmarine.edu.au/abyss-landing-page
			RV Investigator Voyage - Videos from the Abyss voyage (15 May - 16 June 2017)	https://www.youtube.com/user/NERPMarineHub/feed

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
D5	**A standardised national assessment of the state of coral and rocky reef biodiversity**	This project will involve integration of a national suite of reef biota Underwater Visual Census (UVC) monitoring datasets (Reef Life Survey, UTas, AIMS, Parks Victoria, SA DEWNR) to provide a comprehensive update to the state of Australian Reefs report for the next national State of the Environment Report. Maps and indicator trends will show changes in the health of rocky and coral reefs nationally from 2005 to 2020. The update will include addition of a new index which summarises the population trajectories for 600-1000 reef species nationally. Individual species trajectories will provide the only threat status information for the majority of these species, assisting future listing of previously unassessed species if significant declines are detected.		
D6	**Socioeconomic benchmarks**	Social and economic values are key drivers for marine science and marine policy but are too rarely integrated with marine biodiversity monitoring programs. In close consultation with PA we will review existing metrics used to survey social and economic values associated with marine parks. This review will include consulting with national and international expertise and actively consulting with State and other Commonwealth agencies, some of whom are currently conducting reviews or have existing frameworks for surveying social and economic values (e.g GBRMPA, NSW DPI and Vic Parks). In collaboration with national partners and PA we will organise a national methods workshops to discuss and refine metrics and methods to quantify social and economic benchmarks for State and Australian Marine Parks (AMPs) and produce an SOP relevant to AMPs taking into consideration the DoEE's environmental accounting processes and PA's Monitoring, Evaluation, Reporting and Improvement (MERI) framework.	Measures for social and economic monitoring of the Australian Marine Parks	https://www.nespmarine.edu.au/document/measures-social-and-economic-monitoring-australian-marine-parks
D7	**NESP Hub support for Parks Australia's Monitoring, Evaluation, Reporting and Improvement System for Australian Marine Parks**	This application is to facilitate Hub engagement with Parks Australia during development and initiation of their Monitoring, Evaluation, Reporting and Improvement (MERI) System for Australian Marine Parks. A key priority for the Marine Parks Branch over the next 18 months is finalising the Australian Marine Park MERI System. The Marine Biodiversity Hub will play an important role in development and implementation of this system. Hub partners have had previous experience in developing the integrated monitoring framework for the Great Barrier Reef, developing a process for identifying indicators for monitoring Key Ecological Features, and also have collected much of the ecological data that exists within Australian Marine Parks.		
D8	**Canyon mapping & biodiversity in Gascoyne Marine Park**	The approved survey to the Gascoyne canyons aims to map the surrounding marine park using multibeam sonar and to characterise the biodiversity of North-West canyon fauna, using an ROV to undertake a comprehensive taxon inventory and eDNA analyses to provide a methodological comparison. The proposed project will extend the survey's capability and increase its relevance to marine park management, particularly in deep-sea and canyon habitats. The proposed project will yield communication products such as a fly-through, eco-narrative, and image library, as well as products consistent with previous NESP reporting such as a voyage plan and post-survey report.		
E1	**Guidelines for analysis of cumulative impacts and risks to the Great Barrier Reef**	Existing guidance and standards for assessing impacts and risk (e.g. ISO 31000) are specified at a high-level allowing for considerable variation in approach, cost and outcomes from assessments and no guidance on direct or cumulative impacts. We will develop a national standard to support analysis of impacts and risks to the environmental, social and economic values required by the EPBC Act. The standard will be compatible with and support the process outlined in the Significant Impact guidelines for MNES and for Australian Marine Parks (AMP), including the means to calculate the impact and risk of upstream, downstream, facilitated and indirect impacts that will be presented in clear tabular and graphic formats, including maps as appropriate.	Guidelines for analysis of cumulative impacts and risks to the Great Barrier Reef	https://www.nespmarine.edu.au/document/guidelines-analysis-cumulative-impacts-and-risks-great-barrier-reef
			Ecosystem restructuring along the Great Barrier Reef following mass coral bleaching	https://www.nespmarine.edu.au/document/ecosystem-restructuring-along-great-barrier-reef-following-mass-coral-bleaching
			A new wave of marine evidence-based management: emerging challenges and solutions to transform monitoring, evaluating, and reporting	https://www.nespmarine.edu.au/document/new-wave-marine-evidence-based-management-emerging-challenges-and-solutions-transform
E2	**Characterising anthropogenic underwater noise to improve understanding and management of acoustic impacts to marine wildlife**	Shipping noise is a marine pollutant that contributes significantly to the marine soundscape and is a stressor of marine animals, particularly marine mammals. In Australia, the characterisation and actual impacts of shipping noise on species behaviour are not clearly understood and information is needed. This research will provide quantitative spatial and temporal maps of vessel noise exposure and impacts to MNES. The outputs will provide key information to marine regulators and management agencies such as DoEE, AMSA and GBRMPA, and their counterparts in state and territory governments, to help them meet responsibilities and obligations under international and national law and policy to minimise the impacts of the shipping noise on MNES.	Underwater noise signatures of ships in Australian waters	
			Finescale shipping noise map map for a smaller area (e.g. GBR) to demonstrate improved methods/data	
			Paper on improve methods of ambient noise estimation	
			Short report summarising the results of the initial investigation into incorporating other sound sources and cumulative mapping and a roadmap to accomplish aims in year 2 of project	

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E3	**Microplastics in the Australian marine environment**	The project will inform national policy and action to reduce the release and impacts of microplastics on our environment and oceans: 1. A literature review will firstly identify key marine microplastics research and policy development internationally, with a focus on research that is contextual to microplastics in the Australian marine environment. 2. From this literature review, an options paper will be developed to explore the most feasible and impactful policy approaches for the Australian context and that can be used to form the basis for discussions at a workshop. 3. A one day workshop will draw together policy-makers, researchers and relevant industry peak bodies to discuss and recommend policy and other options to limit microplastics release into the environment. A workshop report will be drafted to summarise findings, recommendations and next steps. a. The report will provide evidence to underpin the development of national policy aimed at reducing microplastic pollution, including by identifying priority actions to deliver Australia's 2018 National Waste Policy.	Primary microplastics in the marine environment: scale of the issue, sources, pathways and current policy	https://www.nespmarine.edu.au/document/primary-microplastics-marine-environment-scale-issue-sources-pathways-and-current-policy
E4	**Recreational fishing in Commonwealth waters**	Australia's recreational fishing sector is moving further offshore in pursuit of fishing opportunities, which places them in areas managed by the Australian Government. Most recreational fisheries research is state based and at two case study sites - Hunter Australian Marine Park (AMP) and the Ningaloo AMP - this data will be assessed for its usefulness to quantify offshore fishing. New data will also be collected will also be collected using creel, socio-economic and remote sensing techniques to better understand fisher's effort, harvest and motivations. As well, the response by fish communities to harvest and the fishery to climate change will be assessed at larger scales. As recreational fishers are key stakeholders in marine management and regulation, a better understanding of their values is required to effectively inform administration of the EPBC Act (e.g. effects of Matters of National Environmental Significance), use of Australian Marine Parks and Commonwealth managed commercial fisheries.	Recreational fishing in Commonwealth waters - Milestone Report, milestone 6 RPv4 2018	https://www.nespmarine.edu.au/document/recreational-fishing-commonwealth-waters
			A cross continental scale comparison of Australian offshore charter boat and tournament recreational fisheries research and its applications to Marine Park and fisheries management	https://www.nespmarine.edu.au/document/cross-continental-scale-comparison-australian-offshore-charter-boat-and-tournament
			A cross continental scale comparison of Australian offshore recreational fisheries research and its applications to Marine Park and fisheries management	https://www.nespmarine.edu.au/document/cross-continental-scale-comparison-australian-offshore-recreational-fisheries-research-and
E5	**The role of restoration in conserving MNES**	Restoration of marine ecosystems offers the prospect of effective conservation in the face of chronic degradation and climate change. But techniques for restoration are generally in their infancy. In 2018 this project will review the capacity for recent advances in restoration of • giant kelp forests, • coral reefs, • seagrass communities, • saltmarsh communities, and • shellfish communities, to reduce conservation risks associated with matters of national environmental significance (MNES) listed under the Cth EPBC Act. In subsequent years we will trial and extend restoration techniques in the more promising habitats and develop a restoration decision framework to guide future investments.	Restoration Showcase June 2020 - Webinar Presentation - "United Nations Decade on Ecosystem Restoration 2021-2030"	https://www.nespmarine.edu.au/document/restoration-showcase-june-2020-webinar-presentation-united-nations-decade-ecosystem
			Restoration Showcase June 2020 - Webinar Presentation - "Rebuilding Australia's lost shellfish reefs"	https://www.nespmarine.edu.au/document/restoration-showcase-june-2020-webinar-presentation-rebuilding-australias-lost-shellfish
			Restoration Showcase June 2020 - Webinar Presentation - "Rebuilding coastal wetland ecosystems in Great Barrier Reef catchments	https://www.nespmarine.edu.au/document/restoration-showcase-june-2020-webinar-presentation-rebuilding-coastal-wetland-ecosystems
			Benefits and Costs of Alternate Seagrass Restoration Approaches	https://www.nespmarine.edu.au/document/benefits-and-costs-alternate-seagrass-restoration-approaches
			Successful communication for shellfish reef restoration projects	https://www.nespmarine.edu.au/document/successful-communication-shellfish-reef-restoration-projects
			Report on cost-effectiveness of alternative restoration projects	https://www.nespmarine.edu.au/document/benefit-cost-analysis-marine-habitat-restoration-framework-estimating-viability-shellfish
			Can bivalve habitat restoration improve degraded estuaries?	https://www.nespmarine.edu.au/document/can-bivalve-habitat-restoration-improve-degraded-estuaries
			The role of restoration in conserving matters of national environmental significance in marine and coastal environments	https://www.nespmarine.edu.au/document/role-restoration-conserving-matters-national-environmental-significance-marine-and-coastal

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Project Number/ID	**Project Name/Title**	**Project Summary**	**Outputs**	**Link to output**
E6	**Assisting restoration of ecosystem engineers through seed-based and shoot-based programs in the Shark Bay WHS**	This project will develop community-based seeding and shoot planting restoration practices in the Shark Bay World Heritage Site (WHS). The goal is to scale up the existing restoration research to practice and assist recovery of the dominant seagrasses, Amphibolis antarctica and Posidonia australis following the 2011 marine heat wave. The Shark Bay WHS is unique globally for its natural values, including stromatolites, extensive seagrass meadow that have constructed sills and banks over 1,000s of years resulting in restricted exchange with the ocean, unique and abundant marine megafauna including 1/8th of the worlds population of dugongs, large populations of sharks and turtles, and one of the longest studied populations of dolphins in the world. The inshore waters of the WHS provides connectivity to the deeper waters of the adjacent Commonwealth Shark Bay Marine Park. Shark Bay seagrasses have recently been devastated by the marine heatwave of 2010-2011 and these events are predicted to increase in frequency and intensity with global warming. The loss of 23% of seagrass cover in the bay (860 km2) had a flow on effect to mega herbivores, fish, tourism and the commercial aquaculture and fisheries industries dependent of the ecosystem. There is a critical need to develop management actions to respond to such events and to prepare for predicted future events. Seagrass restoration has been explored at Useless Loop and on both sides of the Peron Peninsula near Denham and Monkey Mia over the past 6-8 years (3 ARC Linkage, 1 ARC Discovery Grant), resulting in an increased understanding of the factors required for successful seagrass restoration along the extreme salinity gradient found in Shark Bay. The Malgana people have responsibilities for sea country in Shark Bay and a strong tie to the land and inshore seas that make up the Shark Bay WHS. This project is a collaboration between scientists and the Mulgana community whereby methods will be jointly developed to assist natural recovery in preparation for future devastating impacts of climate change.	Restoration Showcase June 2020 - Webinar Presentation - "Assisting restoration of ecosystem engineers through seed-based and shoot-based programs in the Shark Bay World Heritage Site"	https://www.nespmarine.edu.au/document/restoration-showcase-june-2020-webinar-presentation-assisting-restoration-ecosystem
			Assisting restoration of ecosystem engineers through seed-based and shoot-based programs in the Shark Bay World Heritage Site (WHS)	
E7	**Assessing the feasibility of restoring giant kelp beds in eastern Tasmania**	The proposed research will extend on externally funded work commencing in 2018 to select for thermally tolerant and low-nutrient-tolerant giant kelp (Macrocystis pyrifera) genotypes, and which will examine effects of acclimation of selected genotypes by pre-exposure to warm, nutrient poor conditions. The project will outplant pre-exposed selected genotypes of giant kelp as micro-sporophytes in experiment providing / not providing an added source of nutrient. The work is designed to assess the feasibility of this approach as a means to develop minimum patch sizes for giant kelp that can be self-replacing and self-expanding.	Restoration Showcase June 2020 - Webinar Presentation - "Assessing the feasibility of restoring giant kelp forests in Eastern Tasmania"	https://www.nespmarine.edu.au/document/restoration-showcase-june-2020-webinar-presentation-assessing-feasibility-restoring-giant
SS1	**Synthesis Project 1: Cross-Hub Integrated Assessment - Northern Australia**	This project is a cross-hub research collaboration that draws on the considerable experience, regional knowledge, data and networks in the NESP Hubs to explore the potential application, and benefits, of integrated environmental assessments (IEA), focusing on Northern Australia. The project will develop a process framework to guide IEA, identifying available information and critical knowledge gaps, methods for synthesis and analysis, and participatory approaches and governance settings. The project will review the existing tools and systems to support IEA and identify opportunities and potential location/s to test implementation in Northern Australia. The project will provide decision-makers in the Department (and State and Territory regulatory and planning agencies) with pathways for undertaking IEA approaches in Northern Australia, to underpin sustainable regional development and, avoid environmental harm to internationally important biodiversity assets and cultural heritage values.		
SS2	**Interpreting pressure profiles**	This project has two objectives: (i) to provide a spatial explicit analysis of the relative risks posed to marine conservation values, as defined by the natural values hierarchy of Park Australia's Monitoring, Evaluation, Reporting and Improvement (MERI) framework, by pressures that operate within Australia's Exclusive Economic Zone and state/territory waters (a "hotspots" analysis); and, (ii) provide a proof of concept of an adaptive, probabilistic assessment of the cumulative risks posed to these values, in a region determined to support the Parks Australia MERI project D7, in a manner that is consistent with the seascape-scale cumulative assessment described in the "Guidelines for analysis of cumulative impacts and risks to the Great Barrier Reef" (developed and tested with Commonwealth, State and Industry stakeholders in project E1).		

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SS3	**National trends incoral species following heatwaves**	The project will engage coral taxonomic experts to annotate existing Reef Life Survey photoquadrats taken across northern Australia before and after major disturbances, to allow: •Quantification of the spatial and species-level responses of Australian corals to the 2016 and 2017 marine heatwave and mass bleaching events (and cyclones that occurred during this period). •Identification of the species most threatened by warming and cyclones, and species likely to respond best to restoration efforts. •Contribution to a coral-specific analysis to the next national State of the Environment report, through project D5.		