GOVERNMENT OF WESTERN AUSTRALIA

Department of
Jobs, Tourism, Science and Innovation

Funding Guidelines | WA Marine Science Project

In support of the UN Decade of Ocean Science

Contents

Contact Information

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1. Introduction

1.1. Context

The United Nations Decade of Ocean Science for Sustainable Development 2021 - 2030 (the Decade) launched in February 2021, establishing a call to action to drive international collaboration across science, policy and integrated ocean management with the view to reversing the decline of ocean health.

The international framework of the Decade provides an opportunity for the Western Australian Government to bring together local, national and international expertise to address priority marine research challenges in Western Australia. It is also an opportunity to showcase Western Australia's marine science capability.

The Minister for Science has approved funding to support a marine research project that will contribute to one or more significant Western Australian marine research priorities and address at least one of the global marine science challenges identified within the Decade Challenges for Collective Impact.

This is a wonderful opportunity to showcase Western Australia's leading marine science research, tackle an important challenge and encourage collaboration at a local, national and international level.

1.2. Invitation to respond to a marine science challenge

The Department of Jobs, Tourism, Science and Innovation (JTSI) has consulted with other WA Government agencies to identify a number of marine science challenges. We invite research institutions to submit an expression of interest using the template provided if they wish to help tackle the challenges outlined below:

Marine Challenge #1: What are the best ways for Western Australian institutions, systems and scientists, traditional owners, Aboriginal communities, custodians, and proponents of development proposals to work together to build the coastal and marine knowledge base needed for marine science and shared custodianship in marine resource management?

Marine Challenge #2: Australian ocean climate information, including seasonal forecasts, is produced and made available by a number of organisations however; a gap exists in the synthesis of this information for key regions and marine ecosystems along the Western Australian coastline.

Marine Challenge #3: Filling key gaps in foundational knowledge to measure and model blue carbon ecosystems to inform policy and management in the Western Australian world heritage marine estate.

Refer to Attachment 1 for more information on each challenge.

1.3. Objectives

JTSI will support a Western Australian marine science research project that:

- Supports goals of the Decade;
- Addresses one of the identified marine challenges;

- Showcases Western Australian marine science expertise;
- Draws on local, national and/or international expertise; and
- Is collaborative in its approach.

1.4. How to apply

- Read these guidelines, including assessment criteria;
- Attend the information session;
- Engage with prospective partners;
- Complete the expression of interest application form;
- Submit application via email to science@jtsi.wa.gov.au by midday (AWST) on 24 December 2021.
- Late applications or changes to applications **will not be accepted** after the closing time.

2. The process to identify the project

2.1. The assessment process

JTSI will identify a Decade project through a two-stage process.

Step 1: Expression of interest (November / December 2021)

Research institutions are invited to submit an expression of interest, due by 24 December 2021, that outlines the research approach and provides indicative information regarding partners, contributions, project timing and budget. These will be reviewed against the eligibility criteria and the assessment criteria by a JTSI-led panel.

Following receipt of expressions of interest, JTSI may contact proponents to discuss the proposal, suggest modifications, or make connections with other parties working on similar issues, or who may have submitted similar proposals.

Step 2: Full proposal (February / March 2022)

Proposals that are assessed as having met the criteria will be invited to progress to the detailed proposal stage. In some cases the invitation may include conditions or suggestions.

Detailed proposals will be sought in February 2022 and are expected to be due in March 2022.

Detailed submissions will be considered by a JTSI-led panel against the same criteria as expressions of interest, with the lead entity for the highest scored proposal receiving an offer of funding under a Financial Assistance Agreement (FAA).

A JTSI-led panel will consider proposals against the criteria. JTSI will seek input from nominating agencies and may seek independent expert advice. JTSI will ask your permission to release your application form prior to its release to third parties.

2.2. Eligibility

To be eligible for assessment the proposal must:

- Be led by a Western Australian based tertiary institution or non-government research body;
- Address one of the identified marine science challenges (refer Attachment 1);
- Involve collaboration with at least two (2) other parties (not including the nominating agency)[1]; and
- Be submitted on the Expression of Interest Form via email to science@jtsi.wa.gov.au, by midday (AWST) on 24 December 2021.

The lead entity must also be prepared to submit a proposal to the United Nations for endorsement of the project as a Decade Action.

2.3. Assessment criteria

Proposals will be assessed against the extent to which the proposal:

	Criteria	Weighting
1	Strengthens Western Australia's national and international marine research profile, builds science / research capacity, and contributes to the knowledge base of the identified challenge area.	20%
2	Involves collaboration at a local, national and international level.	20%
3	Generates economic, social and/or environmental benefits for Western Australia and other jurisdictions.	20%
4	Demonstrates capacity to deliver the proposed research outcomes[2].	20%
5	Leverages co-investment to deliver a significant project.	10%
6	Demonstrates alignment with the Decade for Ocean Science Outcomes and Challenges.	10%

Note: an extension or expansion of research that is currently underway can be submitted for consideration, subject to meeting the assessment criteria and expenditure requirements.

Refer to Attachment 2 Guide to Assessment Criteria.

2.4. Notification

If your application has been deemed suitable at the conclusion of the expression of interest assessment process, you will receive written advice and a request to submit a detailed proposal. JTSI may facilitate discussion on shared interests / overlapping submissions. Following assessment of the detailed submissions, applicants will be advised of the outcome of their application by email. If your application is successful, the

[1] Parties may include, but not be limited to for profit entities / corporations, State or Federal Government Agencies, not for profit entities, research providers, industry bodies and other end users.
[2] Experience of the research team, organisational capacity, experience in delivery of similar collaborative projects etc.

email will include an offer of funding. You will be asked to respond within two weeks of receiving the email with your acceptance of the offer or otherwise. Once you accept, JTSI will ask you to enter into a Financial Assistance Agreement (FAA). All applicants, successful or not, can request and receive feedback once they have received advice on the outcome of their application.

3. Funding and expenditure

3.1. WA Government funding

Grant funding available: up to $800,000 over four (4) years commencing 2021-2022. There is no minimum grant amount.

3.2. Acceptable use of WA Government funding and cash co-investment

Expenditure must be incurred by the lead entity or a partner within the project period and be a direct cost to the project in order for it to be funded from the grant.

Expenditure must fit within one of the categories below.

- Salaries and on-costs for personnel directly employed for the project activities (this should be calculated on a pro-rata basis relative to their time commitment using the formula detailed below);
- Contractor costs (must have a written contract prior to starting any project work with costs reasonable and appropriate for the activities performed);
- Student fellowships, stipends and scholarships that are not already funded through other schemes;
- Costs related to the publication of research and the deployment and take-up of research outputs;
- Project management or administration (limited to 10 per cent);
- Communications, media and promotions directly related to the project;
- Travel expenditure directly related to the project;
- Training of volunteers and required approvals;
- Venue and equipment hire (not owned or occupied by applicant);
- Training and workshops; or
- Other associated and relevant costs directly attributable to the delivery of the project.

Eligible salary costs:

- The eligible salary costs are = Annual salary x Weeks spent on the project / 52 weeks x Percentage of time spent on the project.
- Annual salary costs can include a 20% allowance to cover on-costs such as employer paid superannuation, payroll tax, workers compensation insurance.

3.3. Cash co-investment

JTSI is aiming to support a project that generates goodwill, collaboration and collective investment to help tackle an identified challenge. The level of cash and in-kind co-investment from partners will be included in the

assessment of the projects. For co-investment to be considered 'cash' it will need to be used towards an expenditure item as outlined in Section 3.1 and be:

- Money allocated to the project by the lead entity which is then available to be spent at the discretion of the project leader;
- Money transferred to the lead entity by another party to support the project; or
- Money invested in the project by a partner under an agreement with the lead entity.

3.4. The following will be considered as in-kind co- investment for the project

- Existing or ongoing organisational costs;
- Individual membership fees;
- Hospitality functions;
- Insurance;
- Recurring operating costs, e.g. rent and utility costs;
- Upgrades to existing facilities and/or building of new facilities;
- Facility maintenance costs; or
- Purchase of assets for the project.

3.5. Expenditure that cannot be included as co-investment

- Programs/activities that have already commenced or taken place;
- Projects or activities that have already been funded by the Western Australian State Government;
- Purchase of merchandise (e.g. clothing, water bottles etc.);
- Trophies, prize money or gifts; or
- On-costs associated with the general employment arrangement of staff members rather than direct project costs (for example, long service leave, severance costs)

4. Terms and conditions

4.1. How the grant is managed

A lead entity will need to be identified for the project, and that lead entity would enter into a FAA with the State of Western Australia, taking responsibility for managing project funding, reporting and ensuring the requirements of the FAA are met.

The arrangements that the lead entity puts in place with project partners may be written into the FAA. This will be considered once the successful project has been identified.

The FAA will link payments to five (5) milestones:

- Milestone 1: You will need to complete a detailed project plan within 30 days of JTSI and you signing the FAA. JTSI will provide you with a template for this. This confirms the detail of the Research project. The project plan needs to be approved by JTSI before you will receive a payment or commence any activities.
- Milestones 2 – 4: Annual progress reports against the approved project plan, due 12 months apart.
- Milestone 5: A final report due one month after the conclusion of the project, that includes the project financial acquittal

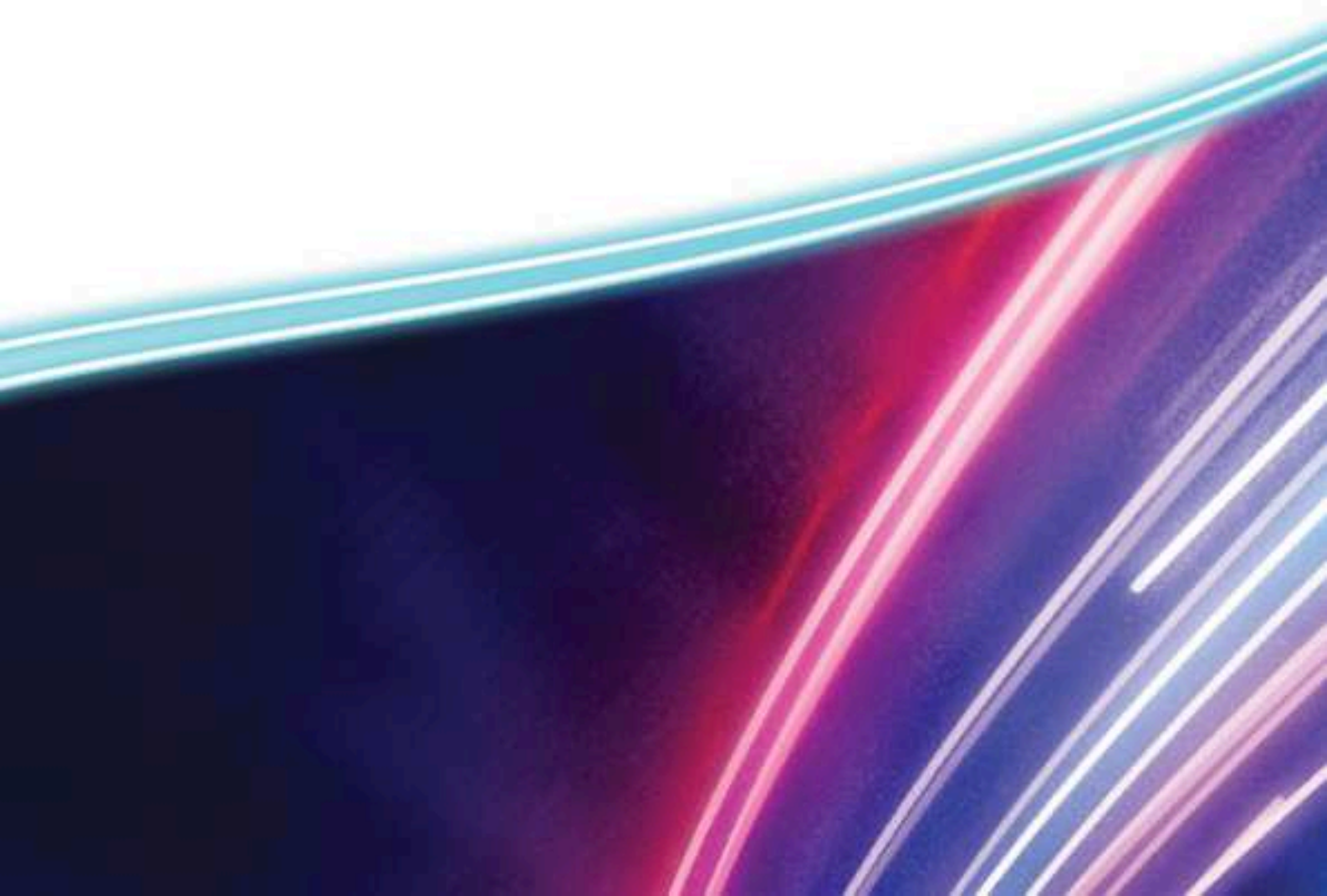
4.2. Freedom of Information Act 1992

You need to be aware that JTSI is subject to the *Freedom of Information Act* 1992, which provides a general right of access to records held by Western Australian State Government Agencies and Local Governments. Information that relates to the receipt of State Government financial support may be tabled in the Western Australian Parliament. This information could include names of recipients, the amounts of financial support, the name of the project/activity and, possibly, a brief description. This could result in requests for more detail to be released publicly. Further information on the operation of the *Freedom of Information Act* 1992 can be obtained from the Department's website.

4.3. Conflict of interest

You must disclose any information that might be relevant to an actual, perceived or potential conflict of interest. You will have the opportunity to do this within the application form.

Attachment 1 – Challenge Overviews



WA Government Challenge
Challenge 1: What are the best ways for Western Australian institutions, systems and scientists, traditional owners, Aboriginal communities, custodians, and proponents of development proposals to work together to build the coastal and marine knowledge base needed for marine science and shared custodianship in marine resource management?

Aligns with Decade Challenge
Challenge 10: Ensure that the multiple values and services of the ocean for human well-being, culture and sustainable development are widely understood, and identify and overcome barriers to behaviour change required for a step change in humanity's relationship with the ocean.

Context

It is intended that this project will identify methods to incorporate Aboriginal cultural and scientific knowledge within Western Australian marine science, contributing to enhanced/collaborative decision making, shared management outcomes, and improved research and management of Western Australia's marine environment. Management of natural resources requires partnerships between varied and diverse stakeholders. A key element in shared management is ensuring that all stakeholders have equitable access to knowledge, resources and expertise to ensure equity in decision making, setting priorities, and implementing research and monitoring programs. In Western Australia, traditional owners are recognised as having responsibilities for the management of marine resources on native title lands, with all marine protected areas managed through a joint management approach based on trust, recognition, mutual respect and shared goals. Outside of native title lands, there is an increasing recognition of the importance of traditional/cultural knowledge in environmental management with a range of goals including improved management, impact assessment and mitigation, and strengthened connections between communities and traditional lands.

While decision-making is underpinned by science, historically this has not always included the foundational understanding of cultural activities and local knowledge that is important to traditional owners and underpins their decision making. Western science findings and the appropriate skills to implement monitoring programs are not always available to traditional owners to ensure they have a shared level of understanding when decisions are made. Further, outside of native title lands traditional owners may not have a direct role in ongoing management of culturally important marine areas. Two way sharing of knowledge is becoming increasingly recognised as best practice in environmental management to ensure all parties have the best information available for decision making and management purposes. This includes understanding values, goals and aspirations, and existing knowledge as well as the tools and techniques to continue to gather information.

To meet this challenge a project could demonstrate and validate culturally appropriate engagement mechanisms, including but not limited to:

- incorporating an understanding and appreciation of the values, priorities and cultural activities of local Aboriginal communities for sea country;
- two way sharing of knowledge between local Aboriginal communities, land/marine managers and the scientific community, including foundational knowledge, methodologies and techniques to acquire information as well as the communication tools to share it;
- culturally appropriate and transparent protocols guiding engagement, curation of knowledge and management of information;

It is intended that the project will be applied to one or more of the following living case studies, and have potential to be applied across Western Australia's coastline. The following potential case studies have been included to highlight different means of approaching this challenge including through a focus on enhancing shared responsibilities for the management of sea country and/or means of capturing and showcasing indigenous knowledge for ongoing environmental impact assessment and management.

Case Study 1 - Aboriginal Cultural Knowledge, Science and Derbal Nera (Cockburn Sound)
Summary
Derbal Nera (Cockburn Sound) has been established as the future home of Western Australia's new container port (Westport). Under the Westport Delivery Strategy, social and environmental outcomes are sought to be optimised by collaborating with stakeholders from the outset to identify opportunities for improving the environment, community values and assets. The Westport project aims to genuinely deepen knowledge and understanding of Nyoongar cultural values and scientific knowledge within Derbal Nera to consider how to incorporate these values into its marine science program, ongoing management, environmental impact assessment and potentially a future revision of the State Environment (Cockburn Sound) Policy. Engagement has commenced with Nyoongar stakeholders to understand values and deliver on benefits (economic and cultural) to the local communities. These discussions have highlighted the opportunity to understand Nyoongar cultural values and scientific knowledge and incorporate these values and knowledge into environmental impact assessment and management of Cockburn Sound. The Westport team is aware of the importance of knowledge around songlines, storylines, historical sea level changes, totem animals, and would like to use these to build a holistic understanding of Derbal Nara, not only from a cultural perspective but also with tangible outcomes and learnings for the environmental management of Derbal Nera.

Nominating Agency: Westport Program Office (Department of Transport).

End users: Cockburn Sound Management Council, Department of Water and Environmental Regulation, Department of Primary Industry and Regional Development, Kwinana Industries Council, the City of Cockburn, Town of Kwinana and City of Rockingham, local Aboriginal communities.

Case Study 2 - Building shared capacity for management of coastal resources with traditional owners across Western Australia with a focus on threatened and migratory megafauna
Summary
The Department of Biodiversity, Conservation and Attractions (DBCA) is responsible for the management of marine protected areas in Western Australia through a joint management approach and is also responsible for the management of threatened marine fauna, many of which are intricately embedded in Indigenous culture throughout Western Australia. While traditional owners have a role in decision processes, information for decision-making and the appropriate knowledge and skills to implement programs is not always effectively communicated. DBCA is aware of the importance of working together with traditional owners to identify shared priorities for marine resources, and finding effective ways to share knowledge including techniques and technologies that will enhance two way sharing of knowledge. The focus of this project would be on-using current experience and learnings to develop a framework for building shared capacity to manage coastal resources with traditional owners, both on and off reserve. This would include working together to identify shared priorities for marine resources, sharing knowledge including techniques and technologies, developing appropriate training and designing communication tools and information storage and access that will enhance two way sharing of knowledge. Threatened and migratory megafauna, namely marine turtles and marine mammals, have high values locally, nationally and internationally and are a focus of State and National plans and international agreements. Shared management priorities for research and monitoring for these species needs to inform the development and application of implementation plans. DBCA has been working with a number of indigenous saltwater communities across the Kimberley through joint management arrangements and research collaborations to better understand shared priorities for marine resources and how to meet research and monitoring needs together. The initial focus has been on turtle, dugong and seagrass resources and a collective of saltwater groups is developing a turtle and dugong management plan. The proposed project could progress and enhance these existing initiatives in joint management and expand the activities to encompass more traditional owner groups.

Nominating Agency: Department of Biodiversity, Conservation and Attractions.

End users: Department of Biodiversity Conservation and Attractions, Traditional Owners, local Aboriginal communities, Indigenous Ranger Groups, joint management bodies (e.g. Land Councils), Department of Primary Industries and Regional Development, other jurisdictions responsible for the management of migratory species.

WA Government Challenge
Challenge 2: Australian ocean climate information, including seasonal forecasts, is produced and made available by a number of organisations however; a gap exists in the synthesis of this information for key regions and marine ecosystems along the Western Australian coastline.

Aligns with Decade Challenge
Challenge 5: Enhance understanding of the ocean-climate nexus and generate knowledge and solutions to mitigate, adapt and build resilience to the effects of climate change across all geographies and at all scales, and to improve services including predictions for the ocean, climate and weather.

Context
Western Australia has been one of the most severely affected regions in Australia by marine heatwaves (MHW), with an average of 20-25 MHW days per year since 1950, and a projected increase of greater than 300 MHW days per year by 2030. Yet there is no central repository of information about heatwave events over time and at the level of detail needed for people to collectively take action and support systems to recover. The 2011 extreme MHW event had a major effect on the marine ecosystem and fisheries, with some fisheries being closed for 5 years and some stocks still having not recovered after 10 years. This presents a challenging future for fishery and aquaculture sustainability.

If industry, recreational fishers and fisheries managers had access to longer lead-time seasonal forecasts of ocean conditions at a regional / ecosystem scale they would be better equipped to adjust their activities to reduce impacts on areas affected by marine heatwave events. However, this requires a comprehensive picture of MHW data which incorporates predictions, outcomes and impacts at a regional / ecosystem scale. Collectively, this information will enable fisheries managers and industry operators to make informed decisions about adaptation and management strategies, both in advance of, and following MHW events.

The Fisheries team in the Department of Primary Industries and Regional Development (DPIRD) is keen to be involved in a project, with the fisheries and aquaculture industries, key stakeholders and researchers to find a way to produce this valuable information and make it available to end users. This could include activities such as:

- Identifying key areas along the Western Australian coast that represent important fishing grounds, spawning/recruitment areas and ecosystems;
- Synthesising available data to downscale seasonal ocean forecasting information/modelling to the areas identified in point 1;
- Scoping the level of seasonal forecasting information useful for informing fishing operations and fishing seasons;
- Documenting historic MHW event data, including the thermal stress predictions and a retrospective narrative on the outcome (location, timing, duration, intensity etc.) and impacts (marine ecosystem and fishing & aquaculture industries) of the MHW events;
- Recommending the most appropriate and effective means of disseminating the project information to end users;
- Developing case studies to highlight the impact of climate change on fishery and aquaculture operations, and demonstrate how seasonal forecasting information can assist operators to plan and adapt for the future.

Nominating Agency: DPIRD is responsible for the development and protection of Western Australia's agriculture and food sector and aquatic resources, and the building of vibrant regions with strong economies.

End Users: DPIRD, fishery and aquaculture industries, research community.

WA Government Challenge
Challenge 3: Filling key gaps in foundational knowledge to measure and model blue carbon ecosystems to inform policy and management in the Western Australian world heritage marine estate.

Aligns with Decade Challenge/s
Challenge 4: Generate knowledge, support innovation, and develop solutions for equitable and sustainable development of the ocean economy under changing environmental, social and climate conditions.

Challenge 5: Enhance understanding of the ocean-climate nexus and generate knowledge and solutions to mitigate, adapt and build resilience to the effects of climate change across all geographies and at all scales, and to improve services including predictions for the ocean, climate and weather.

Context
'Blue carbon' ecosystems support a range of environmental, social and economic values in Western Australia's marine estate and provide opportunities for certification of blue carbon for emissions abatement (e.g. Australian Carbon Credit Units).

Ideally, this project would assess how our marine parks could protect blue carbon assets and storages whilst still protecting the key ecological values of those marine parks.

Understanding blue carbon capture in marine parks requires research that takes a whole-of-ecosystem approach to assess areas of strength and weakness in Western Australia's blue carbon capacity, with the scope including macroalgae, mangroves, seagrass and tidal marshes.

A key knowledge gap has been identifying sources of carbon in sediments, and the contribution of macroalgae relative to other primary producers. The proposed project should address this gap and complement existing mapping to explore the pressures that threaten blue carbon ecosystems, the implications for their carbon capture and storage, and what policies and actions could help the WA seascape maintain and even enhance blue carbon sequestration.

Focussing on Shark Bay and Ningaloo marine parks, both inscribed on the UNESCO world heritage list, the project will quantify blue carbon in these parks, assess risks to long-term storage, and identify key assets. Of value to the Department of Biodiversity, Conservation and Attractions (DBCA) would be a project that includes (but is not limited to):

- Development of spatial models for seagrass, mangrove, tidal marsh and macroalgal (Ningaloo) ecosystems at multiple points in time to understand temporal variability of blue carbon reserves and identify where carbon has been stored stably over that time;
- Mapping of environmental and human pressures that threaten the long-term stability of blue carbon, identifying areas that have been resilient to these pressures over that time, and are likely to remain resilient as climate changes;
- Modelling the input information in terms of the technical and commercial feasibility of carbon stores to be monetised; and
- Using stable isotopes and biomarkers to assess the source of organic matter in marine sediments at multiple locations and habitats within each marine park to reveal the source-to-sink pathways in blue carbon cycles.

Nominating Agency: DBCA is responsible for Western Australia's Marine Parks.

End Users: DBCA, Department of Water and Environmental Regulation, Department of Primary Industry and Regional Development, regional communities, carbon markets, Clean Energy Regulator.

Attachment 2 – Guide to assessment criteria

This attachment provides suggestions on the information that could be considered in the response to each of the selection criteria.

It is a guide only, to assist with applications – proposals do not need to include all the material suggested and can contain information not covered in this guide.

Strengthens Western Australia's national and international marine research profile, builds science/research capacity, and contributes to the knowledge base of the identified challenge area.

Responses to this criterion could consider:

- How the project will contribute to the profile of WA marine research, including communications activities, forums and expert committee, collaborations;
- The extent of the development of new knowledge through basic and/or applied research;
- Knowledge shared through traditional research means (publications, presentations, publishing resources / tools / data etc.);
- Knowledge shared through other means (citizen science, science outreach);
- Training and career opportunities for researchers based in Western Australia;
- Retaining and acknowledging the established research excellence in Western Australia.

Involves collaboration at a local, national and international level

Responses to this criterion could consider:

- How the project can leverage collaboration to help tackle challenges at an ocean scale (i.e. the project does not need to be limited to Western Australian state waters);
- Partners from other jurisdictions in Australia or overseas who will take part in the project;
- How the project activities will build and develop networks and connections at the national and international level;
- Training and career opportunities for researchers based outside of Western Australia, particularly nations around the Indian Ocean.

Generates economic, social and/or environmental benefits for Western Australia and other jurisdictions

Responses to this criterion could consider:

- A logical explanation of how the proposed project activities will generate economic, social and/or environmental benefits in the short/medium/long run;
- The groups that would receive the benefits;
- The time horizon over which the benefits would be generated;
- How benefits will be captured and/or measured;
- Groups in other jurisdictions (nationally or internationally) that could benefit economically, socially and/or environmentally from your project, and how these benefits could be realised.

Demonstrates capacity to deliver the proposed research outcomes

Responses to this criterion could consider:

- The expertise of the partner entities who will assist in delivering the proposed project;
- The capacity of the lead entity to manage the project and proposed outcomes, including experience in delivery of similar collaborative research projects;

- The key personnel / capability that will be in place to deliver the project (especially the research team and project lead);
- Whether the project can be delivered within a four year timeframe;
- Whether the project can be delivered within budget (the grant and proposed co-investment).

Leverages co-investment to deliver a significant project.

The WA Government grant is providing seed funding with a goal of generating a bigger project through additional co-investment. The aim is to achieve a project in the order of $2 million in cash over four years (including the WA Government grant).

At the Expression of Interest stage, JTSI is seeking an estimate of the funding that can be brought to the project and advice on the level of certainty around the funding. Proposals that are invited to Stage 2 (detailed submission) will need to provide more information on budget and letters of support regarding partner co-investment.

Responses to this criterion could consider:

- Outlining the investment by different parties (cash and in-kind) towards the project;
- Explaining the strategy for attracting further resources over the four years (for example, additional grant funding);
- The description of project expenditure and co-investment should be written with reference to these guidelines.

Demonstrates alignment with the Decade for Ocean Science Outcomes and Challenges

The response should show an understanding of the United Nations Decade for Ocean Science for Sustainable Development and contribution that the project will play in supporting at least one Decade challenge and the Decade outcomes.

The 7 Ocean Decade Outcomes:

A clean ocean where sources of pollution are identified and reduced or removed.

A healthy and resilient ocean where marine ecosystems are understood, protected, restored and managed.

A productive ocean supporting sustainable food supply and a sustainable ocean economy.

A predicted ocean where society understands and can respond to changing ocean conditions.

A safe ocean where life and livelihoods are protected from ocean-related hazards.

An accessible ocean with open and equitable access to data, information and technology and innovation.

An inspiring and engaging ocean where society understands and values the ocean in relation to human wellbeing and sustainable development.

The Decade Challenges

Challenge 1

Understand and beat marine pollution

Understand and map land and sea-based sources of pollutants and contaminants and their potential impacts on human health and ocean ecosystems and develop solutions to remove or mitigate them.

Challenge 2

Protect and restore ecosystems and biodiversity

Understand the effects of multiple stressors on ocean ecosystems, and develop solutions to monitor, protect, manage and restore ecosystems and their biodiversity under changing environmental, social and climate conditions.

Challenge 3

Sustainably feed the global population

Generate knowledge, support innovation, and develop solutions to optimise the role of the ocean in sustainably feeding the world's population under changing environmental, social and climate conditions.

Challenge 4

Develop a sustainable and equitable ocean economy

Generate knowledge, support innovation, and develop solutions for equitable and sustainable development of the ocean economy under changing environmental, social and climate conditions.

Challenge 5

Unlock ocean-based solutions to climate change

Enhance understanding of the ocean-climate nexus and generate knowledge and solutions to mitigate, adapt and build resilience to the effects of climate change across all geographies and at all scales, and to improve services including predictions for the ocean, climate and weather.

Challenge 6

Increase community resilience to ocean hazards

Enhance multi-hazard early warning services for all geophysical, ecological, biological, weather, climate and anthropogenic related ocean and coastal hazards, and mainstream community preparedness and resilience.

Challenge 7

Expand the Global Ocean Observing System

Ensure a sustainable ocean observing system across all ocean basins that delivers accessible, timely, and actionable data and information to all users.

Challenge 8

Create a digital representation of the Ocean

Through multi-stakeholder collaboration, develop a comprehensive digital representation of the ocean, including a dynamic ocean map, which provides free and open access for exploring, discovering, and visualizing past, current, and future ocean conditions in a manner relevant to diverse stakeholders.

Challenge 9

Skills, knowledge and technology for all

Ensure comprehensive capacity development and equitable access to data, information, knowledge and technology across all aspects of ocean science and for all stakeholders.

Challenge 10

Change humanity's relationship with the ocean

Ensure that the multiple values and services of the ocean for human wellbeing, culture, and sustainable development are widely understood, and identify and overcome barriers to behaviour change required for a step change in humanity's relationship with the ocean.