



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.