Concept Plan SP 2019-031

Do marine reserves adequately represent high diversity cryptobenthic fish assemblages in a changing climate?

Marine Science

Project Core Team

Supervising Scientist	Shaun Wilson
Data Custodian	Shaun Wilson
Site Custodian	

Project status as of Sept. 23, 2020, 11:07 a.m.

Approved and active

Document endorsements and approvals as of Sept. 23, 2020, 11:07 a.m.

Project Team	granted
Program Leader	granted
Directorate	granted

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Biodiversity and Conservation Science Program

Marine Science

Departmental Service

Service 6: Conserving Habitats, Species and Communities

Aims

The overarching aim of this project is to quantify the diversity and composition of CRF assemblages in Ningaloo Marine Park and gain an understanding of how CRF change due to shifts in fishing pressure or habitat composition caused by climate change. The project will initially 1. Develop appropriate methods for measuring and monitoring CRF assemblages 2. Compare CRF assemblages collected from inside and outside of no-take sanctuary zones and 3. Compare CRF assemblages across a gradient of reef (habitat) types from high coral cover and complexity to reefs dominated by macroalgae with low complexity. The project will initially take place in Ningaloo Marine Park, but may be extended to other marine reserves after the first three stages are completed

Expected outcome

The project will determine appropriate techniques for monitoring CRF, comparing assemblages in fished and unfished areas to assess how spatial variation in fishing pressure influences predation and prey. This will provide an indication of marine reserve effectiveness for conserving diversity and a key ecological process. Comparing CRF assemblages in different habitats and levels of habitat quality (e.g. % coral cover) will also explore how changes in habitat due to climate related disturbances and pressures will affect fish assemblages. Findings will therefore determine the utility of CRF as indicators of environmental change and adequacy of management zones in marine reserves for capturing fish diversity and associated ecological processes. This quantitative approach will provide a basis for assessing the diversity and ecological value of CRF relative to larger bodied counterparts throughout WA's network of marine reserves.

Strategic context

By using novel techniques to assess diversity of an unstudied component of the fish assemblages relative to environmental stressors in the state's network of marine reserves the project aligns with strategic themes of biodiversity knowledge, pressures and threats to ecosystems and innovative science outlined in the Science Strategic Plan 2018-21 (SSP). Specifically, the following approaches in the SSP will be addressed: 1. Conduct biological survey, including genetic survey, in priority management areas, 2. Understand the pressures and threats acting on ecosystems, 3. Identify and realise opportunities for adoption of technical advances and innovative approaches for conservation. As the project involves scientists from the Western Australian Museum, CSIRO, universities and AIMS it also addresses the approach to collaborate with other science providers and government agencies.

The project will also "Undertake research to better characterise finfish diversity and abundance in the reserves" and "assess the potential impacts of climate change on Ningaloo Marine Park over the next 50 years, with particular emphasis on the coral reef communities", both high priority strategies in the current management plan for Ningaloo Marine Park.

Expected collaborations

The project will initially focus on sites in Ningaloo Marine Park and we will work closely with marine staff from the DBCA Exmouth District. The curator of fish at WAM, Dr Glenn Moore, will provide taxonomic expertise, whilst Dr Martial Depcyznski (AIMS) and Dr Chris Goatley (UNE) will help collect fish with icthyocides and provide advice on CRF ecology. Dr Simon Brandl (Simon Fraser University, Canada) and Dr Chris Fulton (ANU) will help with deployment and retrieval of artificial reefs, whilst Dr Cindy Bessey (CSIRO) will co-ordinate sampling and DNA analyses of water to assess the viability of eDNA as a monitoring technique.

Proposed period of the project

July 1, 2019 – June 30, 2022

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	0.5	0.5	0.5
Technical	0.05	0.05	0.05
Volunteer			
Collaborator	0.55	0.55	0.55

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	12,000	10,000	12,000
External Funding			