Concept Plan SP 2021-040

Benefits of marine parks for marine fishes in a changing climate

Marine Science

Project Core Team

Supervising Scientist	Jordan Goetze
Data Custodian	Jordan Goetze
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Project status as of June 24, 2021, 4:09 p.m.

New project, pending concept plan approval

Document endorsements and approvals as of June 24, 2021, 4:09 p.m.

Project Team	required
Program Leader	required
Directorate	required

Benefits of marine parks for marine fishes in a changing climate

Biodiversity and Conservation Science Program

Marine Science

Departmental Service

Service 7: Research and Conservation Partnerships

Aims

To conserve W.A.s marine biodiversity, a network of marine reserves has been established ranging from tropical to temperate waters. In principle these marine reserves should protect the broad range of marine biodiversity found in W.A, however, this is complicated by a changing environment/climate, where marine habitats and species distributions are unlikely to remain static. To assess whether marine parks are representing the full range of species found in W.A., data on species occurrence, abundance and distributions are needed from both inside and outside of marine parks. Marine finfish are an ecologically and socially important component of marine biodiversity, which are a high priority for research and monitoring across most parks, due to the combined pressures of fishing and a changing environment. To enable adaptive management a long-term monitoring program was established in 2009 to understand patterns in the distribution and abundance of finfish across W.A. marine parks. Combining state-wide monitoring data with external collaborations detailing fish assemblages outside of marine parks (collected using multiple methodologies), will allow an assessment of biodiversity across the state. This will be supplemented by ongoing MSP monitoring data and new information on fishes from the Kimberley marine parks. With this in mind, we aim to address the following objectives 1.) Are the marine parks of WA successfully including the full range of finfish biodiversity, representing spatial differences across W.A? If not, which locations/species are not adequately represented within marine parks? 2.) Have finfish assemblages within marine parks changed over time, and do any changes correspond with climatic events or changes in fishing pressure? Moreover, do these changes persist through time and do patterns of change differ among parks located along the WA coast? and 3.) Given differences in the methods used among research institutes, and advances in techniques used to collect fish data, can we develop conversion factors that will enable the synthesis of DBCA finfish data with legacy datasets (underwater visual census) and emerging methods (remotely operated vehicle video)?

Expected outcome

This state-wide synthesis of finfish data will assess the ability of marine parks to conserve the biodiversity of marine fishes across W.A., providing guidance on long-term marine park planning and management, and important information that could be used to determine where future parks may be best placed (Objective 1 and 2). It will also provide an improved understanding of how marine parks function in a changing environment (Objective 2). Through objective 3 we will develop protocols for increasing the size/scope of datasets facilitating a better understanding of spatial and temporal trends in finfish populations. Addressing objective 3 will also enable the evaluation of W.A. conservation management within a global context, highlighting the significance of our ecological assets. Finally, we will make sure that this legacy data is “future proofed” by ensuring comparability with emerging methods due to technological advances (e.g. remotely operated vehicle video surveys).

Strategic context

This project aligns with five strategic themes outlined in the Science Plan 2018-21 (listed in italics below). Specifically, the project will acquire and share knowledge on biodiversity (*Biodiversity knowledge*) through the collation and synthesis of a state-wide finfish dataset, through collaboration with researchers from universities and government agencies (*Collaboration with science providers)*. This will enable a state-wide assessment of the conservation status of marine fishes (*Conservation of ecological communities*), and a greater understanding of the pressures and threats acting on them (*Pressures and threats to ecosystem composition*). It will provide information on the vulnerability of marine fishes to climate change and how marine parks may buffer against these impacts (*Impacts of climate change on biodiversity*). Finally, this project addresses applied research

priorities; *to explore the effects of climate change and fishing on finfishes*, as identified in Kendrick et al, (2016) and the management plans of nine marine parks.

Expected collaborations

This project will synthesise DBCA finfish data across all marine parks in W.A. As such we will work closely with MPCs in regional offices and the monitoring program in MSP. To incorporate data outside of marine parks (needed for objective 1), we will collaborate with external government agencies (AIMS, CSIRO, DPIRD) and universities (UWA and Curtin). We have spoken to data custodians, Euan Harvey and Ben Saunders from Curtin University, Tim Langlois from UWA and James Gilmour and Matthew Birt from AIMS, and Mike Travers from DPIRD who have agreed to commit data to the project and assist in the statistical analysis and interpretation of results. These researchers have extensive experience with the methods used to collect fish data as well as combining large scale datasets to synthesize and provide ecological assessments over broad scales. As such a workshop will be organised to facilitate collation, analysis, interpretation, and write-up of results among collaborators.

Proposed period of the project

July 1, 2021 – July 1, 2024

Staff time allocation

Role	Year 1	Year 2	Year 3
Research Staff (Jordan Goetze, Shaun Wilson)	0.3 (JG),0.05 (SW)	0.3 (JG),0.05 (SW)	0.3 (JG),0.05 (SW)
Monitoring Staff (Tom Holmes, Claire Ross, Emily Lester, Will Robbins)	0.05 (All combined)	0.05 (All combined)	0.05 (All combined)
Technical Officer (Caprice Hyde)	0.05	0.05	0.05

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	$5,000 ResearchBudget$;30,000 Kimberley Fieldwork	$5,000 ResearchBudget$	$6,500 ResearchBudget$
External Funding		$7,500 Collaborators$	