Concept Plan SP 2023-039

Assessing the cumulative risk of anthropogenic pressures to the ecological values of the Exmouth Gulf

BCS Marine Science

Project Core Team

X X **Supervising Scientist** Malindi Gammon
Data Custodian Malindi Gammon

Project status as of July 5, 2023, 11:59 a.m.

X X New project, pending concept plan approval

Document endorsements and approvals as of July 5, 2023, 11:59 a.m.

X X
Project Team required
Program Leader required
Directorate required

Assessing the cumulative risk of anthropogenic pressures to the ecological values of the Exmouth Gulf

Program

BCS Marine Science

Departmental Service

None

Background

Coastal ecosystems are amongst the most threatened on earth due to the threats associated with a growing human population, including coastal development (i.e., land clearing and pollutant run-off), shipping (i.e., noise pollution and risk of vessel strike to marine fauna), fishing (i.e., dredging and overfishing) and climate change (i.e., sea level rise and marine heat waves). Cumulative risk assessments (CRA) aid in understanding the impact people and pressures have on the marine environment. Crucially, they highlight where multiple activities are impacting an ecological value, which may not be considered 'at-risk' when considering pressures individually.

The Exmouth Gulf is a wide, semi-enclosed embayment that supports a number of key ecological and cultural values, including an extensive mangrove, salt flat and algal mat system, a humpback whale nursery, and foraging habitat for dugongs and sea turtles. The significance of Exmouth Gulf was recognised during December 2021 when the West Australian Government announced its intentions to establish a marine park in the Exmouth Gulf. Planning for the marine park requires spatially explicit information on the cumulative threats to habitats in the gulf, and the free-ranging species which use them.

Aims

The overarching goal of this project is to assess the combined risk to the ecological and cultural values from multiple pressures in the Exmouth Gulf using a spatially explicit CRA. This can be separated into the following key aims: (1) identify and collate appropriate spatial data on the values and pressures of the Exmouth Gulf and surrounding areas; (2) identify key knowledge gaps and acquire the necessary field data to address these gaps; (3) model the cumulative risk to the values of the Gulf from multiple pressures, using a CRA; and (4) validate model predictions with appropriate field data.

Expected outcome

The initial data-gathering phase of this project will contribute to a greater understanding of the system-wide ecological values of the Exmouth Gulf and will illustrate key knowledge gaps associated with these. Through the development of a CRA (e.g., The InVEST Habitat Risk Assessment, https://naturalcapitalproject.stanford.edu/software/invest), this project will establish a transparent framework which can be amended and improved as new information becomes available and it is expected identified knowledge gaps will be addressed throughout the project. The CRA maps will provide important information for the marine planning process and will help inform long-term monitoring sites. Results will be shared through presentations to an advisory group established by the Minister for the Environment (the Exmouth Task Force), the Department of Biodiversity Conservation and Attractions (DBCA) Aboriginal Engagement, Planning and Lands Branch, and through scientific publications.

Strategic context

This project will assist to meet the following strategic goals of the DBCA Science Strategic Plan 2022-25:

- Biodiversity knowledge and scientific information are available to inform conservation, adaptive management and decision making;
- Ecosystem management and planning to mitigate threats to ecosystems and associated values is evidence-based and effective; and
- Protected area acquisition and zoning is based on knowledge of conservation values.

This project will collate spatial information on the ecological values and anthropogenic pressures of the Exmouth Gulf, and will collaborate with research institutes to address key knowledge gaps. The cumulative risk to ecological values will be assessed in a spatially-explicit context through a CRA and outcomes will help inform marine park spatial planning.

Expected collaborations

During the initial phase of this project, it is necessary to acquire a range of existing marine spatial datasets and therefore instrumental to engage with a range of data custodians. Some key collaborations already identified include:

- Luciana Ferreira, a Research Scientist at the Australian Institute of Marine Science (AIMS) who specialises in marine megafauna and risk assessments and has several datasets associated with the Exmouth Gulf.
- Sharyn Hickey, a Lecturer at the University of Western Australia who specialises in GIS and remote sensing datasets, and has a number of projects underway in the Exmouth Gulf including work to map the intertidal habitats as part of the Mardie Project (https://wamsi.org.au/research/programs/mardie-project/).
- Karissa Lear, a Post-doctoral Research Fellow at Murdoch University who studies threatened shark and ray fauna, including sawfishes and wedgefishes, which represent an understudied taxa in the Exmouth Gulf.

Proposed period of the project

Nov. 1, 2022 – Oct. 30, 2024

Staff time allocation

to | X | X | X | X |

Role	Year 1 (FTE)	Year 2 (FTE)	Year 3
Scientist - Malindi Gammon (DBCA)	1.00	1.00	
Supervising Scientist - Simone Strydom (DBCA)	0.05	0.05	
Supervising Scientist - Thomas Holmes (DBCA)	0.02	0.02	
Collaborator			

Indicative operating budget

to | X | X | X | X |

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	138,175.00	138,175.00	
External Funding			