



Pilbara Marine Conservation Partnership

Environmental Pressures - Mapping our seabed biodiversity

The Pilbara shelf is an important area, for both its exceptional biodiversity, and its economic development significance. Natural resource conservation is a primary goal for the region which supports extensive human activities like offshore gas and petroleum production as well as commercial and recreational fishing. Planning, assessment and management of the Pilbara's marine environment requires a thorough understanding of the distribution of habitats and biodiversity. It has been highlighted that managers need more information about marine habitats and biodiversity distribution patterns and risks on the Pilbara shelf to ensure human activities are conducted sustainably. A team of Pilbara Marine Conservation Partnership researchers have delivered vital seabed biodiversity maps to help achieve this outcome.

Background

The Pilbara shelf has been a centre of activity over the last decade with large scale developments occurring both on the shelf and along the coastline. Development in the Pilbara's marine environment has, at times, occurred at a rate faster than our capacity to fill key knowledge gaps. Most of the current knowledge of the region has also come from historical offshore fisheries surveys. The lack of detailed understanding of the dynamics within this marine area have made environmental assessments challenging for both industry and the responsible regulators.

To help close this gap the Pilbara Marine Conservation Partnership (PMCP) has been undertaking research on a range of topics in the Pilbara.



Figure 1: Photograph illustrating an example of the abundance and diversity of sponges observed in the Pilbara study area (CSIRO).

The Approach

Between 2012 and 2015, the Pilbara Seabed Biodiversity Mapping & Characterisation Project mapped marine habitats and their associated biodiversity across the length and breadth of the west Pilbara shelf. The regional seabed biodiversity study area spanned the region between northern Ningaloo to the Dampier Archipelago, encompassing Barrow Island and the area west of the Montebello Islands, to depths of approximately 50 metres. The key objective of the study was to provide a region-wide characterisation of biodiversity and habitat patterns in the west Pilbara.

Comprehensive information on biodiversity of the seabed gathered during the Pilbara Seabed Biodiversity Mapping & Characterisation Project was collected by visiting 125 sites, representing a wide range of environments on the Pilbara shelf. Data were collected and processed from over 63 kilometres of towed video, 1469 benthic sled samples and 382 demersal fish trawl samples. Taxonomists and other staff from the [WA Museum](http://www.wa.gov.au/government/department-of-museum-and-heritage) identified 1326 species or taxa.

All this information was used to identify key environmental variables important for structuring seabed distributions, and the development of predictive models of bio-physical relationships between seabed species, their assemblages and the physical environment.





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What did we uncover?

From the information and data collected during the surveys and environmental data sets already in existence (e.g. bathymetry; sediment properties; seabed current stress; NASA Ocean colour; human use data layers) predictive models were developed to quantify the bio-physical relationships between seabed species, their assemblages and the physical environment.

Ten unique biogeographic areas were identified, including details on their composition in terms of habitats, species and characteristic environmental attributes (e.g. depth; salinity; slope).

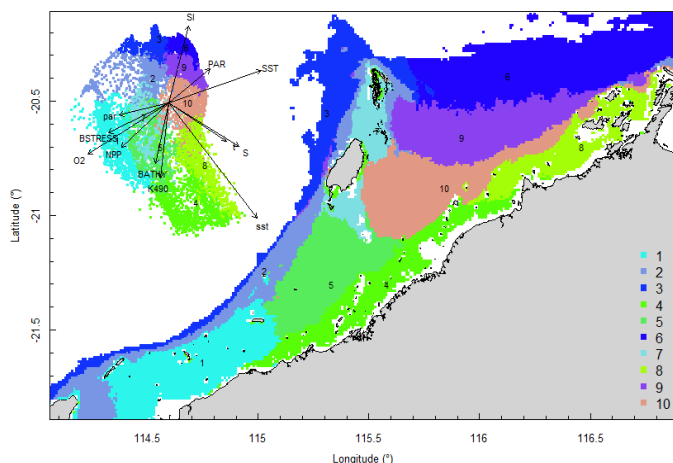


Figure 2: Final seabed characterisation of the west Pilbara region (5-50 m water depth). Ten assemblage types were defined based on analyses of new and existing biological survey data with multiple environmental layers. The biplot indicates the principal variables associated with the assemblages.

Maps were also produced of the predicted distribution and abundance of 180 seabed species throughout the Pilbara study region.

These new data and its analyses have documented the important relationships between sampled species distributions and environmental gradients and have been used to predict patterns of seabed assemblages and species distributions at a regional scale.

Other outputs from the project include thousands of valuable biodiversity specimens accessioned into the WA Museum, and the identification of several new species.

Who is this information useful to?

The project has demonstrated substantial biodiversity on the seabed in the Pilbara region, and has filled in data gaps for the majority of the ~18,700 km² study area, much of which had no pre-existing data.

The information provided by the project will help support the sustainable management of the Pilbara region by providing a range of maps that can be utilised in quantitative environmental assessments, to support spatial planning and management applications across the west Pilbara including conservation and assessments of current uses. The maps can also assist program design for monitoring of biodiversity attributes with respect to various human uses, mapping biodiversity values and quantifying their levels of protection in sanctuary or special purpose zones, and exposure to areas of use.

The characterisation maps also have the potential to provide information for evaluating future development proposals — thus providing lasting benefits.

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To find out more visit: <https://research.csiro.au/pmcp/>

