Progress Report SP 2013-006

The influence of macroalgal fields on coral reef fish

Marine Science

Project Core Team

Supervising Scientist	Shaun Wilson
Data Custodian	
Site Custodian	

Project status as of July 11, 2016, 1:03 p.m.

Approved and active

Document endorsements and approvals as of July 11, 2016, 1:03 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

The influence of macroalgal fields on coral reef fish

S Wilson, T Holmes

Context

Macroalgae are a prominent component of tropical benthic communities along the north-west coast of Australia. Within the Ningaloo Reef lagoon, large fields of macroalgae are a distinct feature of the marine park, covering ~2000 ha. These macroalgal fields are important habitat for fish targeted by recreational fishers and are a focal area for boating activity within the park. Moreover, large seasonal shifts in algal biomass on these and other tropical reefs suggest macroalgae play an important role in nutrient fluxes in Ningaloo and similar systems. Recent work at Ningaloo has quantitatively assessed seasonal variation in biomass and diversity of macroalgal communities and assessed methods for estimating coverage of macroalgae using remote sensing. This project will build on the information gained from these initial studies to improve understanding of how macroalgae are distributed across the Ningaloo lagoon and better define the role of macroalgal fields as habitat for fish recruits and adults.

Aims

- Quantify spatial variance in macroalgal fields at Ningaloo Marine Park, and determine the relative importance of physical and biological drivers of algal abundance and diversity.
- Identify attributes of macroalgal fields favoured by juvenile fish and examine the relative importance of habitat quality and predation on juvenile abundance.
- Assess the influence of juvenile fish on replenishment and future adult abundance.

Progress

- A paper documenting the movement of fish to macroalgal patches with greater cover and canopy height in response to seasonal shifts in macroalgal assemblages has been published in the journal *Ecosphere.*

- Work on seasonal fluxes in macroalgal biomass and the importance of tropical macroalgae as habitat for fish has been presented as seminars at the University of Stockholm, Sweden, The University of Singapore and to Parks and Wildlife staff in the Exmouth District. It has also been incorporated into two posts on Departmental social media.
- A PhD project (STP 2015-006) examining how within- and between-patch habitat structure influences reef fish diversity in macroalgal habitats has begun.
- Field data for four summers and three winters has now been collected.
- Data collected from this project has been incorporated into a wider geographic analysis of shifts in macroalgal communities along the Western Australian coast, which has now been accepted for publication at the journal *Science*.

Management implications

- Marine conservation managers and planners will have a greater understanding of the ecological and social importance of macroalgal habitats in Western Auslralia's tropical north. This includes the ecological importance of macroalgal fields as habitat for fishes and their role in supporting key processes like recruitment. This knowledge will also improve the capacity to predict future abundances of adult fishes, particularly those threatened by changes to habitat, climate and fishing pressure, and will help to maintain important social values like recreational fishing.
- An improved understanding of the distribution of macroalgal fields in tropical Wester Australia will improve predictions of the ecological significance of algal biomass when planning and managing marine reserves.
- This study of macroalgal communities will provide baseline data for future long-term monitoring of the condition of macroalgal communities in marine reserves.

Future directions

- Compile and analyse data to understand links between juvenile and adult fish, assessing the relative importance of juvenile abundance and suitable habitat.