

## **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 June 16, 2021, 10:23 a.m.**

Approved and active

**Document endorsements and approvals as of June 16, 2021, 10:23 a.m.**

**Project Team**

granted

**Program Leader**

granted

**Directorate**

granted

# The influence of macroalgal fields on coral reef fish

S Wilson, T Holmes, K Murray

## 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 approximately 2,000 hectares. 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. 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 review on fish assemblages in tropical macroalgae fields was published in *Fish and Fisheries*. The review, based on surveys from 23 locations in 11 countries, identified 627 fish species in macroalgal fields. Approximately a third of these species were predominantly found in macroalgal habitat as adults or juveniles. The abundance of fish in macroalgal habitats is often highest during the juvenile stage, providing further evidence that macroalgal habitats are important nurseries. Whilst some species are clearly macroalgal specialists, the majority of the fish species observed in macroalgal habitats were also seen in nearby coral or seagrass habitats, indicating that fish move across habitats to forage, reproduce or when they develop from juveniles to adults. While many macroalgal-associated species are of minor commercial value, their local importance for food and livelihood security can be substantial.

## Management implications

- Meta analyses of studies from around the world demonstrate that many fish species inhabit tropical macroalgal meadows during some part of their life and that these meadows are an important component of the tropical seascape.
- Tropical macroalgal habitats are important nurseries for fish of ecological and fisheries importance in Ningaloo Marine Park. Canopy forming macroalgal fields are therefore habitat of high conservation value that should be considered for protection when planning marine reserves.

## Future directions

- Undertake a follow-up study from the meta-analysis combining information collected on the distribution of fish and small-scale tropical fisheries to estimate the contribution of macroalgal habitats to fisheries.
- The spatial and temporal dynamics of canopy forming macroalgae at Ningaloo and how this is influenced by environmental disturbance will be examined.
- Undertake data analyses to understand links between juvenile and adult fish abundance.