

# PROGRESS UPDATE

## COMPONENT

Quantifying the value and market potential of coral reef and mangrove ecosystem services

## ACTIVITY

Valuation of coral reef fisheries productivity in relation to habitat quality

## OBJECTIVE

To develop a food web model for coral reefs that accounts for the influence of coral reef structure and health on the dynamics of a coastal community

**Dr Alice Rogers, The University of Queensland, is towed on a manta board to survey coral reef cover and habitat at Selayar, South Sulawesi.**

Photo: N. Wolff



**Deploying tiles used to quantify algal growth during reef complexity work at El Nido, Philippines.**

Photo: C. Castro



## VALUING FISHERIES PRODUCTIVITY OF CORAL REEF HABITAT, QUALITY

### Overview

This activity involves enhancing a food web model developed for the Caribbean (Rogers et al. 2014) for use at the two CCRES pilot sites: El Nido, Philippines, and Selayar, Indonesia.

The new model will assist coastal managers from government and community agencies to estimate the value of coral reef fisheries and their potential to change over time.

The following actions are being undertaken:

- Model development and refinement
- Data collection and experimentation
- Model testing and validation
- Scaling-up model predictions for marine spatial planning

The team for this activity comprises representatives from The University of Queensland (UQ), Brisbane, the University of Philippines Marine Science Institute (UPMSI), Manila; DINAS Marine and Fisheries, Selayar, and Balai Pengelolaan Sumberdaya Pesisir dan Laut (BPKSL), Makassar, Indonesia.

### Progress

#### El Nido, Philippines

The collection of data to develop a preliminary food web model and make initial estimates on carrying capacity began at El Nido, the Philippines, during May 2015.

During a 10-day field visit the team, led by Dr Alice Rogers, UQ, conducted extensive surveys at seven reef locations in Bacuit Bay, ranging from the inner bay to more exposed sites.

The locations monitored were:

- Depeldet
- Dibuluan
- Pinasil
- Tres Marias
- Twin Rocks
- Dilumacad (Helicopter Island)
- East Matinloc (Hidden Beach)

Data collected is being analysed with key results to be made available in the coming months.

The El Nido model will estimate the reef fisheries' productivity and carrying capacity of reef fisheries, in



relation to spatial variation in primary productivity and reef structural complexity and health.

The team also seeks to quantify reef metrics that are indicators of reef resilience (algal turf heights and coral recruit abundance) and continue monitoring conducted by UPMSI in the area since 1996.

### Selayar, Indonesia

Broad-scale reef assessments along the west and the relatively unpopulated east side of Selayar have been undertaken during field visits to the island during August and November 2015.

During August detailed scuba surveys were carried out at several sites along the western side. The data collected on habitat complexity, fish abundances and benthic cover has been used for a preliminary food web model to make preliminary estimates for carrying capacity and productivity.

During November extensive manta tow surveys were conducted along 10 kilometres of coastline on the eastern side. The data from this activity will help researchers to scale-up the preliminary estimates.

The team is seeking to quantify the extent of reef damage from dynamite fishing (bombing), as well as obtain general measures of coral cover and reef habitat type. Snorkel surveys were also completed, in order to spot-check newly-acquired satellite imagery for the island and build a reliable habitat map.

Data collected were:

1. Percent live coral cover
2. Proportional coverage of branching massive and plating corals
3. Percent soft coral cover
4. Percent / occurrence of bomb damage
5. Percent of available settlement habitat composed of rubble
6. GPS coordinates of reef extent, start of seagrass etc during snorkel transects from reef crest to shore

### RIGHT: A tile used to quantify algal growth.

Photo: M. Quibilan

7. Multiple depth measurement from reef rest to shore, including measures on sand to allow up-scaling for bathymetry maps

Initial analyses reveal that Selayar's eastern side has experienced significant damage from bombing, much of which appears to be older. Some locations are showing encouraging signs of recovery but many do not. There are patches of better habitat, and these tend to be in the southern part of the area surveyed. There are extensive seagrass beds and often narrow expanses of reef.

The data collected will be used to produce coral reef habitat maps for Selayar and scale-up model predictions for potential fisheries productivity on coral reefs of varying habitat quality.

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CCRES will develop knowledge products — which inform the design of global, regional and national projects, plans and policies — and technical models and planning tools which assist with preparation of community-based coastal resource management plans.

