



UP MSI's Kubi Follosco (second left) and DLSU's Cai Sampson (far right) with members of the local community on their third field visit to El Nido for the CCRES project.
Photo: G. Albano

PROGRESS UPDATE

COMPONENT I

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

ACTIVITY

Quantifying the role of mangroves and seagrasses in filtering upland runoff and facilitating sedimentation

OBJECTIVE

To provide information and supplement present understanding on the mechanisms that highlight the efficiency of mangroves and seagrasses in filtering upland runoff and facilitating sedimentation

Sediment captured in the settling disk placed in the mangroves, Manlag, Palawan.

Photo: G. Albano



ASSESSING MANGROVE AND SEAGRASS EFFICIENCY IN SEDIMENTATION AND WATER QUALITY REGULATION

Overview

Mangroves and seagrasses provide services to coastal communities across the East Asia-Pacific region by preventing beach erosion and regulating water quality. Mangroves and seagrasses also trap sediment (the process is referred to as 'sedimentation') and fine particles from run-off that would otherwise enter lagoons and cause stress to adjacent coral reefs.

By stabilising the coastline, these habitats also play a vital role in the defense of the shorelines and riverbanks against erosion and coastal surges.

Among the research activities of CCRES in El Nido on the island of Palawan in the Philippines is a project to measure rates of sedimentation in mangroves over a gradient of genera-specific zones. It involves measuring the amount of sediment trapped by different mangrove zones, and seagrass beds to document the efficiency of these filtration systems.

The data collected will help researchers and coastal managers to understand the sediment-trapping capacity of these ecosystems. The task aims to provide information and supplement the present

understanding of the mechanisms at work in the sedimentation process.

The team for this activity is made up of researchers from De La Salle University (DLSU) and the University of the Philippines Marine Science Institute (UP MSI). The researchers are addressing two key questions:

1. How effective are mangroves and seagrasses in filtering upland runoff in terms of enhancing the settlement of suspended sediments inside the forest and meadow, respectively?
2. What is the spatial pattern of sedimentation within mangrove forests and seagrass meadows?

To answer these questions, the following actions have been undertaken:

- Sediment trapping and measurement across mangrove zones (community types)
- Analysis of the pattern of sedimentation across mangrove zones
- Age-reconstruction of collected *Enhalus acoroides* samples

The locations surveyed to date include Manlag, Aberawan and Cadlao.



These sites, along with another one on Cadlao Island, are helping CCRES researchers to better understand the role of mangroves and seagrass in stabilising the coast and regulating water quality.

Progress

The field activities have been completed for this research project. One of these involved the deployment of settling disks (sediment traps) to measure how much sediment accumulates inside the different mangrove zones and seagrass beds. In 2014, the traps were left onsite for 177 days, and in 2015, for 58 days.

A similar pattern of sedimentation was observed across sites, although mangrove zones with the highest sedimentation varied. Zones with high sediment volume appear to correspond with areas having higher stem density. In Aberawan, the middle zone had the highest volume of sediment deposited, while in Manlag, the seaward zone had the highest sediment deposited. On Cadlao Island, the landward zone showed the greatest accumulation. These results further support the role of healthy and dense mangrove vegetation in trapping sediment and, consequently, in stabilising the coast and regulating water quality.

RIGHT: Mangroves on the Palawan coast.

Photo: G. Sheehan

Across sites, the landward zone was mostly muddy, the middle zone sandy-muddy, and the seaward zone predominantly sandy. Such characterisation is expected to provide further insight into how various mangrove types function in reducing coastal erosion.

Aspects of the seagrass work demonstrate that seagrass density may fulfil an important function in filtering upland runoff in surveyed sites.

Presently, the mangroves in Manlag and Aberawan are capable of mitigating the impacts of sedimentation on adjacent seagrass beds and coral reefs. These must be appropriately managed to address the greater siltation issue in Bacuit Bay. Potential interventions include protecting Manlag and Aberawan mangroves as ecotourism zones, evaluating upland development in relation to its impact on coastal ecosystems and resources, and the regulation of activities on seagrass beds (e.g. fish corrals).

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Measuring growth patterns of seagrass (*Thalassia hemprichii*).

Photo: M. Samson



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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.

