Daan-Lungsod – Guiwang Marine Sanctuary, Alcoy, Cebu

Aileen P. Maypa[1,2], Dean Apistar[1], Jimmy Paguio, Roxie Diaz[1] Danilo Delizo, Jr.[1], Agnes C. Sabonsolin[1] and Sheryll Tesch[1]

[1]Coastal Conservation Education Foundation, Banilad, Cebu City, Philippines 6000

[2] Zoology Department, University of Hawaii at Manoa, Honolulu, Hawaii, 96822, USA

Geographic Location

Daan-Lungsod – Guiwang Marine Sanctuary (9°40'56.5" N, 123°30' 20" E) is located on the southeastern side of Cebu Province. It belongs to the Municipality of Alcoy.

Transect Sites and Methods

Transects were laid on sections of the reef flat (n =3, participatory monitoring), and on the reef crest (n =3, Coastal Conservation Education Foundation Research and Monitoring Team, CCE Foundation-REMOTE). Substrate evaluation employed the point intercept method. Distance between transects (10-20 m) was determined either by kick cycles or by visual estimation. Fish abundance and sizes were also estimated using an underwater visual census technique within three replicate 50 x 10 m transect lines (English *et al*. 1997). The same transects were used for substrate and fish assessments.

Physical Features

Alcoy is one of 53 coastal municipalities of Cebu Province. The municipality is comprised of eight *barangays*, six of which are coastal, including Daan-Lungsod - Guiwang. Agriculture is the main source of livelihood producing crops such as corn, coconut and vegetables (Maypa et al. 2005, 2006). Fishing ranks second major income source engaging 25% of the population. Most of the fishers are marginal and use non-motorized boats. Alcoy is being developed as a tourist destination due to its white sand beaches and coral reef dive sites (Maypa et al. 2006).

Reef Structure and Corals

Daan Lungsod – Guiwang Marine Sanctuary is a 22.709-hectare shoal, located approximately 500 m off the mainland, between the boundaries of *Barangays* Daan Lungsod and Guiwang. The substrate is heterogeneous, consisting of seagrass and coral reef ecosystems.

Live hard coral cover (LHC) in 2008 inside the sanctuary is fair (LHC = 29.67 ± 15.0%). Comparison in LHC between years reveals only a marginal significance ($p = 0.054$, $F = 2.73$, $DF = 6$). However, a significant increase of 7.3% in LHC from the years 2002 to 2003 was documented by Maypa *et al.* (2004). A trend line suggests an increasing pattern from 2002 to 2008.

Noteworthy Fauna

Target fish (commercially important species) densities in the sanctuary and non-sanctuary rank from 'very poor' to 'poor' (less than 400 fish/500m^2) from 2002-2008. However, in 2005 (1,569 ± 606.5 fish/500m^2) the fish density can be classified as moderate (Hilomen et al. 2000). In a previous report, an increasing overall trend was observed in the sanctuary from 2002 to 2006 using a trend-line (Maypa *et al.* 2006). However, an inferential statistical test was not made due to low replication in 2002. Currently, using only the data from October 2003 to 2008, fish density was significantly highest in 2005 ($p=0.017$, $H=12.12$, $DF =4$) compared to the rest of the years sampled; but densities declined significantly in the following years. The dominant target fish are Scarids (parrotfishes) and Caesionids (fusiliers), however, the latter was not recorded in 2008. Fusilier density was significantly ($p = 0.023$, $H = 13.02$, $DF = 5$) highest in 2005 (1473.22 ± 2275.55 fish/500 m^2) and lowest in 2008 (0 ± 0). The density of Scarids, on the other hand, has been maintained from 2003 to 2008 (78.33 ± 38.68 fish/500 m^2). Comparison between years reflected no significant results.

Scientific Importance and Research

This marine sanctuary is regularly assessed by non government organizations (NGOs) and government organizations. Academic institutions also conduct research in the area (e.g., University of the Philippines-Marine Science Institute Giant Clam and Coral Rehabilitation Project, Silliman University Marine Laboratory Coral Rehabilitation Pilot Site). Graduate students from foreign Universities also utilize the sanctuary for both socio-economic and ecological studies.

Economic Value and Benefits

Twenty five percent of the population of Alcoy is engaged in fishing. The adjacent areas of the sanctuary are fishing grounds subjected to moderate to high fishing pressures. Currently, Alcoy appears to rely on pelagic species for food, e.g., family Scombridae *(bodboron, tuloy)*, Belonidae *(balo)* Hemiramphidae *(saluwasi)*. Reef-associated *(e.g., bansikol, mamsa)* and reef species *(e.g., pugapo, katambak)* are less represented in the catch (Municipal Profile 2000). Daan-Lungsod – Guiwang Marine Sanctuary is also a potential dive site for tourist divers.

Disturbance and Deficiencies

Currently, there is a need for more *bantay dagats* (fish wardens). Complete compliance of the "no-take" policy needs to be enforced fully for target fish densities to recover.

Legal Protection

Daan-Lungsod – Guiwang Marine Sanctuary is a no-take zone, established in the year 2002 through Municipal Ordinance No. 2002-12.

Management

The sanctuary is co-managed by the *barangay* councils of Daan- Lungsod and Guiwang LGUs, Guiwang United Fisherfolk Organization (GUFOG) and Alcoy Kingfisher Organization (AKO). This is supported by the municipal LGU through the Mayor, the *Sangguniang Bayan*, the Municipal Agriculture Office (MAO), the Municipal Planning and Development Office (MPDO), PNP Police Environmental Desk Officer (PEDO, and other organizations and individuals. The management body at the municipal level is headed by the Mayor, and is overseen by a project management committee which has six operational committees, namely: (1) patrolling, surveillance and coastal law enforcement, (2) monitoring; (3) information, education, and communications (IEC) and training; (4) financial management; (5) linking/networking and fund sourcing; and (6) equipment and maintenance. The structure and operations are logistically supported by the LGU (e.g., guardhouse, buoys, gasoline for patrolling, etc.). Technical support and other logistical needs are provided by other groups like CCE Foundation, Department of Environment and Natural Resources (DENR) and Bureau of Fisheries and Aquatic Resources (BFAR). Additional funding comes from resolutions and solicitations from the provincial government and other individuals (Maypa et al. 2005, 2006). Current MPA rating using the system developed by CCE Foundation is at level 4 (sustained; data from the CCE Foundation - National Geographic Society project) which is similar to the previous year's rating (Raymundo 2008).

Recommendations

Positive changes in fish abundance and LHC are slow in this sanctuary. Hoever, these findings are consistent with a majority of marine protected areas (MPAs) in southeast Cebu. Of 20 MPAs, only 14% exhibit significant positive changes in both LHC and fish densities within the 4 to 7 years of protection (Eisma - Osorio et al. 2009). Recovery of fish stocks may take longer, thus, continued strict enforcement of the "no-take" policy must be maintained. In addition, fish stocks recovery maybe enhanced if the surrounding non-sanctuary area is managed as well (*e.g.*, limit gear use to non-active gear only). For improvement of the LHC condition, additional areas for coral rehabilitation may be an option, especially in rubble zones.