

Marine Protected Areas of Libagon, Southern Leyte

Initial Findings

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Introduction to Coral Cay Conservation

Coral Cay Conservation (CCC) has carried out marine conservation projects all over the world, including in the Philippines, Belize, Honduras, Malaysia and Fiji. CCC successfully set up Marine Protected Areas and provided scientific data that has been used to manage local marine resources. The project in Danjungan Island in the Philippines between the years 1996-1999 was particularly successful and the reefs around the island recently received the accolade of Best Managed Reef of the World. Since 1995, CCC has worked with the Philippine Reef and Rainforest Conservation Foundation Inc. (PRRCFI) and local communities to survey and safeguard reef and rainforest areas in the Philippines. To date these have included coastal regions of the Southern Negros Occidental, Anilao, Palawan, Danjungan Island and the forests of North Negros.

At the invitation of the Provincial Government of Southern Leyte, CCC began its survey work in Sogod Bay in September 2002. CCC is conducting a collaborative program to survey the region's coral reefs and provide training and conservation education opportunities for project counterparts. The aim is to develop local capacity and ensure the long-term protection and sustainable use of marine resources throughout Southern Leyte. We are hoping that we can build on our previous successes, extending our stay here in Southern Leyte.

The Philippines is renowned for its rich marine environment but with as much as 97% of its reefs at risk, immediate conservation action is needed. Children living in coastal areas are recognized as the future stewards of their marine resources and CCC is working closely with this local stakeholder group to raise awareness and increase understanding of the need for greater conservation efforts in the Philippines.

Introduction to Marine Protected Areas

MPAs are an important management and conservation tool in protecting existing fish stocks and helping them to recover. In addition to this, they allow coral reefs to grow and pristine reefs are protected from harmful human actions. Over a few years we can already begin to see the benefits that properly managed MPAs provide. A ‘spill over’ of fish from within the MPA to outside the MPA allows fishermen to catch fish, often more so than was the case before and ensures that a healthy fish community remains in the protected area (see diagram below). Community based MPAs have proven to be an effective way of forming sustainable fisheries and maintaining peoples livelihoods. A third benefit is that they can provide an income from eco-tourism when divers pay a fee to dive within the MPA. As long as the numbers of divers is restricted and diving is done without touching or interacting with the marine environment, the effects of eco-friendly diving have been proven to be minimal.

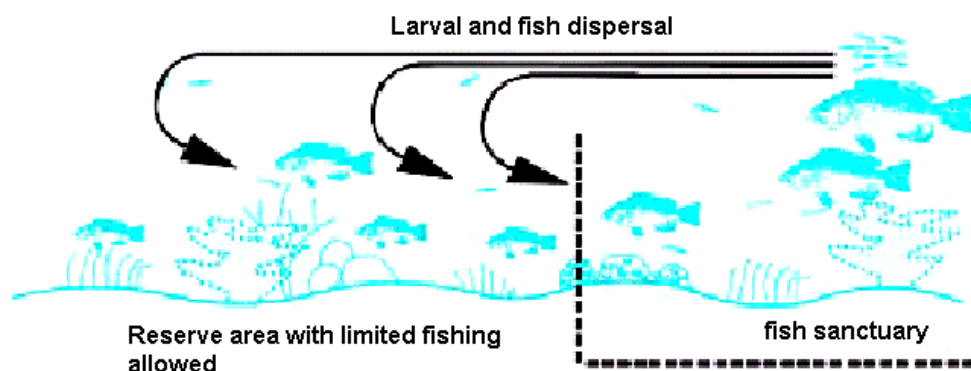


Fig. 3.1. Schematic diagram of MPA functioning. The large, protected fish within the MPA produce larvae which settle and grow outside the MPA where they can be caught by fishermen. In addition, the corals inside the MPA are not disturbed by direct human impacts. One square km of healthy reef can support over 20 tons of fish per year. One square km of damaged/destroyed reef can only produce 3 tons (Bohnsack, 1990).

At the end of October 2006 four dives were completed in different MPAs in Libagon, Southern Leyte. On each dive the MPA was photographed extensively and a brief assessment made of the condition of the reefs. What follows is a description of each site, punctuated with photographs to highlight the comments and observations made, as well as suggestions to improve the management of each site.

Site Name: Biasong MPA

Location: South of Libagon

Site Description

The site was situated on a long, open, exposed area of Sogod Bay just outside Libagon. A rocky shoreline made entry to the dive site challenging with full SCUBA gear. A strong current prevented the entire area from being dived. The location of the dive site suggests strong currents might be frequent in the area. The area itself was surrounded by a few houses that lined the top of the slopes following the coast line; a seating area was already in place for a guard to observe the MPA. Two buoys marked the southern end of the MPA and two buoys marked the northern boundary. This is a good start but people did not pay attention to them. According to local people, boats pass through regularly and illegal fishing often occurs. The sea bed had a gradual slope beginning from just a few meters below the surface continuing well below 30m.



Looking south



Looking north

Fish life

There was a small number of predatory fish of different families: groupers, lion fish and lizard fish supported by the abundance of smaller fish species also present. There where a lot of economically important fish in the MPA: snappers, groupers, parrot fish, fusilier and sweetlips. A number of butterfly fish were also observed. The more butterfly species within a reef area, the healthier the reef system is said to be as these

species feed on corals and sponges. At this site they were present but not in any great abundance.



Spotfin lionfish



Lizard fish



Spadefish, sweetlips and angelfish



Grouper

Coral Cover

The main habitat in the area and at all depths was a mixture of soft corals with intermittent hard coral cover where suitable substrate existed. Sedimentation was high in the area and may have smothered hard corals preventing them from becoming established. Many young coral colonies existed (recruits - corals under 5cm in diameter) in only a few feet of water. The area was covered with large boulders but these had not been colonised by corals. Soft corals were present at all depths from the surface to 20m and below and were the main habitat of this area. Although there was a general lack of large hard corals, there was a good diversity of sponges and invertebrates in the area. The areas in which the hard coral cover was dense and well established, lead to large numbers of fish. The majority of the corals growing in these

areas were non-acropora species in encrusting or foliose life forms. Without coral a reef can not sustain itself as it is the corals and the algae that grow on them that supports the other reef animals.



Sea fan and foliose coral



Upper reef area



Foliose coral



Sponges, soft corals, invertebrates and hard corals

Invertebrates

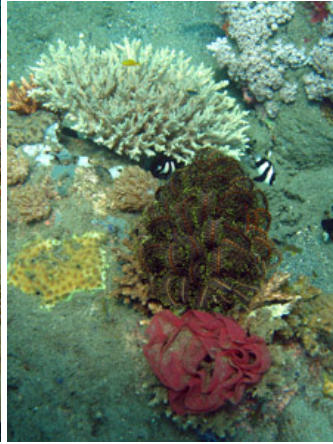
High sediment loads and strong currents may play a role in the high numbers of filter feeders in the area such as pulsing soft coral, sponges, brittle stars and flower soft coral.



Nudibranch



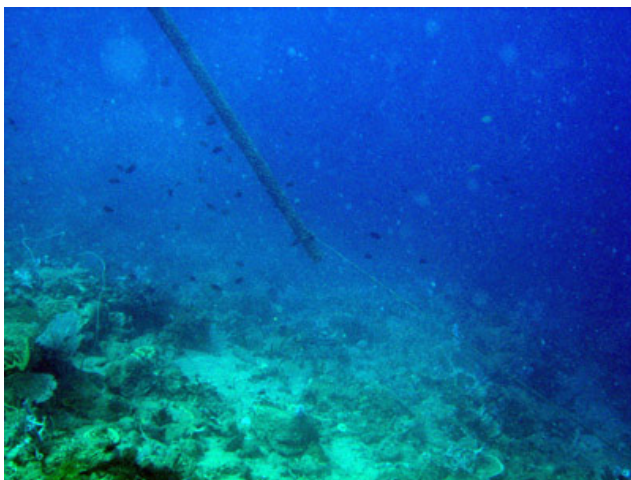
Sponge & hard coral



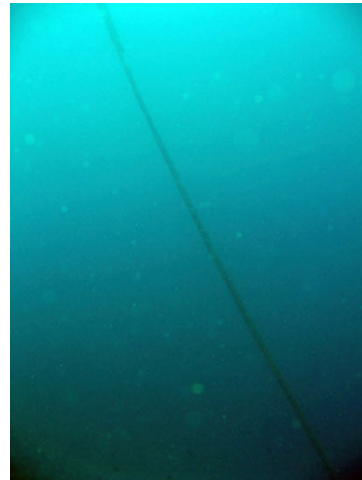
Coral & invertebrates

Damage to site

The presence of fish traps, long lines and discarded waste can seriously damage the reef. The dragging up of fish traps and nets can dislodge corals and disrupt the fragile ecosystem that exists. The area seemed to be heavily silted, perhaps from nearby rivers or land run-off. Heavy siltation in the water leads to a choking of the coral polyps and the corals will eventually die as they become smothered and cannot absorb enough energy from sunlight. If there is a river mouth nearby or a water outlet further up the coast of untreated water, this can lead to the increase in nutrients in the water resulting in higher algal growth over the corals. Plastic waste such as bags do not only harm coral by covering them but can also kill turtles which easily confuse them for jellyfish upon which they prey.



Fish line



Fish trap line



Plastic bags

Management Suggestions

Notice boards in the area would inform more locals that this is a MPA and would also help explain to them the rules that have to be followed. A motorised boat passed through the MPA area whilst the dive team were kitting up. Ideally boats should not be permitted inside MPAs in order to minimise disturbance and pollution of the marine environment.

Re-planting of mangroves further north from this site could help in reducing the siltation in the immediate area and aid reef recovery. What mangroves do is to help protect firstly the land, secondly provides a breeding grounds for small fish and it also slows down the water enough as it filters through the roots that if there is any suspended particles in the water they fall down on the mangrove roots rather than on the reef. With these in place it would help the reef area recover quicker and let hard corals re colonise the area.

Site Name: Punta MPA

Location: South of Libagon

Site Description

This site is slightly more sheltered but still fairly exposed. The MPA already has a guard hut showing a good level of community commitment but there were no signs explaining the rules and regulations. Such information would help people understand why the MPA exists. There were no markers to signal the MPA boundary, just fishing towers to the north and one to the south. Entering from the shore many coral bommies were observed but very little continuous hard coral cover. The reef sloped continuously from the surface to well below 30m. A few rocky outcrops of rock were covered by a good diversity of hard corals. The reef zone at around 20m Most of the reef zone at around 20m had very poor diversity. In the shallower reef areas at around 12m, the topography changed and there was an abundance of solid substrate, a large amount of hard corals, soft corals, sponges, invertebrates and sponges.



Looking south



Looking north

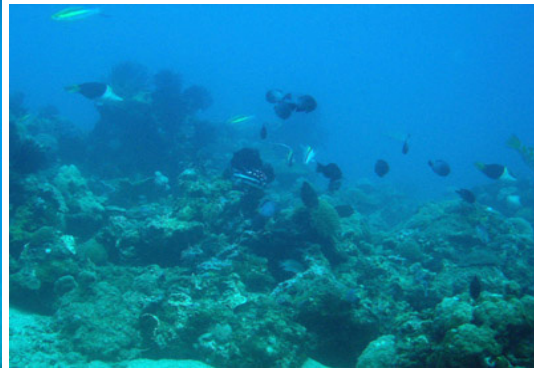
Fish Life

Fish diversity was low above 10-12m and consisted mainly of bottom feeders and transitory fish such as fusiliers. With increased coral cover around 12m there was increase in fish diversity especially in the butterfly species (a good indicator of coral reef health). There was a good abundance of commercially valuable fish in the area such as snapper, parrot fish and fusiliers that if left to grow to maturity and reproduce could yield more fish to help populate the surrounding area in years to come. These fish were generally small – possibly an indication of over fishing especially as fishing

towers were situated right outside the MPA. Juveniles of species such as the black and white snapper were present in high numbers but large adults were not seen.



Large group of small fish



Snappers, parrots, wrasse and fusiliers



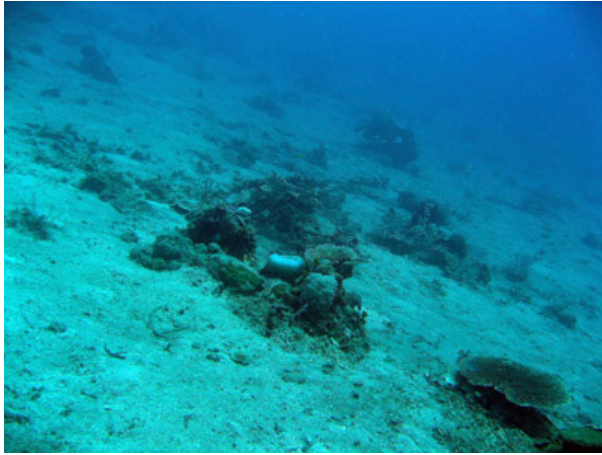
Anemone fish



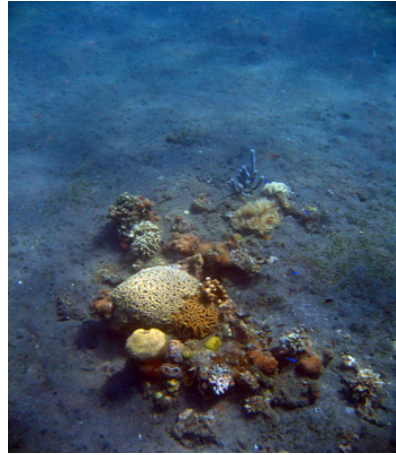
8 banded butterfly fish

Coral Cover

The patchy coral cover continued from the surface to below 20m. Soft corals were abundant as there was little solid substrate for the hard coral to fix themselves to. As there seemed to be very little sedimentation in the area the hard corals stand a good chance of recovering and re-colonising if external impacts are reduced through better MPA management. With the reef area being so close to the fishing area and there being no markers out to tell the fishermen where the limits were it is quite possible that some of the destruction on the reef (see below) came from the fishing practises used to catch the fish in the area.



Dispersed patch reef



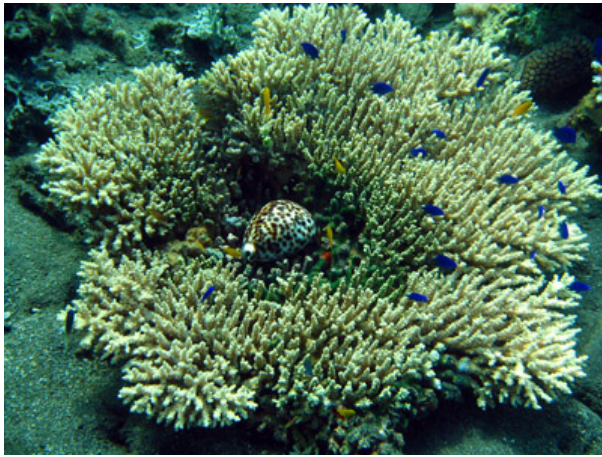
Small coral bommies



Good areas of coral cover

Invertebrates

There were a high number of invertebrates with corallimorphs, feather stars and giant clams found in abundance. There was a high diversity of invertebrates found at all depths with sea cucumbers and benthic feeders in large numbers.



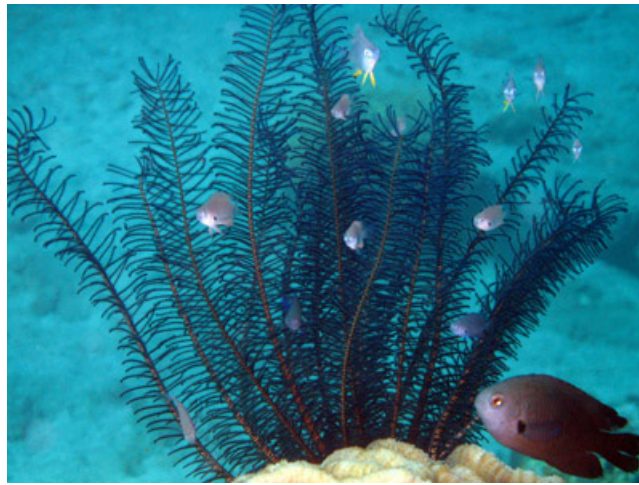
Tabulate coral and cowrie shell



Oyster



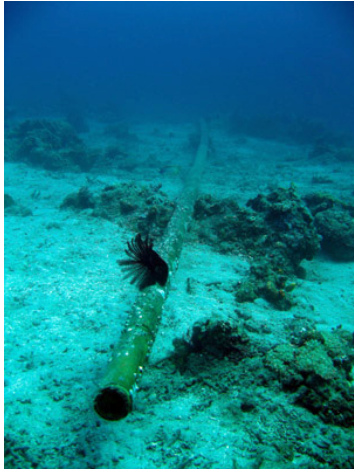
Giant clam



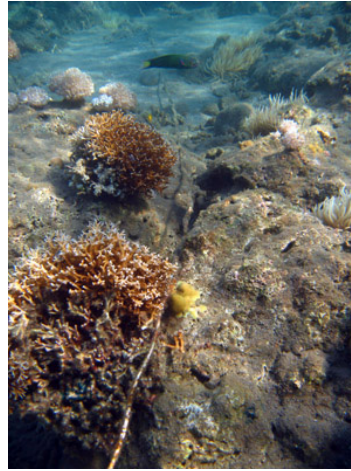
Feather star

Site Damage

Even with a small community being so close to the site the impact on the reef was less than expected. There was no plastic observed in the water, but there were other materials in the water such as unused fishing equipment and building materials. These are harmful for the reef as being unnatural objects such as these can continue to either catch fish or can break or kill the corals if dropped on them.



Discarded items



Wire



Trampled habitat

Management Suggestions

Fish towers are not best located just outside an MPA as they do not allow many of the fish leaving the MPA to migrate up or down the reef and repopulate areas of low fish abundance. With the patchy composition of the sea bed it would be easy to sink a few holdfasts and attach marker buoys to signal the MPA boundaries. Such concrete sinkers, if carefully placed, would not affect the reef itself as there is no large abundance of corals below 20m. The sinkers might even provide a substrate for more corals to settle and grow on. The site itself is suitable for shallow diving up to 20m or less as beyond this depth there is little life as the sand continues. Notice boards can be an affective way of letting people know about the area and the local regulations. It was good to see a guard house already in place to look over the area but no guards were seen, making illegal fishing in the MPA a strong possibility.

Site Name: Oticon MPA (proposed)

Location: North of Libagon

Site Description

This dive site was situated directly off of a beach adjacent to a considerable population. The MPA had no marked boundaries indicating its position, nor where there any signs telling the locals about MPA regulations. There is a river outlet situated to the north of this proposed MPA which maybe one of the major contributors the low abundance of hard coral on the reef area. There was not a complete absence of hard corals but much of the area was covered with silt and sand and the corals left dead and broken on the bottom. There was a good turn out of local people to come and ask about our purpose to dive there. It was explained and they seemed genuinely interested about what had to be said.



Looking north



Looking south

Fish Life

Fish abundance was generally low. However, at about 12m depth, there was a large patch of coral with a high diversity of fish. Predators such as lionfish and groupers were seen as well as a large number of snapper, sweetlips and a good diversity of butterfly fish. Given the state of most of the reef, it was surprising to see such a vast array of butterflies with at least seven different species seen on the dive. Butterfly fish are an indicator of reef health. The high numbers seen here indicate that the general reef health in the area is good even though much damage exists. With proper management there is a good chance for the reef to recover well. The large populations of fish such as groupers, snappers, fusiliers, parrot fish and spadefish provide a good basis for the area to operate as a sustainable fishery for local people.



Spadefish, parrot fish, wrasse



Grouper



Anemone fish



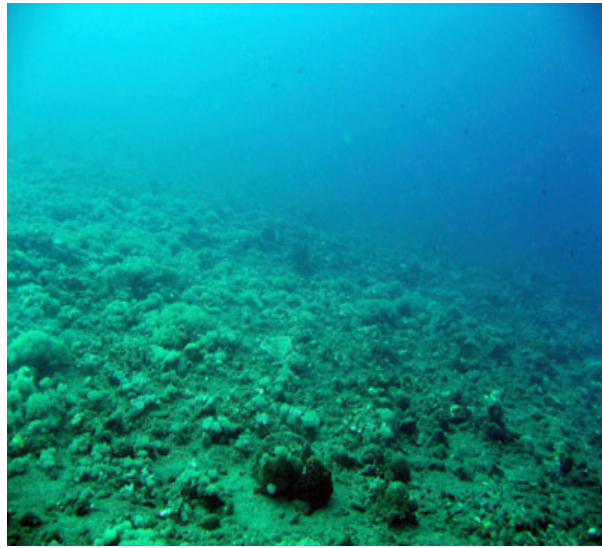
Surgeon fish

Coral Cover

The shallow water was dominated by soft corals, sponges and algae. Almost all of the branching corals had been broken and were covered in algae and many other hard corals were dead or dying. The reef sloped gradually to 20m and there were very few hard corals or a good substrate for them to attach to. Again this might be due to the silt from the nearby river mouth. The entire upper reef slope is dominated by soft corals and little else. However, an endangered/rarely seen hard coral called a button coral was observed.



Broken reef



Sediment and soft coral



Patchy reef



Rare button coral

Invertebrates

Even with the seabed being heavily silted and made up of loose material there was a reasonable abundance of benthic invertebrates including a large number of sea stars. Many of the giant clam shells observed were discarded and empty. With the suspected high quantity of nutrients coming from the river just north of the area it is understandable that there may be this boom in filter feeding invertebrates.



Sea cucumber



Nudibranch

Site Damage

Numerous factors are likely to have contributed to the destruction of the corals within the area dived. Corals in the boat mooring area were destroyed and covered in algae. Children were observed picking up the corals and throwing them back after extracting fish and this presents a serious problem for the health of the reef. With the reef area being so close to a town there was a big problem with the litter situation with many plastic items in the water. Plastic bags, diapers and food wrappers can smother and kill the coral.



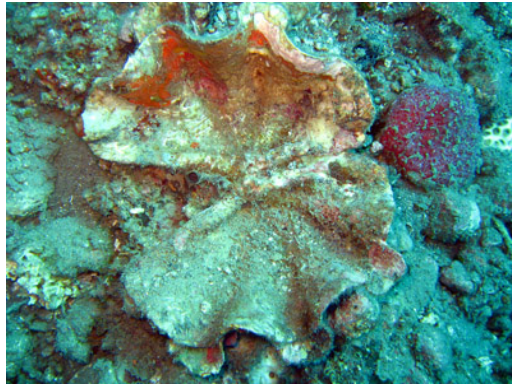
Algal growth



Child with coral in hand



Plastic litter



Empty clam shells

Management Suggestions

On arrival at the site a child was observed with a large piece of coral, shaking it to remove a damsel fish no bigger than 7cm in length. On catching the fish he threw the coral back into the sea. This coral will now die. It is these sorts of activities that really harm the reef. A little education can help prevent and/or reduce this damage and help the reef recover what it has lost. One of the most important things to do is to educate the local people in the area to the meaning of the MPA and what its long-term benefits can be. Another way to try and help the coral recover is to plant mangroves or sea grass that helps to slow the water enough as to make it deposit its sediment on the sea grass bed or in the mangroves allowing the corals to try and establish themselves. The local Barangays should also try to improve their waste disposal techniques and educate the local population about responsible waste disposal.

Site Name: Nahulid MPA

Location: North of Libagon

Site Description

This site is situated well away from any immediate human impact being around 500m off shore. Limited access to this site means that it has not been subjected to the same human pressures as the previous three locations on the mainland. The shallowest section of this site was about 15m and the seabed descended to well below 30m. The reef around the shore suffered from heavy fishing pressure with large nets on towers only 100m from the water entry point. A small river runs into the middle of the area.

The sea mound was an area that I was told was not allowed to be fished by local fisherman. This is a great sign that local people are taking an interest in the reef and are taking steps to protect it however there were no markers or signs to demonstrate this statement. The mound itself was several hundred meters long and a few hundred wide. Being situated offshore it is exposed to strong tidal currents.



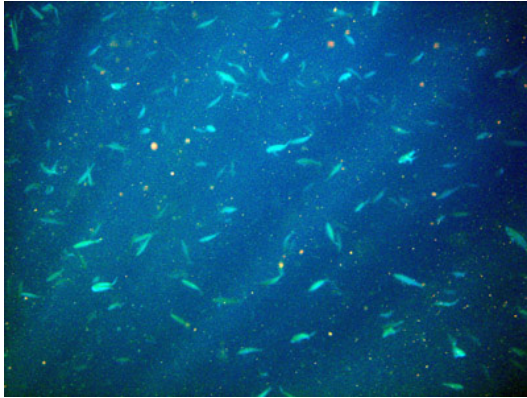
Looking north



Looking south

Fish life

Emperor angel fish, sweetlips, parrot fish, snappers and groupers were observed. If protected properly, these fish will provide a good stock for the surrounding area. There were a lot of predatory fish in the area but not as many small benthic fish as expected.



Fusiliers



Emperor angelfish



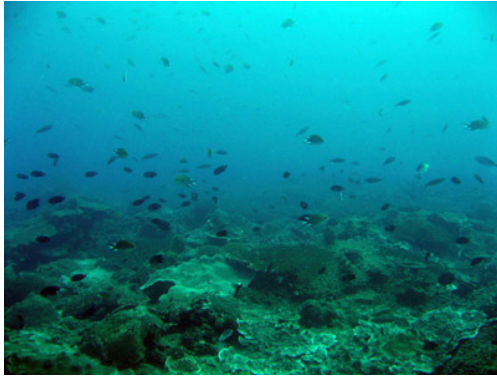
Coral grouper



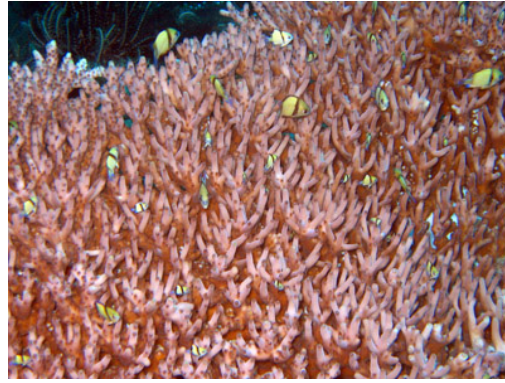
Sweetlips

Coral Cover

The dive area looked aesthetically good and there were many different coral species including a lot of foliose and branching corals. This may show that there has been a bit of damage done to the reef area in the past since the slow growing corals have had less time to re-establish themselves. On the south side of the sea mound as the coral cover increased so to did the fish numbers and diversity. There seemed to be very little coral diseases or bleaching but there were a few damaged corals from currents and littering of waste on the reef.



Encrusting and tabulate corals



Tabulate plus damsel fish



Large area of coral cover



Big areas of foliose coral

Invertebrates

There was a good diversity of invertebrate life at this site including giant clams, and feather stars. With it being an area of high tidal currents there were many filter feeders at the site. Large anemones supported many damsel fish on the reef.



Big anemone



Feather star and soft coral

Damage to site

Litter was a problem on the site with a lot of large debris such as sacks and baskets lying on the seabed. Plastic bags were seen floating in the water column, this is bad for any turtles that maybe in the area as they mistake them for jelly fish, their main food source and eat them. Then they choke on them and die. There were not so many small pieces of litter such as shampoo packets which was good to see but that maybe due to the location of the site more than anything else.



Baskets



Discarded sacks

Management Suggestions

With the reef being so far offshore it does pose a difficult situation as to how to mark the area easily, clearly and at as little cost as possible. There where no markers on the shore indicating the MPA boundaries and no signs with the rules of the MPAs. A notice board with some basic information as the how the MPA is run, the rules and regulations would help the local people understand why it is there and how it can benefit them. One of the hardest things to do with an MPA is to get the local fishermen and people to understand how and why it is there. A hut or small watch tower can be a good deterrent to people wanting to fish the area, if there is someone watching the area as often as possible and allowing them to hand out fines to illegal fishermen. Once this is accomplished and people understand and respect the new rules the people can begin to benefit.

Given its location in northern Sogod Bay where many rivers enter the sea there is a potential for increased siltation on the site. This may have resulted in the areas of sparse coral cover and sand/silt. Despite these areas, this site has great potential as both a dive site and an MPA given the high coral cover and fish diversity. It is in a quiet area of the coast with few impacts from the mainland population.

Acknowledgements

I would like to extend my thanks to every people that helped in arranging, sorting and allowing these dives to take place. Special thanks to the people named below, without whom none of this would have been possible.

The Mayor of Libagon

The employees of Libagon Municipal Building

Mr. Andy Arnaiz

The SOLAR Team

Barangay Captains of Oticon, Biasong, Punta and Nahulid