

Punta Marine Protected Area Monitoring Results 2012



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1 - Introduction

1.1 - Coral Cay Conservation

Coral Cay Conservation (CCC) is a not for profit organisation, founded in 1986 by a British scientist. CCC's mission is:

Providing resources to help sustain livelihoods & alleviate poverty through the protection, restoration & management of coral reefs & tropical forests.

In order to achieve this mission, CCC has carried out conservation projects all over the world, including in the Philippines, Belize, Honduras, Malaysia, Cambodia 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 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. The project in Southern Leyte has been extended twice, most recently with a move to Napantao in the municipality of San Francisco on Panaon Island in 2008.

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. Communities living in coastal areas are recognized as the stewards of their marine resources and CCC is working closely with local stakeholder groups to raise awareness and increase understanding of the need for greater conservation efforts in the Philippines.

1.2 - 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 protect pristine reefs from harmful human actions. A properly managed MPA can begin to show benefits in just a few years.

Protected within an MPA, fish can grow larger (as they live longer), and a larger fish produces proportionately more offspring than a smaller fish. Eventually, as fish numbers inside the MPA increase, a 'spill over' of fish from within the MPA to outside the MPA allows fishermen to catch more fish in this area and ensures that a healthy fish community remains in the protected area (see Fig. 1).

One square km of healthy reef can support over 20 tons of fish per year, whereas one square km of damaged or destroyed reef can only produce 3 tons (Bohnsack, 1990).

Community based MPAs have proven to be an effective method of producing sustainable fisheries and maintaining peoples livelihoods. MPAs can provide an income from eco-tourism, with divers paying a small 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.

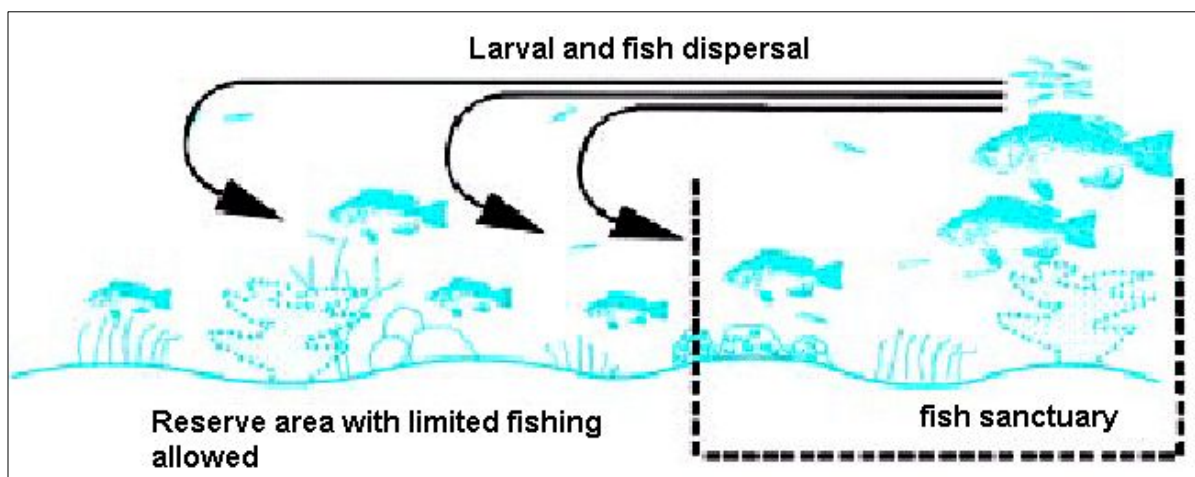


Figure 1 - Schematic diagram of MPA functioning. Protected fish in the MPA grow larger and produce more offspring, this leads to 'overspill', increasing fish numbers outside the MPA. In addition, the corals inside the MPA are not disturbed by direct human impacts.

1.3 - Punta Marine Protected Area

A Marine Reserve was established in Punta in 1997 by the then Barangay Captain, Carlito Paug Sr. This was managed with an open and closed season for fishing. Sadly, in 2003 a devastating landslide occurred, which destroyed the barangay of Punta and covered much of the Marine Reserve with silt. Thus the reserve was abandoned and the village relocated. In 2009 there was a move to establish an MPA on the site of the old Marine Reserve. Coral Cay Conservation conducted preliminary surveys in order to establish a suitable location for the MPA. With the help of the Local Government Unit of San Francisco, Barangay officials and Coral Cay Conservation, Punta MPA was established in June 2009 (Fig. 2).

The MPA is 10.5 Ha, including a buffer zone. Fishing and gleaning are not allowed within the MPA and buffer zone area. The MPA is supported by Municipal Ordinance 128, s2009. The overall management of all of the MPAs in San Francisco is overseen by a Technical Working Group which is made up of members of San Francisco LGU and Barangay Captains. The day-to-day management of Punta MPA is overseen by a Management Committee which is comprised of Barangay Officials.

In December 2012, the MPA was officially opened with a ceremony to remember the casualties of the 2003 land slides. The highlight of this day was the commissioning of the new guardhouse. The guardhouse was painted by CCC staff and volunteers and decorated with the help of the people of

Punta and government officials from San Francisco. The municipality of San Francisco donated equipment that the Bantay Dagats will need to their work, such as torches, a megaphone and snorkel gear. Now that the Punta MPA has a guardhouse enforcing the no-take policy of the MPA has been made easier and illegal fishing with the MPA will hopefully decline.

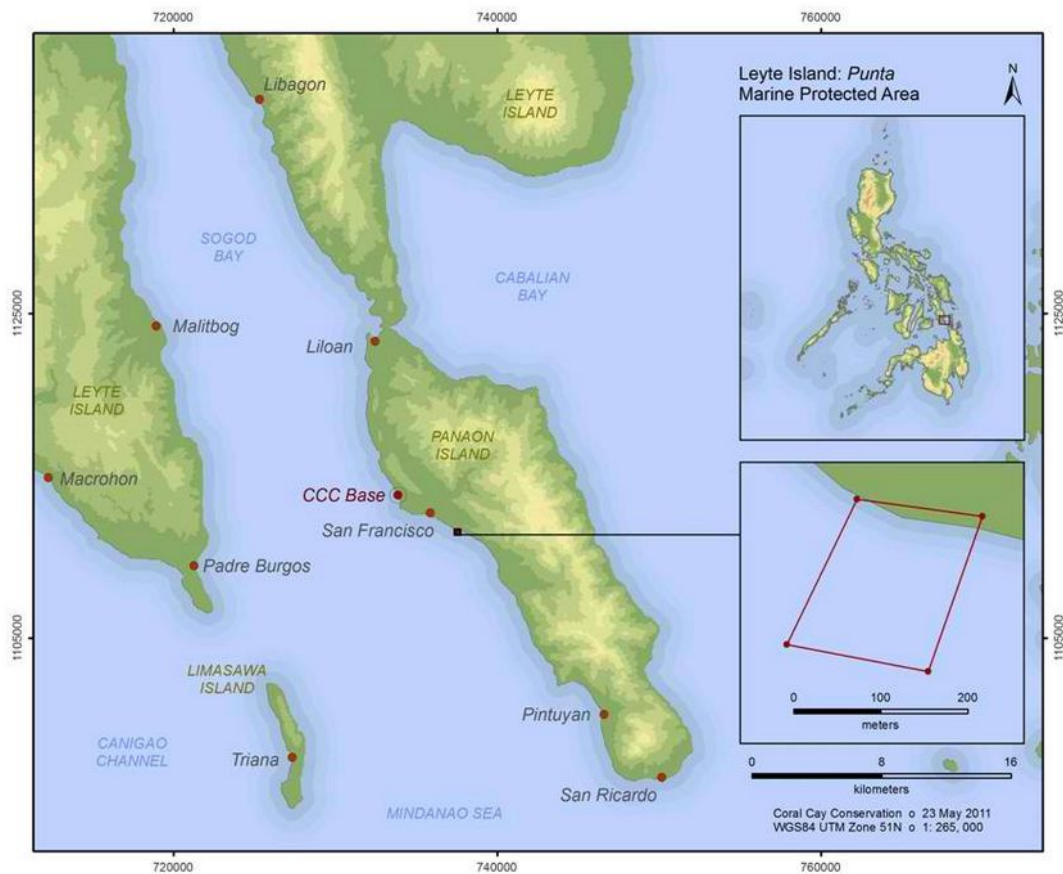


Figure 2 - Map showing the location of Punta MPA survey. Red lines indicate the borders of the MPA.

2 - Methods

The designated Marine Protected Area was assessed with 10 x 50m survey transects conducted in November 2012. The surveys were carried out at a depth of 12m. For comparison, additional 10 x 50m survey transects were conducted outside the MPA, also at a depth of 12m. Five of these transects were conducted to the East of the MPA and 5 to the West of the MPA. The survey method closely follows that outlined in the 'Coral Reef Monitoring for Management' book put together by the Marine Science Institute of the University of the Philippines, Diliman; the Guiuan Development Foundation Inc. and the Volunteer Service Overseas (Uychiaoco *et al.*, 2010).

2.1 – Point-intercept transect

For estimating the relative abundance of living and non-living coral on the reef bottom, a benthic point-intercept transect was used by SCUBA divers. "Benthic" refers to the animal and plant life growing on the seabed. A 50m transect line was laid out along a constant depth 12m. A note was made of the benthic cover at every 50cm along the line. The total number of points along the transect line was 100. From these results, the percentage cover of the various substrate types could be calculated. Benthic categories were chosen as follows:

Coral	Sponges & Others	Algae	Non-Living
Hard coral	Sponges	Turf Algae	Rubble
Soft coral	Other animals	Fleshy macroalgae	Rock
Dead coral		Coralline algae	Sand
Dead coral with algae		Seagrass	Silt

2.2 – Fish visual census

Fish families were counted and a note was made of their size within a defined area, along the same transect line as used to estimate benthic cover. Two divers swam side by side and counted numbers of target fish 2.5m to either side and 5m above of the 50m transect line (Fig. 3). Swimming speed was controlled and there was a 15-minute waiting period after the line has been laid so as not to disturb the fish and let them come out of hiding. Fish families that were observed were chosen on the basis that they are (a) good indicator species of reef health or (b) important fish for consumption and hence an indicator of overfishing if their numbers are found to be low, or fishery recovery if their numbers are found to be relatively high. The following families were counted during the surveys:

English name (Scientific name)	Bisaya name
Groupers (Epinephelinae)	Lapu-lapu
Snapper (Lutjanidae)	Maya-maya
Sweetlips (Haemulidae)	Lipti
Emperors (Lethrinidae)	Katambak
Jacks / Trevally	Talakitok
Fusiliers	Dalagang bukid
Coral Breems (spinecheeks) (Nemipteridae)	Silay
Goatfish (Mullidae)	Timbongan
Triggerfish (Balistidae)	Pakol
Butterfly fish (Cheatodontidae)	Alibangbang
Parrotfish (Scaridae)	Mulmul
Surgeonfish (Acanthuridae)	Indangan
Rabbitfish (Siganidae)	Kitong
Rudderfish (Filefish) (Kyphosidae)	Ilak
Moorish Idol (Zanclus cornutus)	Sanggowanding
Angelfish (Pomacanthidae)	Adlo

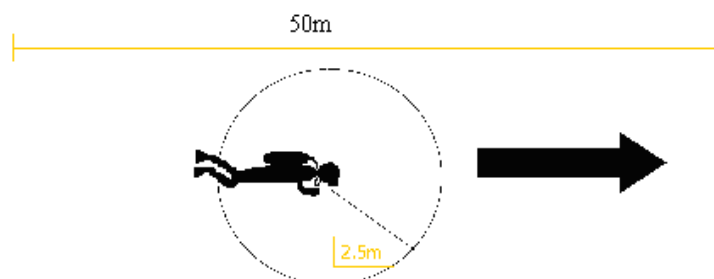


Figure 3 - Fish visual survey method used to estimate fish abundance along the 50m line. The diver notes down any target fish seen 2.5m to either side and 5m above.

The size of each fish recorded was also noted as a healthy fish stock will contain individuals of a range of sizes. Additionally, large adults of predatory fish such as lapu-lapu (groupers), maya-maya (snappers) and lipti (sweetlips) will produce proportionally more offspring than smaller individuals and are therefore important in the recovery and maintenance of fish stocks. Size was recorded by class: 1-10cm, 11-20cm, 21-30cm or >30cm.

2.3 – Invertebrate survey

Invertebrate numbers were recorded 2.5m either side of the 50m transect line, a total area of 250m². The species recorded are either commercially important (e.g. giant clams, lobsters, sea cucumbers) or are good indicators of reef health (e.g. *Diadema* urchins, crown-of-thorns starfish). The species recorded were:

Target invertebrate	Importance
<i>Diadema</i> urchins	Found in high numbers on degraded reefs
Pencil urchins (<i>H. mammilatus</i>)	Commercially important
Crown-of-thorns starfish (<i>Acanthaster planci</i>)	Eat coral, can threaten reefs in high numbers
Giant clam (<i>Tridacna</i>)	Commercially important, now threatened
Triton shell (<i>Charonia tritonis</i>)	Eat crown-of-thorns starfish
Lobster	Commercially important
Sea cucumber (non-synaptid)	Commercially important
Banded coral shrimp (<i>S. hispidus</i>)	Commercially important, eaten by fish
Nudibranch	Indicators of a healthy, diverse reef system
Drupella	Eat coral, can be damaging in high numbers

2.4 – Human impacts and abiotic factors

In addition to the fish, invertebrate and benthic data, another observer made a note of negative impacts on the reef, both natural and human induced. These include:

- SEDIMENTATION Sediment prevents light reaching the corals, restricting their growth and can lead to coral death if severe or prolonged
- BLASTING PATTERNS From illegal dynamite fishing
- ANCHOR DAMAGE From boats mooring inappropriately
- OTHER BREAKAGE Caused by many factors including bad weather or irresponsible diving
- CORAL BLEACHING A reaction to stress, can cause coral death if prolonged
- GHOST FISHING GEAR Fishing equipment abandoned in the area, continues to catch and kill marine animals
- FISH TRAPS Illegal fishing in the MPA
- CORAL DISEASE Caused by many factors, can devastate whole coral communities
- SEAWEED OVERGROWTH Prevents light reaching coral and can lead to death, often caused by low numbers of seaweed-eating fish
- CORAL-EATING SNAILS Can be destructive in high numbers
- CROWN-OF-THORNS STARFISH Outbreaks can destroy entire reefs
- PLASTICS Do not break down quickly, accumulate on reefs and harm corals, fish and other animals

The level of these impacts was graded as 0 – none, 1 – low, 2 – medium or 3 – high.

3 - Results

What follows is a summary of the most important findings from the benthic, fish and invertebrate surveys, and general reef health and abiotic (non-living) factors.

3.1 - Benthic cover

Sand, silt and live hard coral were found most out of all benthic categories both inside and outside the MPA (Fig. 4). However, a large difference was found in the benthic make up between the survey conducted inside and outside the MPA. Outside the MPA sand and silt made up a much larger proportion of the substrate compared to the area inside the MPA, 81.9% and 51.1% respectively. Inside the MPA more hard coral was found, 31.2% and 12.6% respectively, but dead coral covered with algae was also recorded more frequently inside the MPA, 6.3% and 1.0% respectively. Apart from hard coral, sponges and soft coral were found to be more frequent inside the MPA (Fig. 4). Algal benthic categories, such as turf algae, seagrass and fleshy macroalgae, were more common outside the MPA.

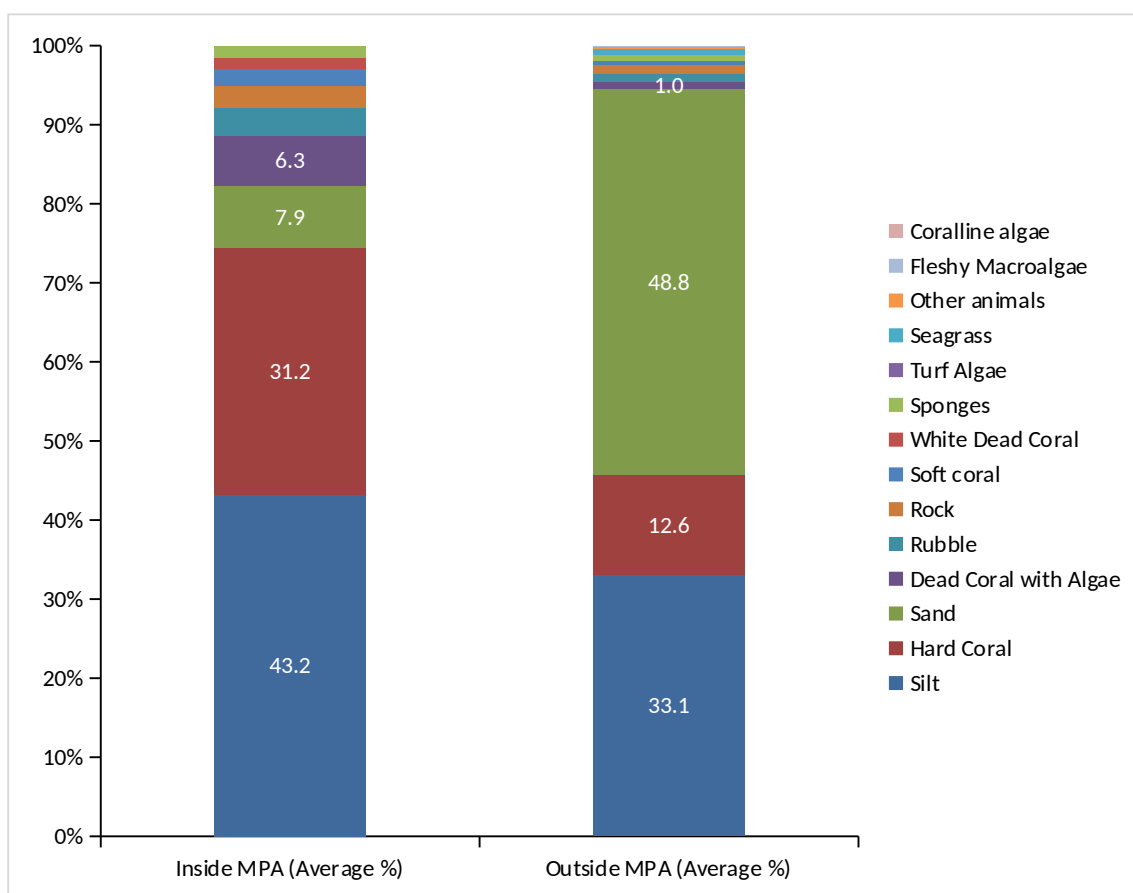


Figure 4 – Percentage benthic cover per category inside and outside the Punta MPA.

The transects were conducted as one long line, starting north of the MPA, passing through it and ending on the south of the MPA. When the transects are plotted in succession it is evident that the area west of the MPA is predominantly sand with little to no silt and hard coral (Fig. 5). Once inside the MPA the sand disappears and the seabed is either silt or hard coral. At the eastern end of the MPA the coral cover decreases and silt increases. Beyond the Eastern boundary of the MPA the coral cover increases again and some sand was found.

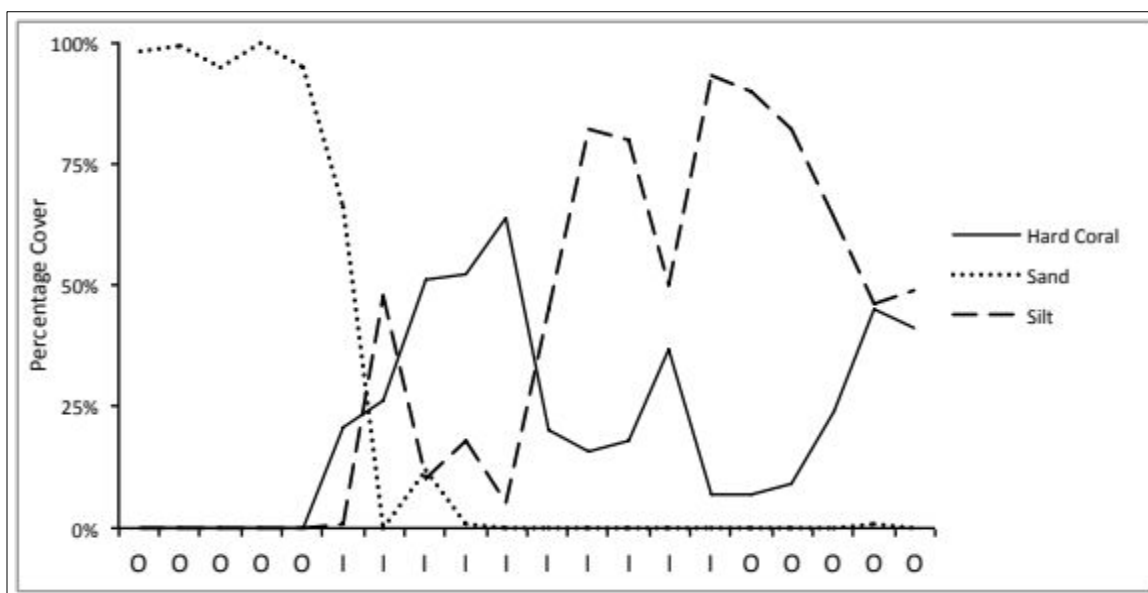


Figure 5 – Percentage cover of the benthic categories Silt, Sand and Hard Coral, plotted in succession, as the transects were conducted. O = Outside the MPA and I = Inside the MPA

3.2 - Fish abundance

The average number of fish recorded per transect inside the MPA was higher compared to outside the MPA, 44.0 per transect and 25.7 per transect respectively. The diversity of fish within the MPA was higher compared to outside the MPA. Inside the MPA fish from 14 families were found and outside the MPA 11 families were found (Fig. 6 and Fig. 7). All families, except Parrotfish and Goatfish, were more numerous within the MPA (Fig. 6). Fusiliers were the most abundant of all families, both inside and outside the MPA. The relative differences between the abundance of families inside and outside the MPA were found to be greatest in the Angelfish and the Butterflyfish, they were greater in the MPA by a factor of 10 and 3.4, respectively. Commercially important species such as Sweetlips, Snapper and Grouper were more abundant inside the MPA and no Sweetlips were found outside the MPA at all. No Emperors or Jacks were observed at all during the surveys at Punta.

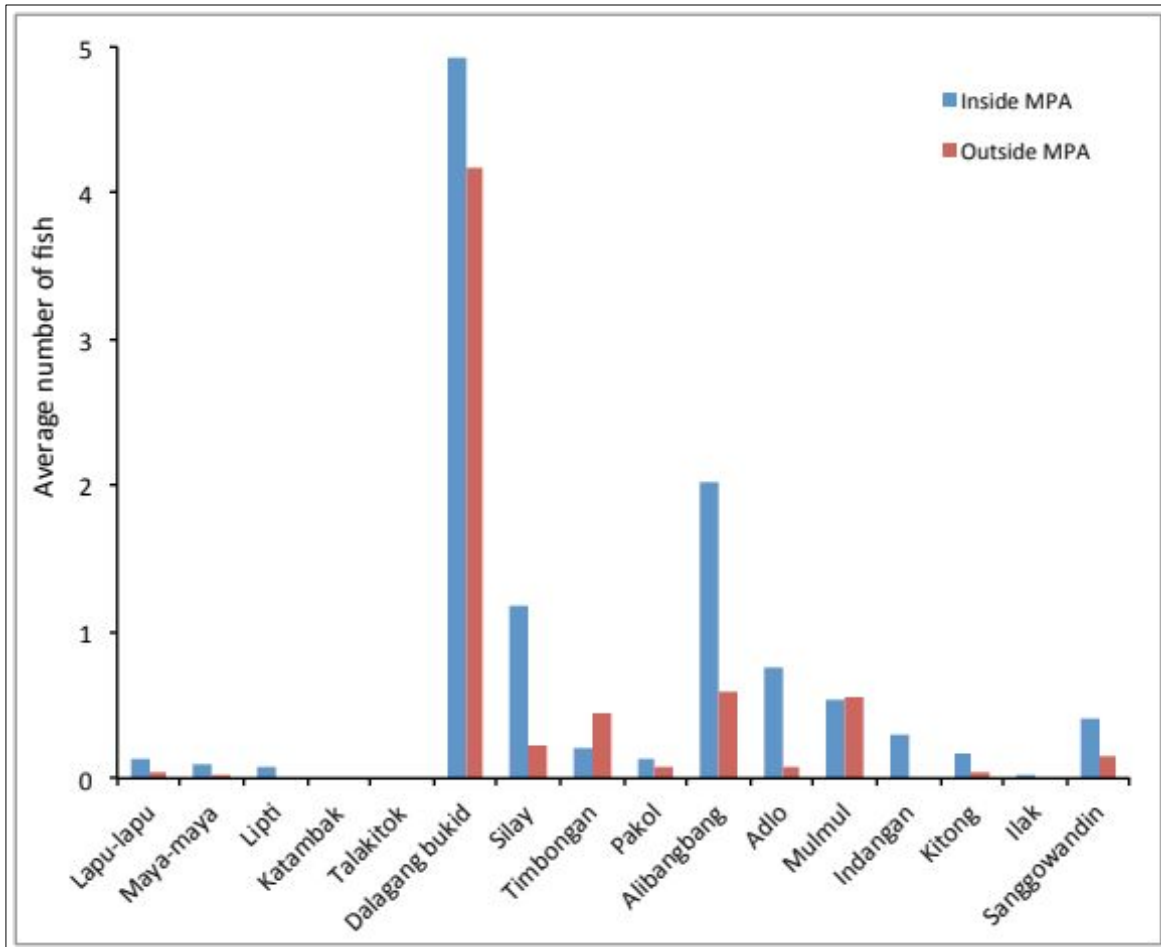


Figure 6 – Average number of fish recorded during surveys inside and outside the MPA.

Size distribution of fish inside the MPA was more diverse compared to outside the MPA. Both inside and outside the MPA the majority of the observed fish were 11-20 cm, inside the MPA the proportion of fish this size was 70%; outside it was 81%. The smallest size class, 1-10 cm, made up 26% of the recorded fish inside the MPA and 18% outside the MPA. Larger fish were more common inside the MPA. Inside the MPA fish 21-30 cm comprised for 3% of all fish observed, while outside the MPA this figure was 1%. Fish larger than 30 cm were not found outside the reserve but inside the reserve several were recorded, making up 1% of the total number of fish observed. These larger fish were Groupers, Triggerfish and Parrotfish (Fig. 7). Of the families that were absent outside the MPA, Sweetlips, Surgeonfish and Filefish, only small individuals were recorded inside the MPA (Fig. 7).

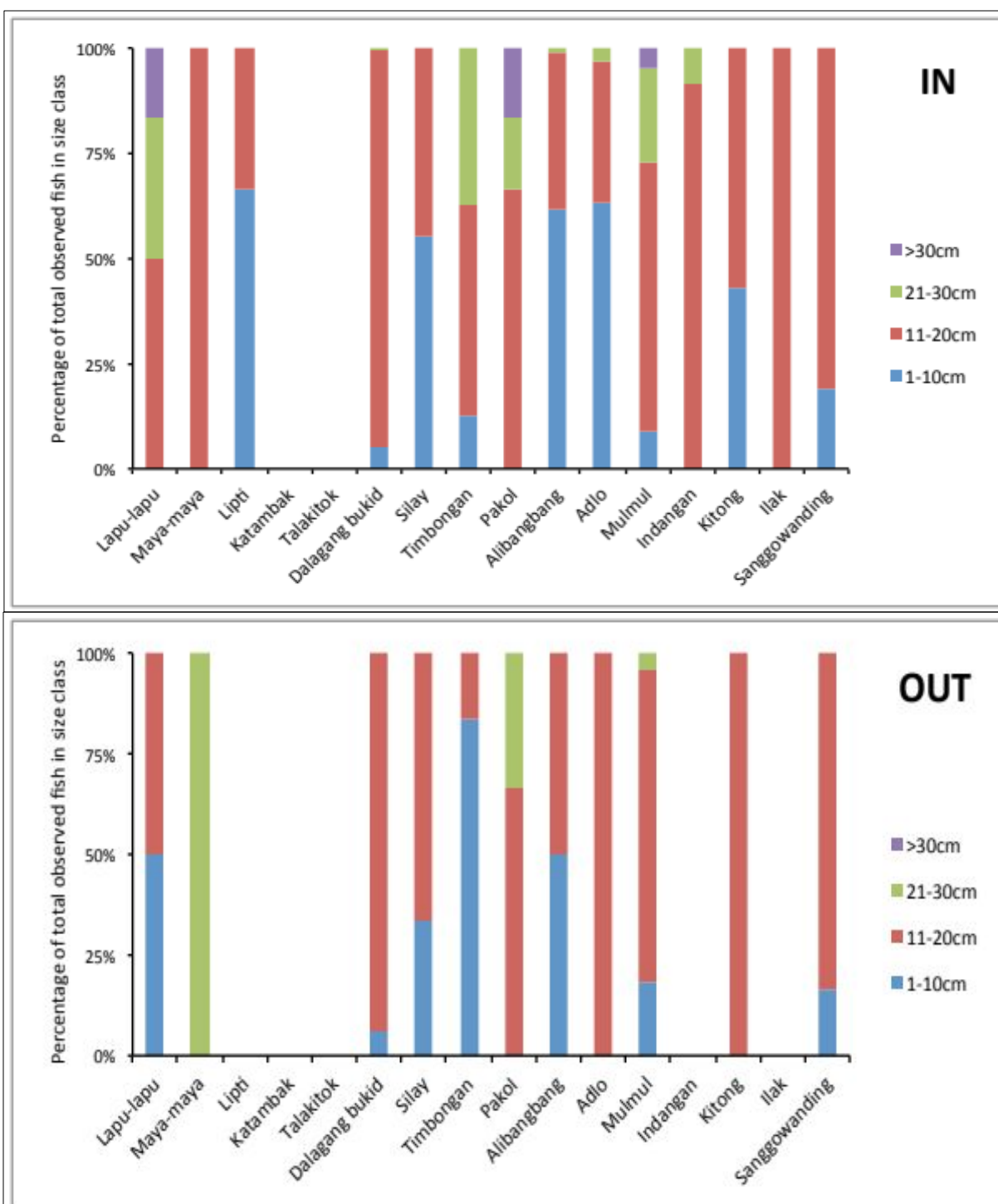


Figure 7 – Distribution of fish families in size classes inside the MPA (IN) and outside the MPA (OUT).

3.3 - Invertebrate abundance

The number of invertebrates recorded was higher inside the Punta MPA compared to the outside (Fig. 8). The most common were the *Drupella* snails. Long spine urchins were generally recorded in low numbers but more prolific inside the MPA. Three Crown-of-Thorn sea stars were found inside the MPA and none were recorded outside the MPA. Nudibranchs were more abundant inside the MPA. The “Other Invertebrates” consisted mainly of sea star such as *Linkia laevigata* and *Nardoa* sp..

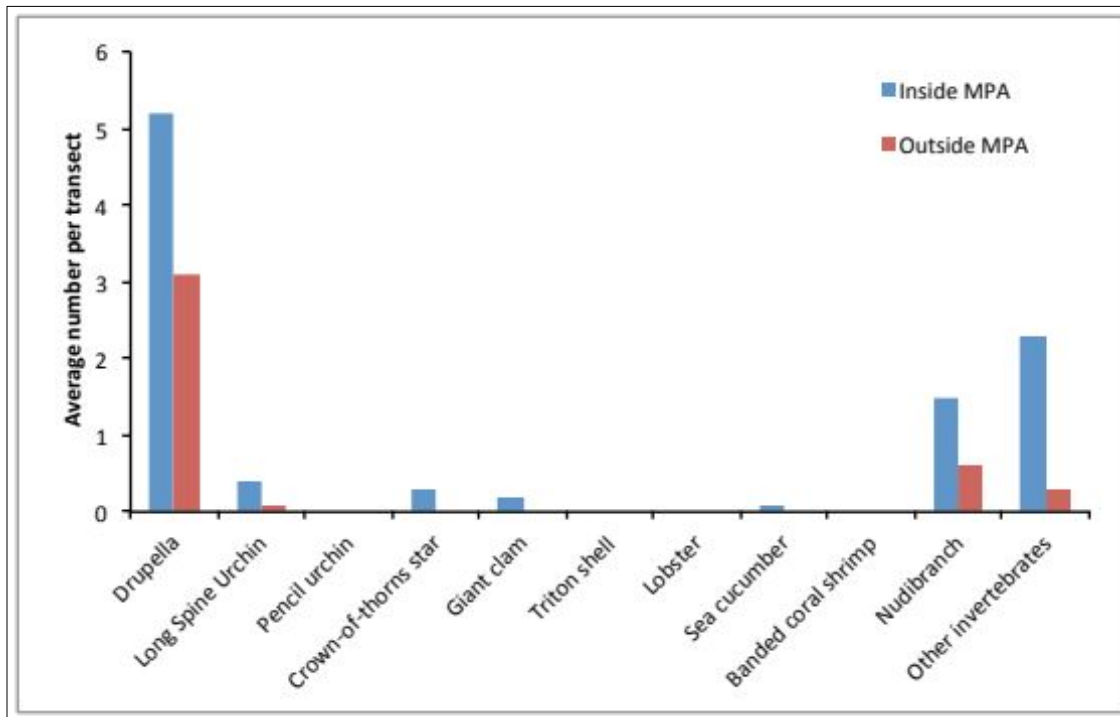


Figure 8 – Average number of individuals in target invertebrate groups per transect (250 m²), inside and outside the MPA.

3.4 - Human impacts and abiotic factors

Negative impacts in and around the Punta MPA were found to be relatively low. On average all categories, except sedimentation, were classed as “low impact” (Fig. 9). Sedimentation was the largest observed impact and was worse within the MPA compared to the area outside the MPA. Plastics were the next biggest impact on the reef and for this category the impact was larger inside the MPA than outside the MPA. Damage to coral from anchors was observed inside the MPA.

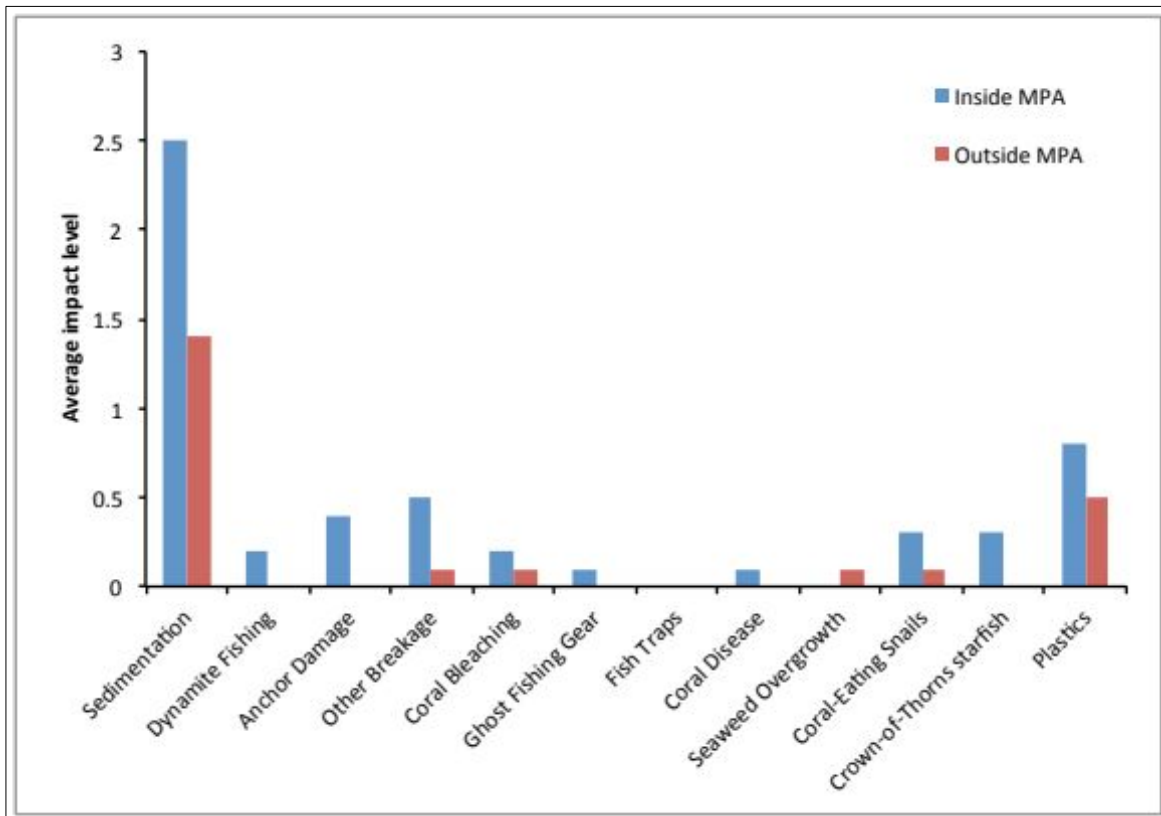


Figure 9 - Average level (0 – none, 1 – low, 2 – medium, 3 – high) for negative impacts on the reef inside and outside the MPA.

4 - Conclusion and recommendations

The survey conducted inside the MPA at Punta has shown that the overall condition of the reef is good. Indicators of reef health, such as percentage hard coral cover, numbers and diversity of fish and invertebrates, high abundance of butterflyfish, nudibranch, low numbers of Crown-of-Thorns and long spine urchins, all suggest that the reef ecosystem within the MPA is in good condition. Furthermore, fish within the MPA were more diverse in regards to size which implies a healthier age structure within the populations. This may indicate that the populations within the MPA are recovering from overfishing. When a tentative comparison is made with data collected at the Punta MPA in 2011 it shows that the number of grouper inside the MPA have increased and are now slightly larger. A note of caution must be added here as the 2011 survey was conducted at 6 meters while the current survey was done at 12 meters, which means that the data may not be directly comparable. Nonetheless these are positive signs and demonstrate that if the Punta MPA is properly managed and enforced, there is great potential for a healthy reef that will provide benefits for the community through fishing and tourism.

The low levels of negative impact within the MPA also suggest that the area is not suffering from dramatic anthropogenic or biotic pressures. Although relatively high numbers of *Drupella* were recorded, their impact remains low. A source of concern, however, was the amount of plastic observed on the reef. Several coral colonies had plastic bags, fishing line or other trash wrapped around them. The occurrence of the damage to corals caused by anchors was observed inside the MPA. Anchoring is not allowed within the MPA and should be closely monitored by the Bantay Dagat on duty. The high levels of sedimentation observed are most probably a direct result of the landslides that occurred in 2003, which caused much silt to be deposited inside the MPA. Silt, unlike sand, is easily stirred up and will remain suspended for longer. It is thus more prone to land on top of corals, thereby smothering and potentially killing them. Despite the presence of a high degree of silt in the area the coral appears to be thriving but it will remain to be a potential threat to the reef.

Although the reef inside the MPA is generally in good condition and fish populations are showing tentative signs of recovery, the effects of overfishing are still evident in the fish and invertebrate data. Commercially important species such as grouper, sweetlips, lobster and pencil urchin, were found either in very low numbers or were absent entirely from the MPA. For the populations to recover from overfishing will take time. Ensuring no poaching takes place inside the MPA will help to speed up this process. The beneficial effects of the MPA to surrounding areas through spillover will be strongest when the populations of target species have recovered to healthy levels. With the construction of the new guardhouse this year and the newly supplied materials for the Bantay Dagats, effective enforcement of the MPA has been made easier. Coupled with this, an effective system for recording and logging any violations should be used. A full time warding system can create costs that the LGU can't afford; it's been shown in many cases that volunteer-based warding can be effective. However, the commitment of the wardens should be regularly assessed.

Management of the MPA can be aided by gaining support from the local community. By conducting social surveys, managers can get a better picture of community awareness, appreciation and opinions about the MPA. The community must remain involved in future decisions and their voice should be heard. Without the support of the community in and around Punta, the MPA cannot work. Furthermore, MPA managers should identify partners able to provide support and specific training. While NGO's can be of great help in the short term, the long term partnership should be with

provincial and national agencies such as PENRMO and DENR. The Provincial Environment and Natural Resources Management Office in particular, being the body in charge of the MPA's management in the whole province, should also be notified of major initiatives concerning the MPA and its management. It is our opinion that their long experience with the topic makes this office a strong ally to face the challenges of managing an MPA.

Although challenges remain to bring out the full potential of the Punta MPA, steps have been made in the last year to cement the commitment to the community to protecting its marine resources. If the enforcement of the MPA is taken seriously it will provide sustainable income for the future generations and a coral reef that the people of Punta can be proud of.

5 - References

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