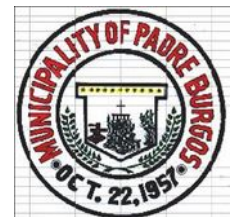


Esperanza II Proposed Marine Protected Area Monitoring Results 2007



Claudio de Sassi and Jan Van Bochove
Project Scientist & Chief Technical Advisor
CORAL CAY CONSERVATION
Tangka'an, Padre Burgos, Southern Leyte, Philippines
Email: lrcp@coralcayconservation.com www.coralcay.org
Tel: 09282149599 / 053 5730307



1 - Introduction to 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.

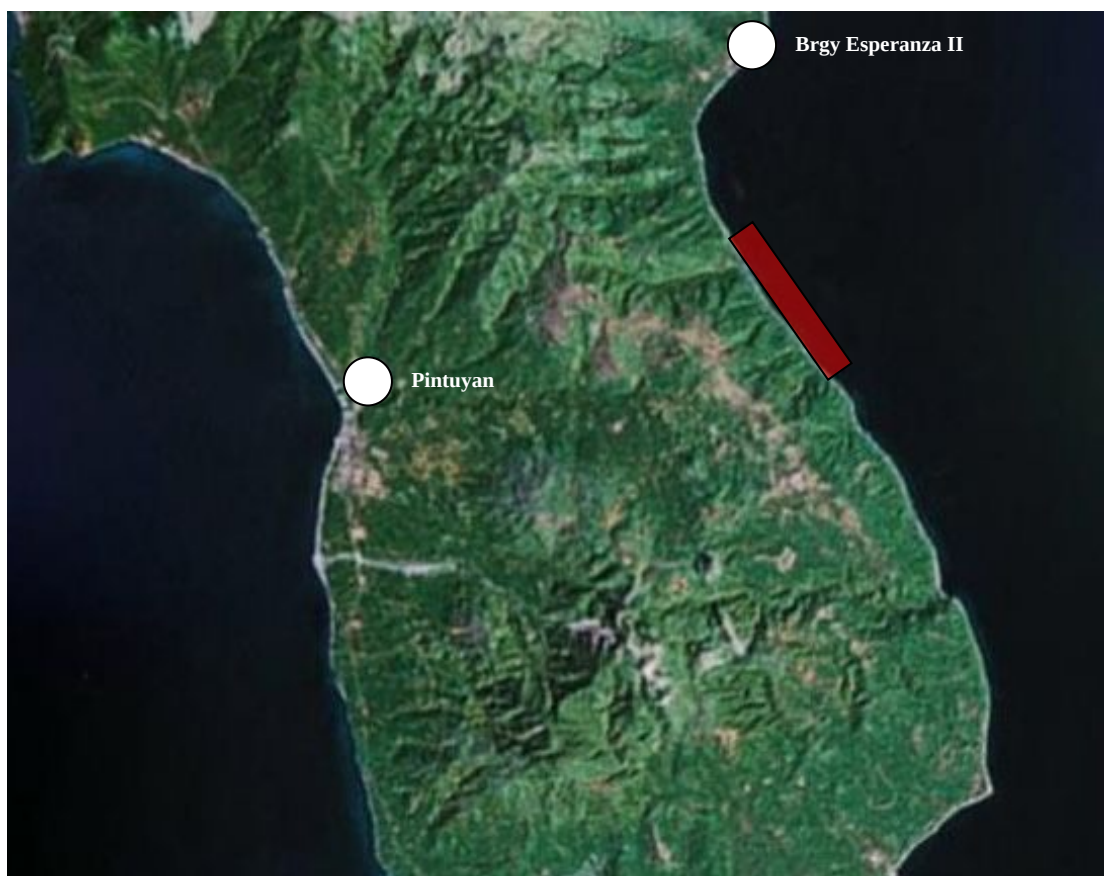
2 – Esperanza II Proposed MPA

In the early 2007, the LGU's of St Ricardo, through the Municipal Agriculture Office, in collaboration with PLAN International started the process of establishing a Marine Protected Area in the Barangay Esperanza II, setting aside a small part of their coastal reef to allow fish stocks to recover and conserve the rich marine life that the area support. At the present time, the process is still ongoing, but all the basic requirements are fulfilled, and the establishment is to be officialised through a resolution of the SB.

The proposed MPA of Esperanza II is approximately 11ha large and is a community based MPA. This means that the Barangay community with an emphasis on the fisherfolk have been involved in setting up the MPA and their opinions were an integral part of identifying the location of the MPA. Furthermore, they were intensely trained by the MAO and PLAN International about the importance of marine sanctuaries for sustainable fisheries and their future livelihoods as fishermen. In accordance with our direct experience on site, the fisherfolk are highly motivated and strongly believe in the project; with no doubt, this could be the key factor to the long term success of the proposed Protected Area.

The increase in diving eco-tourism in Sogod Bay makes the MPA a potential source of income in the near future. The presence in the region of other well established MPA's and, of particular interest, a booming whale shark watching industry has the potential to be a great asset to the whole region. However, the maximal benefit of eco tourism can be reached only through an integrated, regional rather than local approach. A region oriented set up for tourism, where the whole Panaon Island, with all it's assets, is promoted, would be able to attract a much larger total number of tourists in the area than a uncoordinated, local approach could ever do. While the proposed MPA in Esperanza II may not be enough on its own to attract tourists from the other side of the world, the same MPA as a diving opportunity beside the beautiful mountains in the inland, and the whale shark just few miles away, would represent a more attractive option.

However, the primary, long term effect of the MPA will lead to improved fish catch outside of the MPAs as has been shown in Sumilon Island; the first community based MPA that saw local fish stocks doubling within 10 years. Only with the full support of the community and upholding of the regulations and laws that apply within the sanctuary will the benefits become evident over the next years.



Marine Protected Areas

Fig. 2.1. Location of the proposed MPA in the Barangay Esperanza II, St. Ricardo.

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 in sustainable fisheries and maintaining peoples livelihoods. A third benefit is that they can provide an income from eco-tourism when divers pay 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.

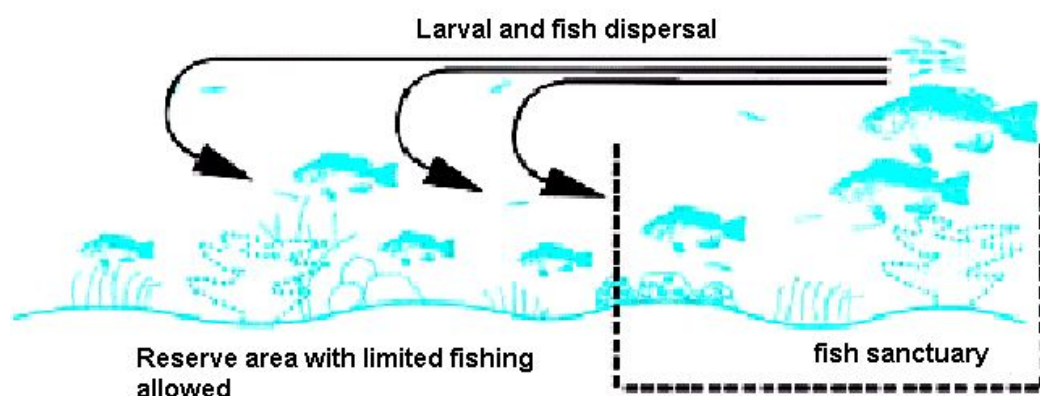


Fig. 3.1. Schematic diagram of MPA functioning. The large, protected fish within the MPA produce larvae which settle and grow outside the MPA where they can be caught by fishermen, and young predatory fish (such as snappers and groupers) within the MPA can move outside as they grow, in search of more territory and small fish to feed on. 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).

4 - Methods

The Area to be protected has been assessed with 8x 50m full survey transects, in the days from July 9th to 11th. The surveys were carried out at a depth of 12m. This depth was chosen because it usually has the highest coral diversity.

The survey method closely follows the one 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.

4.1 - 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 every 25cm along the line. The total number of points along the transect line was 200. Benthic categories were chosen as follows:

Live hard coral	Other benthos types		
<i>Branching</i>	Soft coral	Other animals	Seagrass
<i>Massive</i>	White dead coral	Turf Algae	Rubble
<i>Flat/encrusting</i>	Dead coral w/ algae	Fleshy macroalgae	Rock and block
<i>Foliose/cup</i>	Sponges	Coralline algae	Sand/Silt



Fig. 4.1. A Coral Cay observer estimating benthic cover every 25 cm along the transect line.

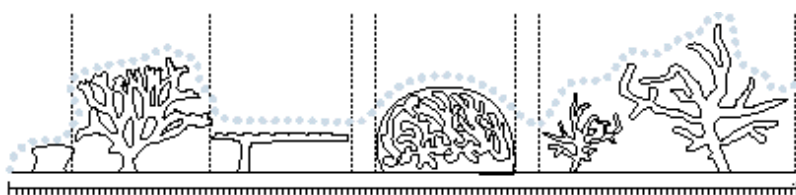


Fig. 4.2. Schematic diagram of a point intercept line laid over different coral lifeforms

From these results, the percentage cover of the various substrate types could be calculated. The results for the benthic surveys can be found in the following section.

4.2 - 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 swim side by side and count numbers of target fish 5m to either side of the 50m transect line.

Swimming speed is controlled and there is 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 for 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:

Groupers (Epinephelinae)	Wrasse (Labridae)
Barramundi Cod (Cromileptes)	Humphead wrasse
Snapper (Lutjanidae)	Parrotfish (Scaridae)
Sweetlips (Haemulidae)	Bumphead parrot
Emperors (Lethrinidae)	Surgeonfish (Acanthuridae)
Jacks / Trevally	Rabbitfish (Siganidae)
Fusiliers	Rudderfish (Filefish) (Kyphosidae)
Coral Breams (spinecheeks) (Nemipteridae)	Damselfish (Pomacentridae)
Goatfish (Mullidae)	Anthias (Anthiinae)
Triggerfish (Balistidae)	Moorish Idol (Zanclus cornutus)
Butterfly fish (Cheatodontidae)	Angelfish (Pomacanthidae)

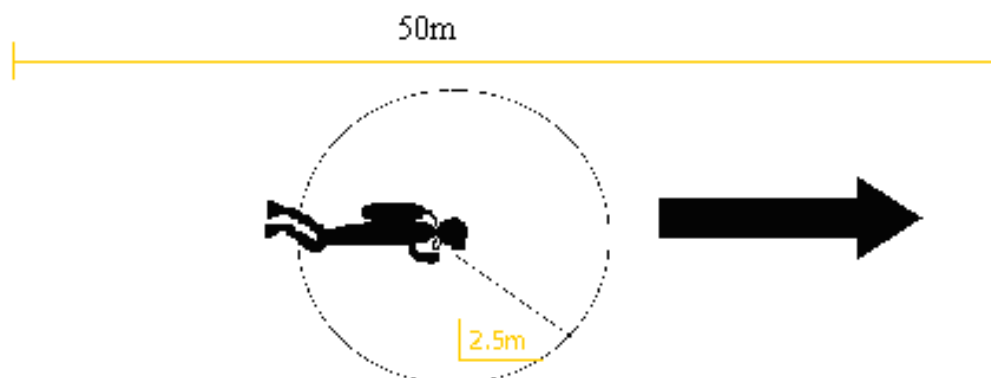


Fig. 4.3. Fish visual survey method used to estimate fish abundance along the 50m line. The diver notes down any target fish seen 2.5m to either side and 5m above. The observer on the other side of the line does the same.

4.3 - Human impacts and abiotic factors

In addition to the fish and benthic data, a fourth observer laid down the transect line for the other observer to follow and made a note of the following factors:

- Transect Orientation
- Depth
- Reef Zone
- Whether the site was sheltered or exposed
- Approximate steepness of the slope
- Horizontal and vertical visibility
- Weather
- Human and natural underwater impacts such as trash, nets, bleaching and coral breakage

A boat marshal made notes of human impacts, drew a map of the area and noted transect locations with a Global Positioning System (GPS) for future reference. Fishing boats, trash, gleaners and many other human influences were also recorded.

5 - Results

What follows is a summary of the most important findings from the belt transect (fish abundance estimates), point intercept (benthic cover as a percentage) and general reef health and abiotic (non-living) factors.

5.1 - Fish abundance

Table 5.1. Fish families observed on surveys in common English, latin and Tagalog name.

Fish	Visayan
Groupers (Epinephelinae)	lapu-lapu
Snapper (Lutjanidae)	maya-maya
Sweetlips (Haemulidae)	Lipti
Emperors (Lethrinidae)	Katambak
Jacks / Trevally	Talakitok
Fusiliers	Solid
Coral Breams (spinecheeks) (Nemipteridae)	Silay
Goatfish (Mullidae)	Timbongan
Triggerfish (Balistidae)	Pakol
Butterfly fish (Cheatodontidae)	alibangbang
Angelfish (Pomacanthidae)	Adlo
Wrasse (Labridae)	Labayan
Parrotfish (Scaridae)	Molmol
Surgeonfish (Acanthuridae)	Indangan
Rabbitfish (Siganidae)	Kitong
Rudderfish (Filefish) (Kyphosidae)	Ilak
Damselfish (Pomacentridae)	Palata
Anthias (Anthiinae)	bilang-bilong
Moorish Idol (<i>Zanclus cornutus</i>)	Sanggowanding



Fig. 5.1. AVEARGE Number of fish for the main commercial and ecologically important families. The graph evidence that commercial species are generally rare or absent. However, the high number of ecological indicators such as Butterfly Fish or Moorish Idol suggest a general good health of the reef. Therefore, the commercial species also should be able to recover significantly if set under protection.

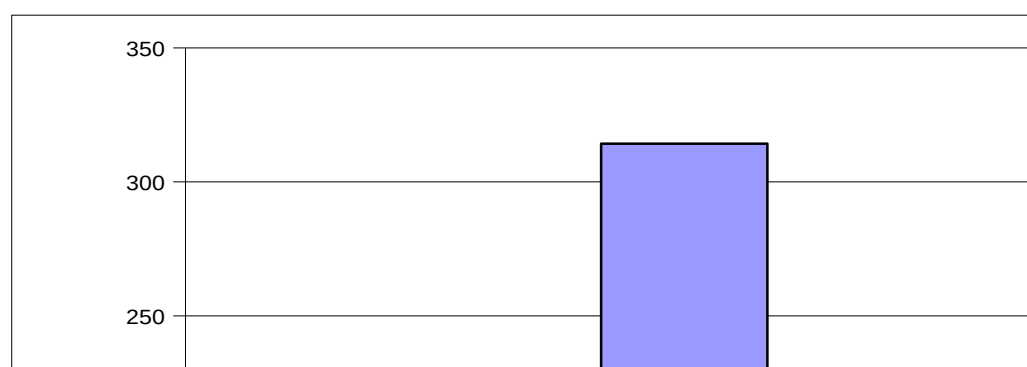


Fig. 5.2. AVERAGE numbers of individuals for more abundant, smaller fishes. Although these species are generally not commercially relevant, their presence is an indicator of how much fish the reef can support, and provide the food to bigger, predatory fish such as snappers and groupers. Normally, these species are among the first to show signs of recovery after the establishment of a protected area. Their actual population is to be considered low.

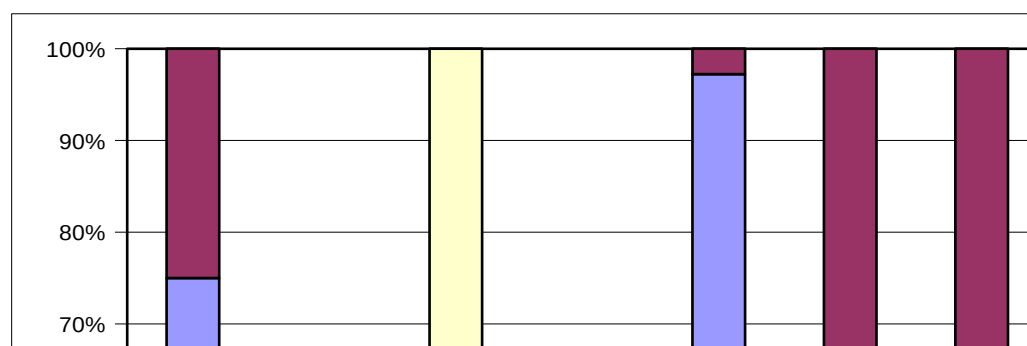


Fig. 5.3. Size Classes Composition of commercially important fish. The graph shows how for many species we have no record of individual over 21cm. The same species are fishes who must grow larger than this to become fertile adults. A healthy fish stock will contain individuals of all sizes and this will hopefully be the case in time. Large adults of predatory fish (groupers, snappers and sweetlips) provide many more offspring than young adults and therefore it is important to let these adults grow to their maximum size.

5.2 - Benthic cover

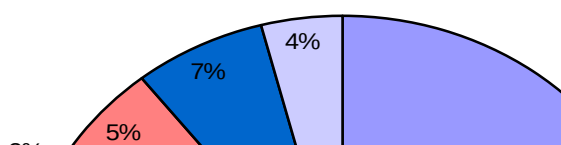


Fig. 5.4. Benthic composition within area designed for protection. The percentage of Live Hard Coral is to be considered very good. A high coral cover is very desirable in a protected area, being a key factor to the biological success of the MPA. The percentage of dead coral is not alarmingly high especially considering that most of the records were due to human causes such as breakage and fairly blasting craters; if all damaging activities in the area will stop after protection, we foresee that this value will decrease slightly toward even higher live hard coral cover. Other organisms such as algae, sponges and other animals are present in small percentages, which can be considered as ideal, as they contribute to the total diversity of the reef. Diversity on a reef can be considered as the amount of services present in a Barangay: with increasing diversity more people, in this case species of fish, will be able to find a suitable environment to live.

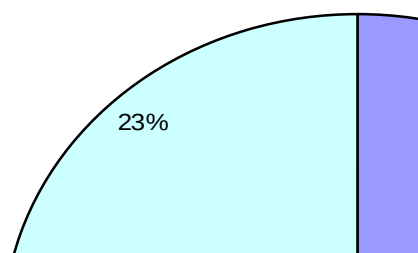


Fig. 5.5. Main Live Hard Coral life forms: the life form cited in this graph are the main growth pattern showed by most corals; considering life forms allow us to rapidly gather information about the coral community structure. While branching and partially foliose mostly represent fast growing, young corals, massive and encrusting corals are usually slow growing and older. Again, a healthy reef should have all the classes represented in a fair amount, which is the case of Esperanza II. In terms of conservation value, a high percentage of slow growing coral is very desirable: various studies show how old, slow growing corals are a better habitat for many fish species, and are also more resistant to various stress factors, from wave action to bleaching event. In Esperanza II, the percentage of young coral is quite high, but this can be seen as a positive signal, since very much of this corals are young colonies who are recovering in damaged areas. With time and protection, the percentage could shift toward more valuable old coral life forms. The presence of several very big and old corals indicates that this reef can be very productive if human impacts are kept as low as possible.

5.3 - Human impacts

Fig. 5.6. A summary of the coral damage and human impacts found inside the proposed MPA. The main

these records imply that dynamite fishing is still practiced occasionally, and must be watched out for. This highly destructive fishing method must be avoided independently of whether the area is protected or not. Rather than through enforcing of rules (as for the MPA itself), dynamite fishing must be generally discouraged through education and better understanding of the fisherfolk. The same is valid also for other damages such as anchoring and trampling; although outside the MPA is not a protected area, as much as possible should be done to protect the areas used for fishing in order to further enhance fish catches. This includes also not littering in the sea, a common problem in the Philippines who can be solved only with intensive waste management campaigns held by the LGU's.

In term of abiotic impacts, the absence of sedimentation is a very positive result, especially considering that several mines active in the area. In general, the water was very clear, with visibility over 20m. Sediments do have a very negative effect on the reef. In fact, region with high sediments deposition normally show very poor coral cover independently of all other parameters. Therefore, the impact of the mines should be monitored closely, since a change in the current patterns could be enough to dramatically change the sediment deposition in the protected area.

6 - Conclusion and recommendations

The Municipality of St Ricardo, and in particular the Barangay Esperanza II are taking on the challenge of establishing and managing a Marine Protected Area, with the aim of preserving their marine resources and replenishing the depleted fish stocks. The area assessed by CCC is to be considered as ideal. The coral cover is very high, the diversity is high. Abiotic factors such as sediments, visibility and temperature all are within the suitable or even optimal range. This is supported by the evidence that new coral growth is taking place in damaged areas; many reefs are not able to recover very well from disturbance, but this is hopefully not the case with Esperanza. The high numbers of butterflyfish also indicate the reef is healthy. The fish community is suffering from the fishing pressure; of all commercial target species, no large individual could be observed. Also, the number of smaller fishes recorded was relatively low.

All this data provides strong evidence for the proposal that an MPA in the region is very much needed and, due to a overall very good reef in the identified area, the chances for the MPA to be successful are high. Hopefully the situation inside the MPA will continue to improve and provide a healthy fish stock that can be harvested outside the MPA. Fish stocks inside MPAs often take several years before significant increases can be seen and careful management of fishing activities is required to ensure this is the case. A healthy fish stock will contain individuals of all sizes and with proper MPA management this will happen in time. It is also interesting to note that a large snapper of 12 kg will provide as many offspring as 210 1kg snappers resulting in higher fish yields in the future. This really underlines the importance of allowing fish to grow and reproduce in an undisturbed environment so that maximum offspring outputs can be attained. **Without proper management the MPA will never work.**

Following here, a brief list of issues that the management is encouraged to consider.

The local stakeholders should identify partners able to provide support and specific training for the MPA managers. While NGO's can be of great help on the short time, 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, shall also be notified of major initiatives concerning the MPA and its management. It's our opinion that the long experience with the topic make this office a strong ally to face the challenges that a new MPA will not fail to raise.

To effectively enforce the rules, a very strict warding system must be in place. This is best achieved through guardhouses and the availability of a patrol boat. Even a small number of violators can strongly affect the success of the MPA, and must therefore be discouraged.

It is crucial that the MPA wardens watch the area at all times and make sure there are no violations such as illegal fishing and passage inside the MPA.

A full time warding system can create costs that the LGU can't afford; it's been showed in many cases that volunteer-based warding can be effective. However, the commitment of the wardens should be regularly assessed.

The first step to take in order to discourage violators is to have simple, understandable rules that are extensively explained to the community. Misunderstanding is source of frustration and might undermine the support of the community. Boundaries of the protected areas, indicated by marker buoys as well as on-land references, need to be clear and be explained to the community. Marker buoys, unfortunately, do incur maintenance costs and have the irritating habit of being washed away by wave action. Wherever possible, natural features shall be used as supplementary sign. In our experience, is well worth to invest an initial considerable budget to install structures that are durable and last for a long period of time, rather than having to spend a fair amount of money every year to maintain a cheaper but less solid initial set up.

Proper waste disposal and allowing less plastic waste to enter the sea would be a good starting point for the Barangay. Proper waste disposal is not only important to preserve marine resources, but also to the quality of life of everybody on the long term!

The installation of mooring buoys for fishermen and/or dive boats outside the MPA would help prevent further anchor damage. By preventing coral damage inside and outside the MPA, the reef will be healthier and able to support more fish for the fishermen in the coming years.

The reef morphology (steepness and complexity) inside the MPA, in addition to the biological features, makes this area very interesting for divers. As mentioned before in this report, the tourism potential of a successful MPA can be a great asset to the region on term of alternative livelihood and also providing a direct income trough diving fees who can help covering the management costs. However, the region must develop it's tourism potential trough a combined effort to attract more people in the area.

We believe that one important step to take in the future is to designate a 50m (or more) buffer zone around the MPA. Boat and diver access within the buffer zone should be allowed but any fishing must be prohibited or at least be restricted to conservative methods such as hook and line only. The following image shows a buffer zone that is typical of many MPAs in the Philippines. Only by proper management in this way will the fishermen be able to realise the true potential of the increased fish yields that an MPA can offer.

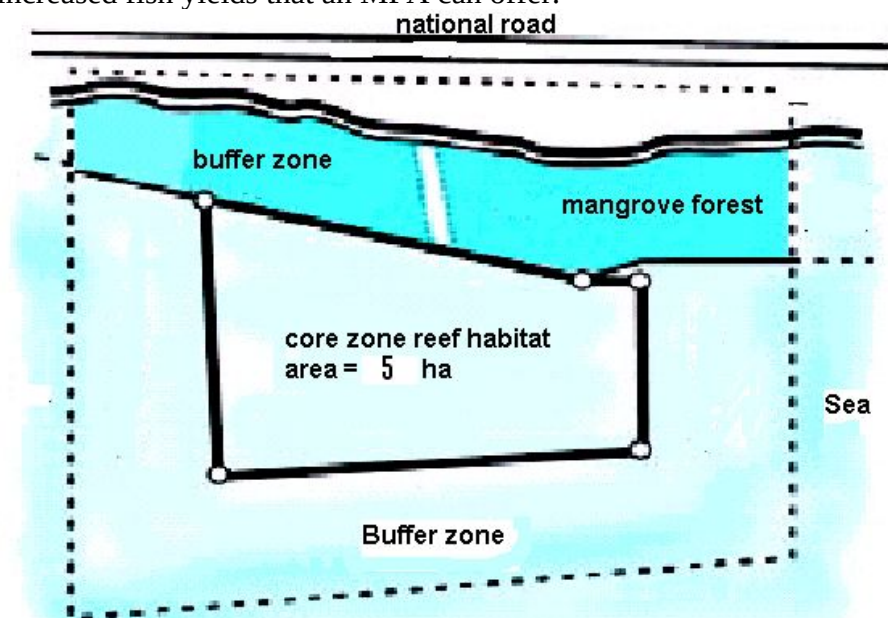


Fig. 6.2. Diagram of a 5ha MPA with buffer zone to prevent disturbance of fish from just outside the core zone.

Social surveys are very valuable in order to 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. **Esperanza II is a community based MPA. Without community support, the MPA cannot work.**

7 – Acknowledgements

There are an incredible amount of people who contributed to our assessment in many different ways, all of them with a generosity and kindness that made our experience in Esperanza simply unforgettable. Our gratitude goes to all of them. In particular, we'd like to thank the Barangay Captain Cristito Betonio and Councilmen Aide Acebu and all member of the council, the fisher folk association trough his president Jessie Mancile, Noel Subere of PLAN International, the community volunteers lead by Mme Cynthia Bagotsay, the medical team, Carmelita Saguban and Bernardita Tagsa, and the Barangay Official of Esperanza trough it's Captain Evaristo P. Virtudazo. Coral Cay would like to thank all the CCC volunteers for their hard work and dedication to providing accurate survey results. We would also like to extend our gratitude to the Municipal Office of St Ricardo for allowing us to carry out this assessment. A last, special thank you goes to the MAO Lauro "Larry" J. Elejorde, for his incredible availability and his friendship toward CCC personnel.