

Southern Negros Coastal Development Programme
Recommendations for location of marine protected areas in the
Municipality Hinoba-an

Report provided for the Mayor of Hinoba-an

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Mission Statement: *To ensure the long-term conservation of the marine and terrestrial environment in the Philippines through education and poverty alleviation.*



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Recommendations for location of Marine Protected Areas (MPA) in the Municipality of Hinoba-an

Introduction

Marine Protected Areas (MPA) are widely accepted as an effective management tool for coral reef fisheries (Polunin and Roberts, 1991, Roberts and Hawkins, 2000). The efficacy of protecting certain coral reef fish species, which is often the primary incentive for establishing an MPA, depends on factors such as biology, availability of suitable habitats, home range and larval dispersal. Another vital factor in the longevity of the MPA is the acceptance of the local community to the concept of protection. A main aim of marine reserves in management of coral reef fisheries is the protection of a critical spawning stock biomass (adult fish) to ensure fish export to fished areas via larval dispersal and emigration from reserve areas (Russ and Alcala, 1996).

Selection criteria for MPAs

Designs of MPAs in size, location and management level are often chosen in considering biodiversity, level of threat and social criteria (Salm and Clark, 1989) or in accordance with habitats present in the area, depending on the management aims. Selection criteria for MPAs in the Philippines have been identified as follows (amongst others Marine Protected Areas Workshop, Salesian Retreat Center, Dumaguete City, 1997):

(1) Social suitability

The MPA is accepted and supported by the local community.

Remaining fishing grounds can still provide income to fishermen (particularly for the phase immediately after establishment).

(2) Economic suitability

The local economy is not significantly disturbed by removal of part of the fishing grounds.

The selected area is suitably accessible for generation of income through tourism.

(3) Ecological and social suitability

(a) *species diversity*

High diversity of corals, fish and marine plants ensure high conservation value.

(b) *naturalness*

Low level of adverse human impacts, natural status of the reef.

(c) *dependency*

Adjacent areas depend on the MPA area as a source for larvae, nursery areas for juveniles and food supply (nutrients, plankton, organisms).

(d) *representativeness*

The MPA area represents a typical reef natural to the region, or represents one of the remaining healthy spots which still retained high species diversity.

(e) *uniqueness*

The MPA contains features, which are unique and could not equally be conserved on a different site.

(f) *integrity*

The size of the MPA is appropriate to provide integrity of the reserve.

(g) productivity

The reef contains a high level of features supporting a high productivity, such as topographic variety (hiding places, crevasses, walls, caves) and a high species diversity to support a multitude of organisms (for example selective corallivores), and has the potential to support more fish biomass than surrounding adjacent reef areas.

(h) vulnerability (natural impacts, anthropogenic impacts)

(i) natural impacts

Natural resistance to coral bleaching – MPA has good water exchange to minimize likelihood of raised seawater temperatures.

Crown of thorns – numbers are low enough not to be a threat to the existing live coral reef.

(ii) anthropogenic impacts

Sedimentation – MPA is located in area less exposed to sediment carried by rivers or entering from coastal erosion.

Coastal development – Building and operation of coastal development (resorts, road construction, ports) are located a considerable distance away from the MPA. If these activities exist, they are properly planned, approved and managed.

Sewage – The MPA is located a significant distance away from existing sewage disposal units (for example outlet pipes), such that eutrophication levels are negligible. New facilities/developments in the vicinity of the MPA are adequately planned and managed to widely accepted water disposal standards.

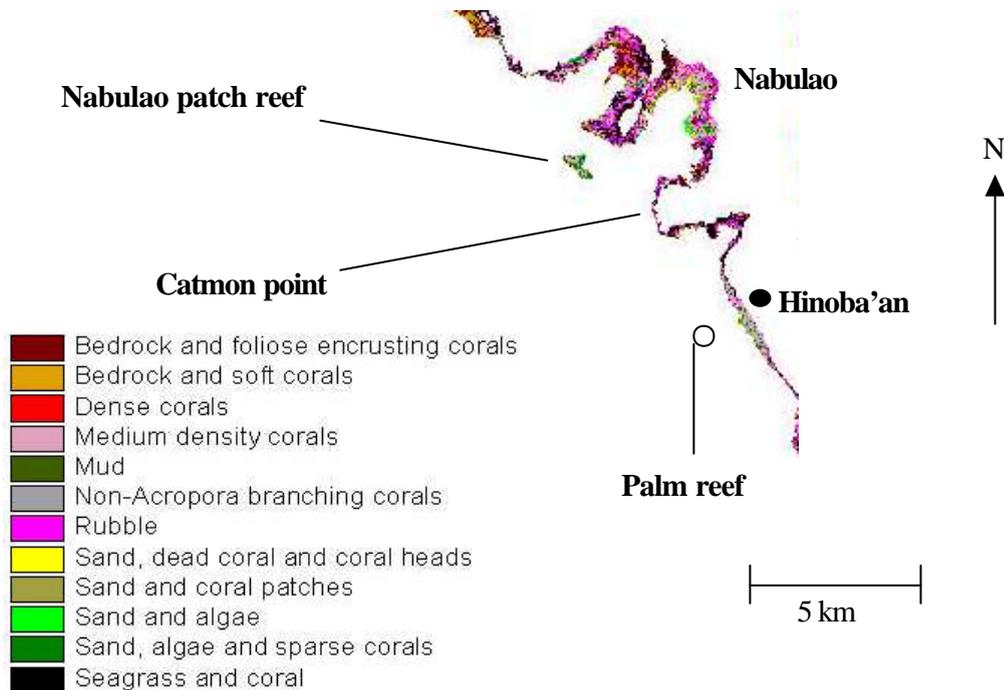


Figure 1. Areas illustrated that would be suitable for the establishment of MPAs in the municipality of Hinoba-an. Map is an insert from Stephens, I (2000), a habitat map for the Negros coast. Qualitative details of habitats and each potential MPA follow below.

Selection of 3 recommended Sites for MPAs in the Municipality of northern Hinoba-an

1 Catmon Point GPS – 09° 37' 04" N, 122° 26' 46' E

Proposed Area: 200 m x 200 m = 40,000 m² (approx.)

Advantages:

- ?? healthy diverse reef – over 90% of the corals listed in the CCC science manual have been confirmed from this location with live hard coral cover of over 50% in some areas (relatively high for western Negros)
- ?? encompasses several reef habitats that can support a wide variety of fish from 30m to surface
- ?? the proposed MPA lies near to deep water, with an associated lesser risk of coral bleaching and sedimentation. Sedimentation plumes from the Nauhang river to the north of Hinoba-an have seen to flow south rather than west towards this proposed MPA, and therefore have a lesser impact on these reefs than on those to the south
- ?? the area lies on a headland that is potentially good as a larval source and sink area for corals and fish. In fact many larval and juvenile fish have been seen in this area, suggesting that this may be an important ‘sink’ area for coral reef fish settlement
- ?? this potential MPA is small enough to prevent a large area of the reef being taken away from the local population in terms of harvestable fishing area
- ?? this area lies south of the mangroves of northern Nabulao Bay, providing a continuous source of juvenile fish that recruit from mangrove and seagrass areas
- ?? Catmon Point is easily located and can be easily and cheaply marked by the use of subsurface mooring buoys

Disadvantages:

- ?? It could be difficult to enforce because it is some distance away from settlements
- ?? it is an area that is often fished (at present)

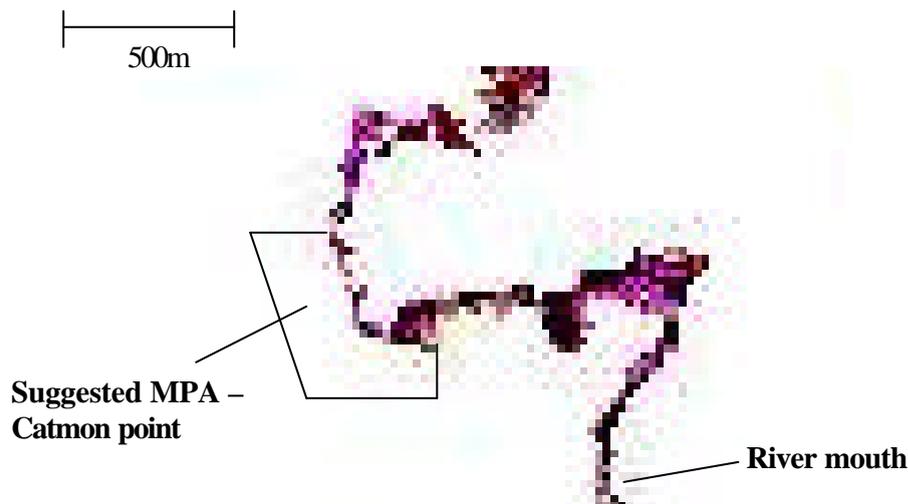


Figure 2. Specific location of Catmon point and the associated suggested Marine Protected Area location (black border). The river mouth is that of the Nauhang river.

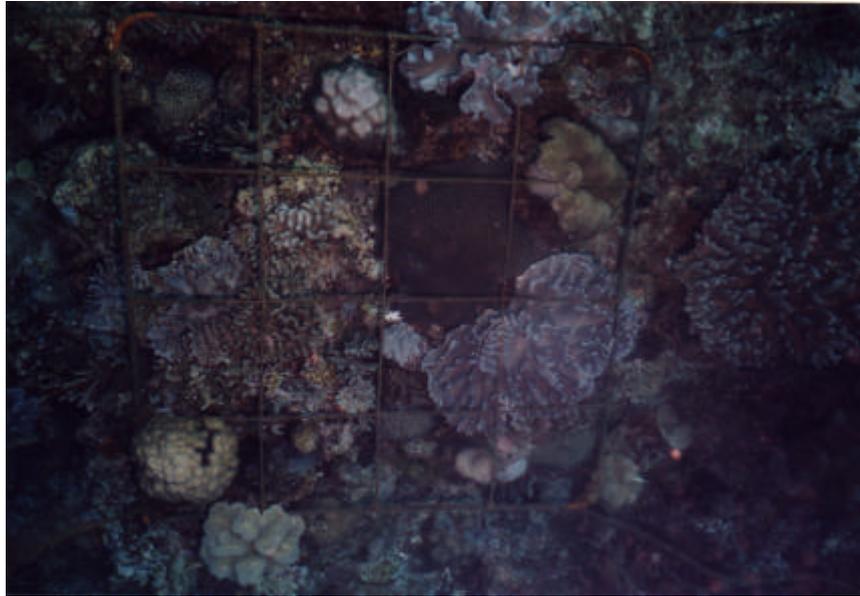


Figure 3. Typical habitat at 12m depth on Catmon Wall (south west Catmon Point).

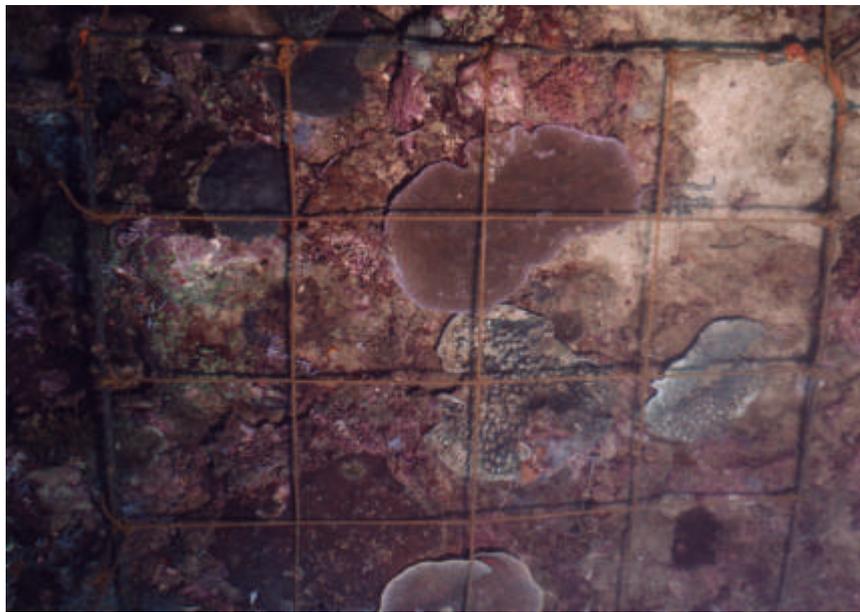


Figure 4. Typical habitat at 18m depth at Catmon Point. *Mycedium elephantotus* and a non-acroporid foliose coral can be seen in this quadrat.

Justification (in reference to points in page 2-3)

- 1 Social suitability needs to be established – are the community agreeable to the area?
- 2 The selected area is located on a headland with steep cliffs, and is somewhat away from significant human population. These qualities could make it a prime tourist destination which could create additional income for the adjacent community.
- 3.a The area of the whole reserve supports a good biodiversity (Harborne *et al.*, 1996).
- 3.b The reefs in the suggested reserve area have sustained a high level of naturalness.
- 3.d, e The diverse reef selected for the reserve represents a typical diverse and healthy reef habitat in Southern Negros (Solandt, pers. observation).
- 3.f The size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport. For example, the very successful Apo Island Marine reserve in Negros Occidental supports large biomass of schooling jack species that provide good spill-over fisheries to adjacent communities (Russ and Alcala, 1996). Here, the no-take zone is only 200m within the reserve. The MPA proposed at Catmon point is not much bigger.
- 3.g The recommended MPA contains a high level of features supporting high biodiversity, such as topographic variety (hiding places, crevasses, walls, and caves).
- 3.h.i The recommended MPA is located on a peninsula. Thus, the likelihood of seawater temperature rises is minimal due to good overall water circulation.
- 3.h.ii The site is less affected by sedimentation than other areas south along the coastline (Beger and Harborne, 2000).

Recommendations

- ?? All destructive fishing in this area should stop (cyanide/muroami/dynamite/poison/compressor)
- ?? All shellfish collection for the curio trade should be terminated
- ?? handline fishing should be allowed to continue at a sustainable level
- ?? fishing should only be allowed at the local sustainable level (no commercial boats with over 2 fishermen)

2 Nabulao Bay Patch reef, GPS – 09° 38' 02" N, 122° 25' 20" E

Proposed Area: 1.5 km x 1.25 km = 1.875 km²

Advantages:

- ?? diverse, large patch reef
- ?? the area encompasses several reef and lagoon habitats including locally threatened stands of staghorn and other branching acroporids (that are susceptible to bleaching).
- ?? the reef is located slightly offshore, thus making access to it a problem for local fishermen during the south-westerly monsoon periods. This suggests that this area can be considered semi-protected due to its inaccessibility during times of heavy weather
- ?? coral populations on the island are fairly significant, especially on the northern side of the reef
- ?? the site lies seaward of one of the largest extant mangrove populations along the Negros coastline (Nabulao Bay) that are a vital source of recruiting commercial fish species onto adjacent reefs (Solandt, pers. obs)

Disadvantages:

- ?? the area is potentially difficult for the local community of Nabulao to self-manage as the patch reef is 1-2 km off-shore
- ?? there would be difficulty marking the area with buoys, as the area has no land reference points. The whole area would need to be buoyed so that the area of the reserve can be clearly seen
- ?? there are potential difficulties with administration, as the patch reef lies on the border with Sipalay

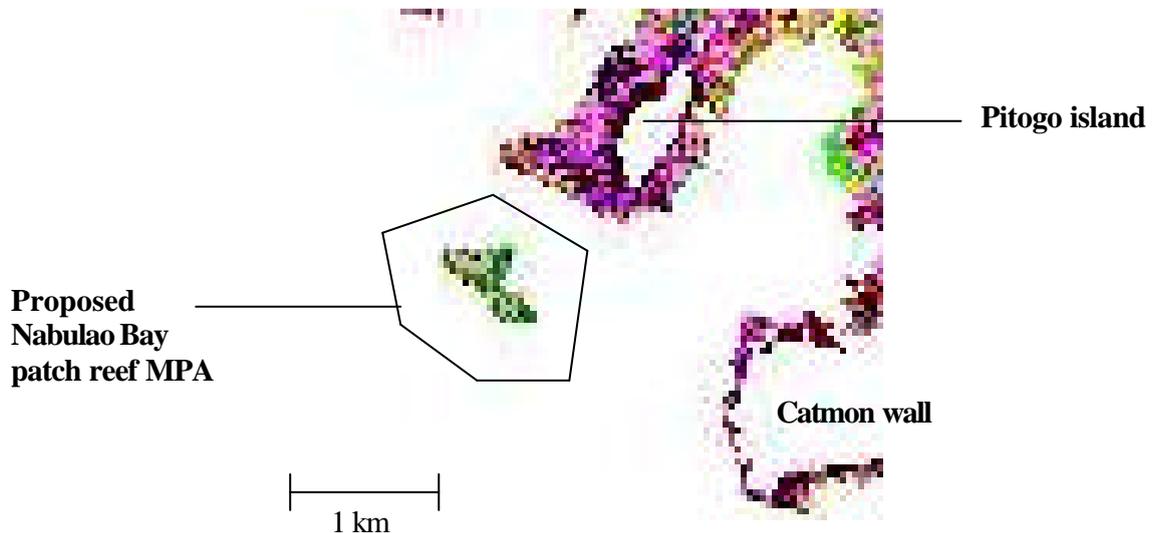


Figure 5. Location of potential MPA at Nabulao bay patch reef in the vicinity of Nabulao Bay

Justification

- 1 social suitability needs to be established for the proposed area. At present there is considerable fishing pressure in this area with commercial and subsistence fishing taking place
- 2 the selected area is located as an exposed sea floor coral formation. This quality makes it a prime tourist destination for the local dive industry, which could create additional income for the adjacent communities
- 3.a the area of the whole reserve supports good biodiversity (Harborne *et al.*, 1996) as well as critical populations of branching staghorn acroporids that are absent in many other Negros locations
- 3.b the reefs in the suggested reserve area have sustained a high level of naturalness
- 3.c further research in water movement is required
- 3.d, e the diverse reef selected for the reserve represents a typical diverse reef habitat in Southern Negros (Solandt, pers. observation). A patch reef of this size off the shore of coastal Negros is unusual
- 3.f the size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport.
- 3.g the recommended MPA contains features supporting high productivity, mainly due to the strong currents and flow associated with shallow patch reefs located some distance offshore. Higher flow associated with seaward reefs can support large stands of ephemeral algal growth that can, in turn, support large numbers of herbivorous fish if fishing pressure is kept at sustainable levels
- 3.h.i the recommended MPA is located off the coastline protruding into the ocean. Thus, the likelihood of seawater temperature rises is minimal (which reduces the likelihood of bleaching)
- 3.h.ii the site is less affected by sedimentation than other areas along the coastline (Beger and Harborne, 2000)

Recommendations

- ?? All destructive fishing in this area should stop (cyanide/muroami/dynamite/poison/compressor)
- ?? All shellfish collection for the curio trade should be terminated
- ?? handline fishing should be allowed to continue at a sustainable level from small bancas
- ?? fishing should only be allowed at the local sustainable level (no commercial boats with over 2 fishermen). The use of nets (>1 inch mesh size) could be allowed in the southern part of this proposed site

3 Palm Reef GPS – 09° 35' 40" N, 122° 28' 10" E

Proposed Area: 1 km x 1 km = 1 km²

Advantages:

- ?? healthy diverse reef and fish diversity and biomass at this location
- ?? encompasses a variety of currents that can seed and be a source of fish larvae and coral to other Negros reefs
- ?? exposed near the open Sulu sea creating lesser risk of coral bleaching and sedimentation
- ?? near to the municipal center of Hinoba-an providing close location for administration, enforcement and education

Disadvantages:

- ?? low level of sedimentation already present
- ?? offshore, so difficult to supply direct guidelines on the size of the MPA unless surface marker buoys are used

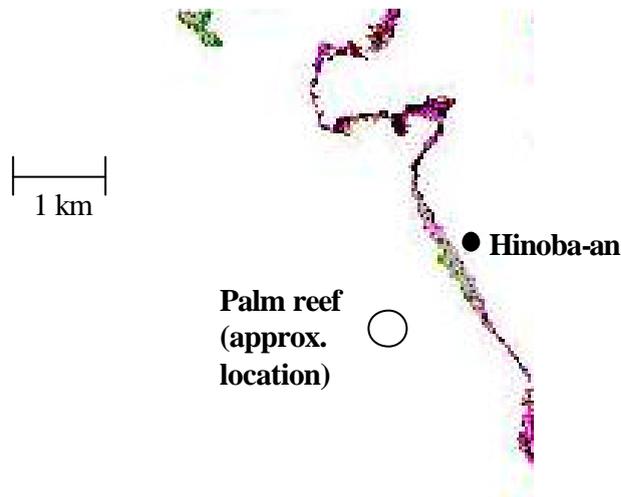


Figure 6. Location of potential MPA at Palm reef located off the coast of Negros close to the town of Hinoba-an.

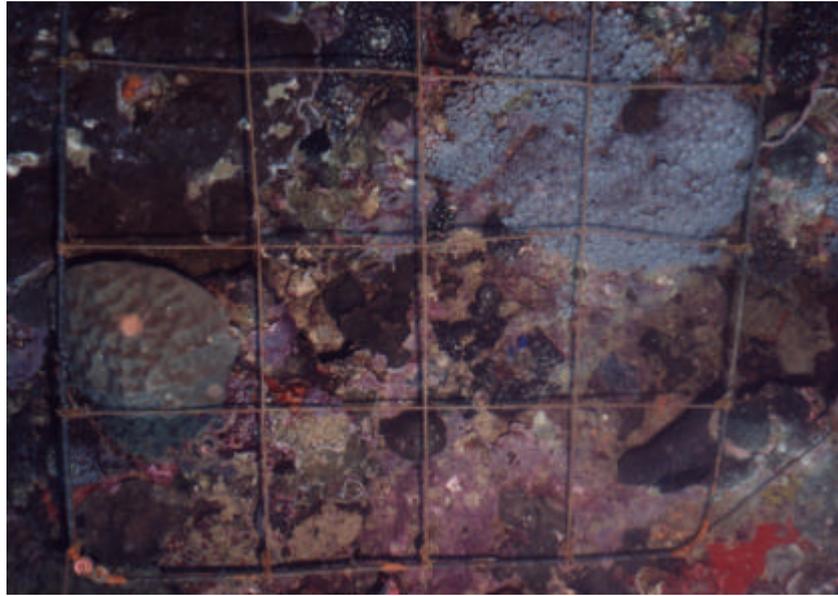


Figure 7. Typical reef habitat at shallow Palm reef with *Porites* sp.(center left) and *Tubipora musica* (top right) prevalent in this quadrat.

Justification

- 1 social suitability needs to be established.
- 2 this area could be important to the local dive industry as a location for fish observation divers.
- 3.a the area of the whole reserve supports relatively good biodiversity (Harborne *et.al.*, 1996).
- 3.b the reefs in the suggested reserve area have sustained a high level of naturalness compared to surrounding areas.
- 3.c further research in water movement is required.
- 3.d, e the diverse reef selected for the reserve represents an unusual yet important area of high current and good benthic diversity for Southern Negros (Solandt, pers. observation).
- 3.f the size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport.
- 3.g the recommended MPA contains a high level of features supporting a high productivity, and high species diversity to support a multitude of organisms. Fish especially seem to congregate at this location. It acts as a point of high habitat diversity in an otherwise ecologically poor area
- 3.h.i the recommended MPA is located close to the edge of the coastal shelf where seawater exchange is significant. Thus, the likelihood of seawater temperature rises is lower compared to areas closer to the shore.
- 3.h.ii The site is less affected by sedimentation than the rest of the Hinoba-an coastline (Beger and Harborne, 2000).

Recommendations

- ?? All destructive fishing in this area should stop (cyanide/muroami/dynamite/poison/compressor)
- ?? All shellfish collection for the curio trade should be terminated
- ?? handline fishing should be allowed to continue at a sustainable level from small bancas

References

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