

SOUTHERN NEGROS COASTAL DEVELOPMENT PROGRAMME
RECOMMENDATIONS FOR LOCATION AND LEVEL OF PROTECTION OF
MARINE PROTECTED AREAS IN THE MUNICIPALITY OF SIPALAY



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1. INTRODUCTION

Marine Protected Areas (MPA) are widely accepted as an effective management tool for coral reef fisheries (Polunin and Roberts, 1991). 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. A main aim of marine reserves in management of coral reef fisheries is the protection of a critical spawning stock biomass to ensure fish export to fished areas via larval dispersal and emigration (Russ and Alcala, 1996).

1.1 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):

A. 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).

B. 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.

C. Ecological suitability

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

CII. Naturalness - Low level of adverse human impacts, with a natural state of the reef.

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

CIV. 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.

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

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

CVII. 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).

CVIII. Vulnerability (*natural impacts, anthropogenic impacts*)

Natural impacts

Storm damage – MPA is in a relatively protected site.

Coral bleaching – MPA has good water exchange to minimize likelihood of raised seawater temperatures.

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. These activities are properly planned, approved and managed.

Sewage – The MPA is located away from existing sewage disposal units (for example outlet pipes). New facilities in the vicinity of the MPA are adequately planned and managed to widely accepted water disposal standards.

Industrial effluents – The MPA is located away from industrial effluent disposal areas (for example contaminated river estuaries) to avoid influx of heavy metals, non-degradable chemicals and high turbidity.

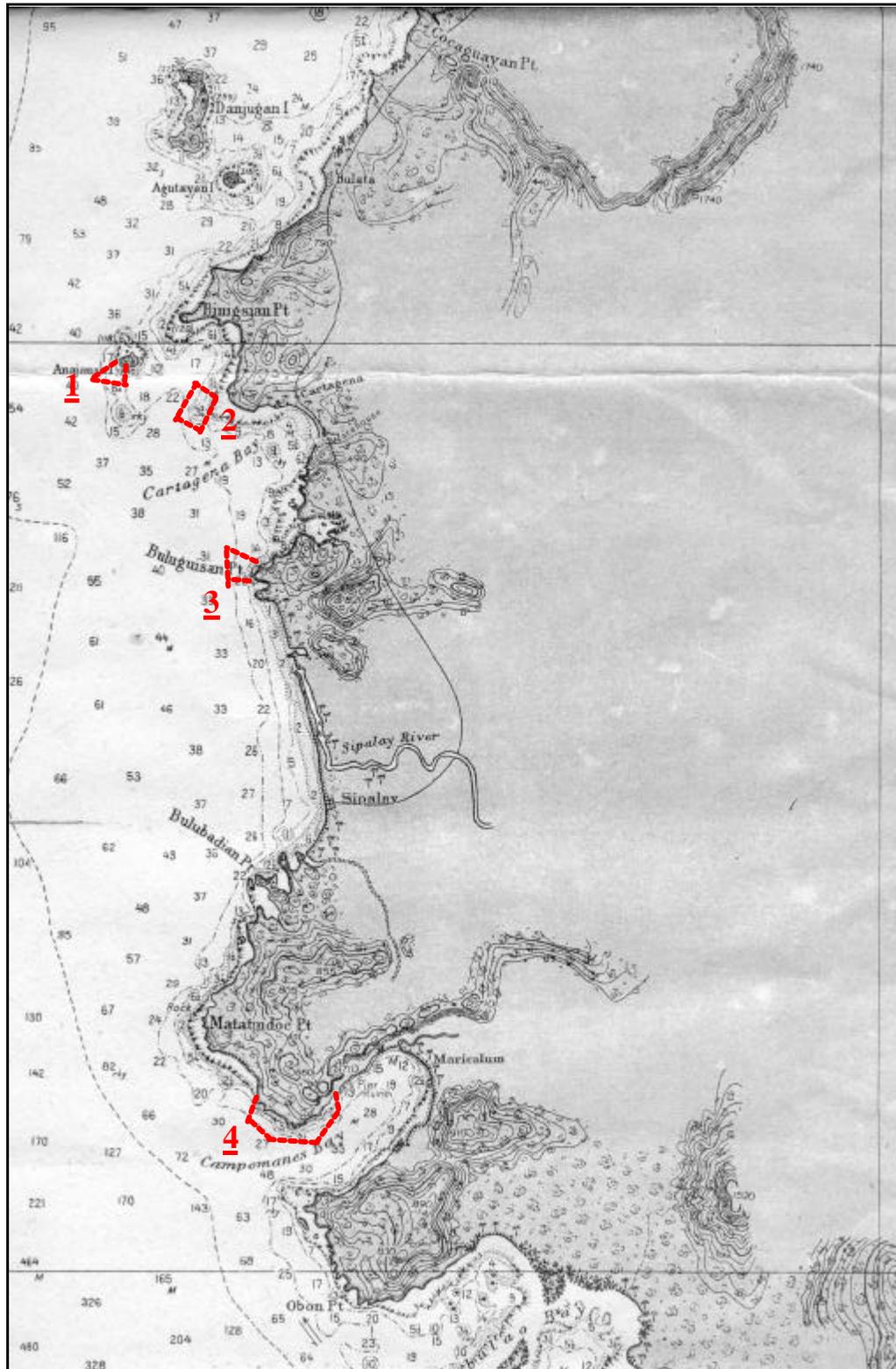


Figure 1. Location of the four recommended protected areas along the coast of Sipalay, south-west Negros. The location of the proposed protected areas are highlighted in red. 1 - Anajuan island, 2 - Punta Lahug, 3 - Buluguisan Point, 4 - North Campomanes Bay.

2. LOCATION OF PROPOSED RESERVES

2.1 Anajauan Island

Proposed Area: $200 \text{ m} \times 400 \text{ m} = 80,000 \text{ m}^2 = 8 \text{ Has.}$

2.1.1 Advantages

- ?? Healthy diverse reef
- ?? Encompasses several “good” reef habitat
- ?? Fish life is diverse
- ?? Near deep open ocean, lesser risk of coral bleaching and sedimentation

2.1.2 Disadvantages

- ?? Difficult to enforce because facing away from settlements
- ?? Problems with administration and jurisdiction, as on border to Cauayan which is yet to be fully established

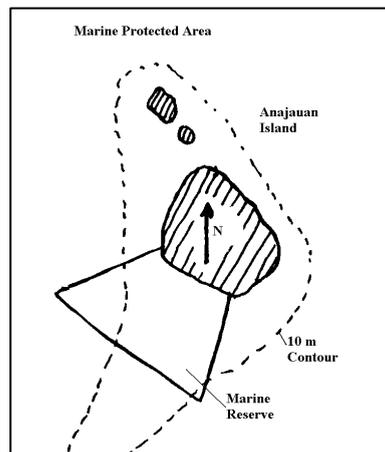


Figure 2. Recommended Marine Protected Area at Anajauan Island.

2.1.3 Justification

A. Social suitability

Social suitability needs to be established.

B. Economic suitability

The selected area is located on an island with natural beauty, beaches. These qualities make it a prime tourist destination, which will create additional income for the adjacent community.

C. Ecological Suitability

- CI. Species diversity** - The area of the whole reserve supports a good biodiversity (Harborne *et.al.*, 1996).

- CII. Naturalness** - The reefs in the suggested reserve area have sustained a high level of naturalness.
- CIII. Dependency** - Further research in water movement is required.
- CIV. Representativeness** - The diverse reef selected for the reserve represents a typical diverse and healthy reef island habitat in Southern Negros (Beger, pers. observation).
- CV. Uniqueness** - The size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport.
- CVI. Integrity** - The recommended MPA 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.
- CVII. Productivity** - The recommended MPA is located on the ocean-ward side of Anajauan Island. Thus, the likelihood of seawater temperature rises is minimal.
- CVIII. Vulnerability** - The site is less affected by sedimentation than other areas along the coastline (Beger and Harborne, 2000).

2.2 Punta Lahug

Proposed Area: 100 m x 500 m = 50,000 M² = 5 Has.

2.2.1 Advantages

- ?? Healthy diverse reef
- ?? Encompasses several “good” reef habitats and backreef / lagoon habitat
- ?? Fish life is diverse
- ?? The site is exposed and pointing away from bad sedimentation sources at the same time slightly sheltered from possible storm damage behind Anajauan Island and Binigsian Pt.

2.2.2 Disadvantages

- ?? Sedimentation is present (low level)
- ?? Problems with administration, as on border to Cauayan which is yet to be fully established

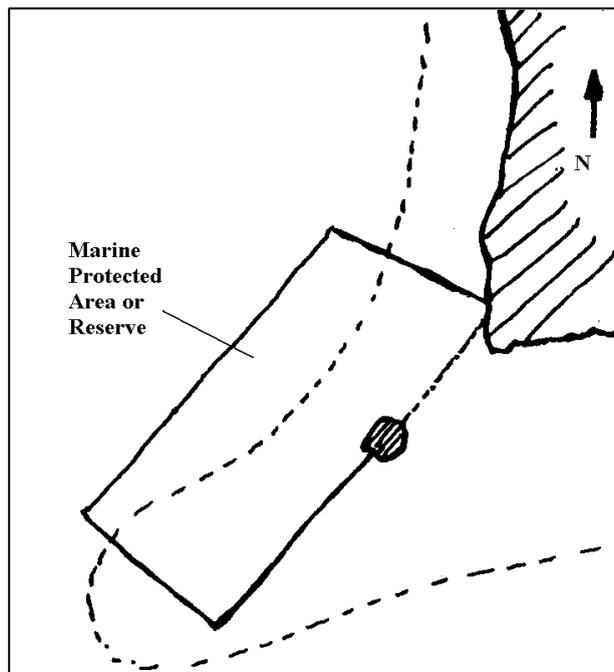


Figure 3. Location of recommended reserve/Marine Protected Area at Punta Lahug.

2.2.3 Justification

A. Social suitability

Social suitability needs to be established.

B. Economic suitability

The selected area is located on a headland and small islet with natural beauty, caves and impressive rock formations. These qualities make it a prime tourist destination, which will create additional income for the adjacent community.

C. Ecological Suitability

- CI. **Species diversity** - The area of the whole reserve supports a good biodiversity (Harborne *et.al.*, 1996).
- CII. **Naturalness** - The reefs in the suggested reserve area have sustained a high level of naturalness.
- CIII. **Dependency** - Further research in water movement is required.
- CIV. **Representativeness** - The diverse reef selected for the reserve represents a typical diverse and healthy reef island habitat in Southern Negros (Beger, pers. observation).
- CV. **Uniqueness** - The size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport.
- CVI. **Integrity** - The recommended MPA 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.
- CVII. **Productivity** - The recommended MPA is located on a part of the coastline protruding into the ocean. Thus, the likelihood of seawater temperature rises is minimal.
- CVIII. **Vulnerability** - The site is less affected by sedimentation than other areas along the coastline (Beger and Harborne, 2000).

2.3 Buluguisan Point

2.3.1 Advantages

- ?? Healthy diverse reef and fish
- ?? Encompasses several “good” reef habitats
- ?? Exposed near the ocean, lesser risk of coral bleaching and sedimentation

2.3.2 Disadvantages

- ?? Low level of sedimentation already present

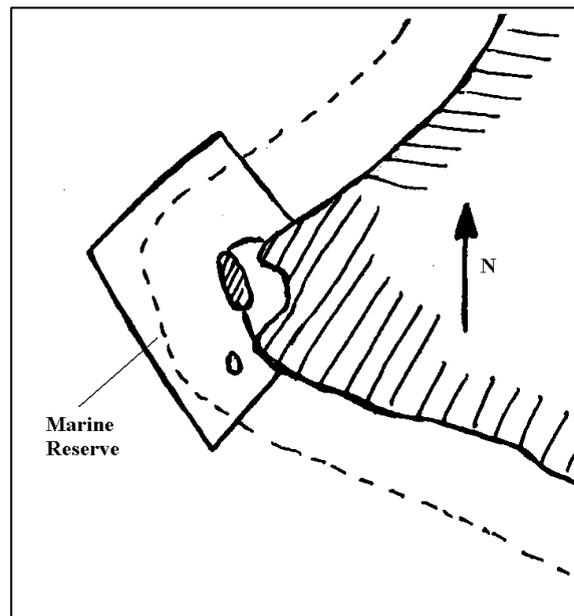


Figure 4. Recommended reserve at Buluguisan Point.

2.3.3 Justification

A. Social suitability

Social suitability needs to be established.

B. Economic suitability

The selected area is located on a headland with natural beauty, caves and impressive rock formations. These qualities make it a prime tourist destination, which will create additional income for the adjacent community.

C. Ecological suitability

- CI. Species diversity** - The area of the whole reserve supports a good biodiversity (Harborne *et.al.*, 1996).

- CII. Naturalness** - The reefs in the suggested reserve area have sustained a high level of naturalness.
- CIII. Dependency** - Further research in water movement is required.
- CIV. Representativeness** - The diverse reef selected for the reserve represents a typical diverse and healthy reef island habitat in Southern Negros (Beger, pers. observation).
- CV. Uniqueness** - The size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport.
- CVI. Integrity** - The recommended MPA 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.
- CVII. Productivity** - The recommended MPA is located on a part of the coastline protruding into the ocean. Thus, the likelihood of seawater temperature rises is minimal.
- CVIII. Vulnerability** - The site is less affected by sedimentation than other areas along the coastline (Beger and Harborne, 2000).

2.4 North Campomanes Bay

It is proposed that Campomanes Bay has three reserve areas associated with the north side of the bay. A Marine Sanctuary, Marine Reserve and Marine Protected Area are proposed for this area.

2.4.1 Sanctuary

Advantages

- ?? Extremely high coral cover and diversity probably one of the best coral reefs left in southern Negros Occidental
- ?? Sheltered from storms
- ?? Lesser sedimentation due to depth of Campomanes Bay

Disadvantages

- ?? May be affected by planned port development, e.g. bilge waters, engine cooling spillage, oil spills and increased sedimentation due to disturbance from propellers

2.4.2 Marine Reserve

Advantages

- ?? Extremely high coral cover
- ?? Very unique habitat and topography on the wall, includes caves and overhang habitats
- ?? Good fish life, potential for development of stocks
- ?? Facing away from Sibalay River and other sources of pollution and sedimentation
- ?? Near deep ocean, lesser risk of coral bleaching

Disadvantages

- ?? Difficult to enforce/control, since it is located far from settlements

2.4.3 Marine Protected Area (MPA)

Advantages

- ?? High coral cover
- ?? Very unique habitat and topography with wall, includes caves and overhang habitats, reef slopes and reef flats
- ?? Good fish life, potential for development of stocks
- ?? Facing away from Sibalay River and other sources of pollution and sedimentation
- ?? Near deep ocean, lesser risk of coral bleaching

Disadvantages

- ?? Difficult to enforce/control, since it is located far from settlements

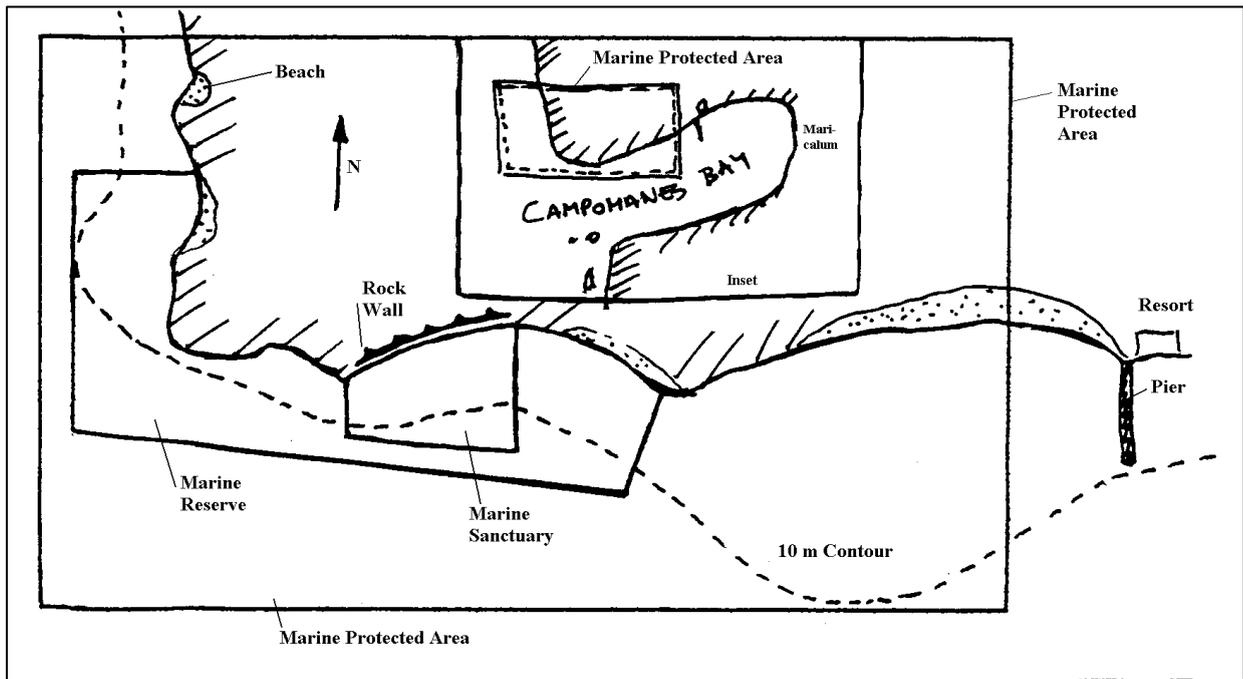


Figure 5. Recommended reserve and sanctuary (no-take zone) at North Campomanes Bay.

2.4.4 Justification

A. Social suitability

Social suitability needs to be established.

B. Economic suitability

The selected area is located in a bay with a unique natural beauty, with beaches, steep rock cliffs above and under water, and the bay is sheltered. These qualities make Campomanes Bay a first-class tourist attraction. The area selected for the Sanctuary borders on a steep cliff, which falls directly into the sea. Owing to its inaccessibility and the lack of a beachfront no loss of income from prohibited development and access will be sustained.

C. Ecological Suitability

- CI. Species diversity** - The area of the whole reserve supports a very good biodiversity (Beger and Harborne, 2000). Exceptional diversity and abundance of life was found at the site of the recommended Sanctuary.
- CII. Naturalness** - The reefs in the suggested reserve area have sustained a high level of naturalness.
- CIII. Dependency** - Further research in water movement is needed.
- CIV. Representativeness** - The diverse reef selected for the Sanctuary may represent one of the most diverse and healthy remaining reef habitats in Southern Negros (Beger, pers. observation). The Reserve area contains a unique wall with caves representing a unique habitat.

- CV. Uniqueness** - The size of the MPA is likely to be of adequate size. Further investigations are necessary to comment on water exchange and larval transport.
- CVI. Integrity** - The recommended MPA 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. Particularly the suggested Sanctuary area, owing to its high coral diversity, supports an abundant fish community with many juveniles, indicating recruitment. Juveniles and adults of selective corallivores (for example *Chaetodon baronessa*) were recorded (Beger, pers. observation).
- CVII. Productivity** - A large portion of the recommended MPA is protected from storm because it is inside Campomanes Bay. Owing to the depth of the bay, the likelihood of seawater temperature rises is minimal. Based on experience, the site is situated optimally as it is on the corner of the bay which is likely to benefit from both shelter and water exchange/ flushing.
- CVIII. Vulnerability** - The site is less affected by sedimentation than other areas along the coastline (Beger and Harborne, 2000). The steep cliffs do not carry topsoil, which could be eroded. The cliffs also prohibit coastal developments such as roads or resorts in the immediate area of the Sanctuary and most of the Reserve. The site is located an adequate distance away from Sipalay River which carries mining effluents. A port development has been proposed in the immediate area of the MPA.

3. PLANNED PORT DEVELOPMENT IN CAMPOMANES BAY

The planned port development is for a development on the north side of CB, next to the current small pier by the CB Resort. Likely impacts of a port are (based on the general assumption of a medium size port as construction details are not available).

3.2 Construction Phase

- ?? Increased sedimentation on the north side of CB, owing to underwater construction. Since the bay is self-contained and is likely to have low water exchange rates, the sediment will be retained in the bay and is likely to smother adjacent reefs.
- ?? Increased noise pollution.
- ?? Increase discharge of oil and other hydrocarbons from leaking fuel and cooling systems. These are likely to affect the adjacent reefs.

3.3 Operating of the port

- ?? Increased sedimentation on the north side of CB, owing to boat propellers. Since the bay is self-contained and is likely to have low water exchange rates, the sediment will be retained in the bay and is likely to smother adjacent reefs.
- ?? Considerable increase of discharges of oil and other hydrocarbons from leaking fuel and cooling systems and bilge water. These are likely to affect the adjacent reefs.

4. DEFINITION OF TERMS

4.1 Marine Protected Area (MPA)

An area in the municipality waters that is established by an ordinance intended for rehabilitation, restoration, protection, conservation and replenishment of fishery and coastal resources because its ecological function as a spawning, breeding and/or feeding grounds for one or group of marine species and is characterized by high productivity and/or high biodiversity.

The following activities are **not** allowed in the area:

- ?? Anchoring
- ?? Collection of plants and animals, except for scientific, educational, research purposes with the necessary permit from a Management Board or pertinent government agency (i.e. DENR)
- ?? Any form of extraction of minerals and substrates (i.e. sand, corals, coral rubble and the like)
- ?? Any form of fishing, gleaning, collection of organisms or hunting, except in designated areas for regulated fishing with necessary permits from Management Board

Allowable activities:

- ?? Recreational diving but regulated by the management board, restricted numbers and subject to fees
- ?? Mooring at designated buoys
- ?? Eco-tourism activities (i.e. recreational diving, boat rides, etc.)

4.2 Marine Reserve

Refers to the designated areas in the marine protected area where fishing and other forms of activities are not allowed and set aside for educational, scientific research purposes, and for the rehabilitation and restoration of the ecosystem, while recreational diving activities are allowed and which is characterized by high productivity and/or biodiversity.

The following activities are **not** allowed in the area:

- ?? Anchoring of boats
- ?? Collection of plants and animals, except for scientific, educational, research purposes with the necessary permit from a Management Board or pertinent government agency (i.e. DENR)
- ?? Any form of extraction of minerals and substrates (i.e. sand, corals, coral rubble and the like)
- ?? Fishing, gleaning, collection of organisms or hunting

Allowable activities:

- ?? Recreational diving
- ?? Mooring at designated buoys

4.3 Marine Sanctuary

Refers to the designated areas in the marine protected area (MPA's) where all fishing and other forms of activities which may damage the ecosystem including gathering of sand, dead and alive corals, oil exploration as well as human access, except for educational, scientific research purposes are strictly and absolutely prohibited and which is characterized by high productivity and/or biodiversity.

The following activities are **not** allowed in the area:

- ?? Anchoring
- ?? Collection of plants and animals, except for scientific, educational, research purposes with the necessary permit from a Management Board or pertinent government agency (i.e. DENR)
- ?? Any form of extraction of minerals and substrates (i.e. sand, corals, coral rubble and the like)
- ?? Any form of fishing, gleaning, collection of organisms or hunting
- ?? Recreational diving

Allowable activities:

- ?? Diving for scientific, educational and research purpose

5. REFERENCES

Beger, M. and Harborne, A.R. 2000. Southern Negros Coastal Development Programme – Municipality of Sipalay. Unpublished report.

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