



Factors Attributing to the Destruction and depletion of the coral reefs in the Philippines


- ❖ Destructive/illegal fishing (Dynamite and cyanide fishing)
- ❖ Pollution (urbanization, coastal construction, sewage, solid wastes)
- ❖ Sedimentation (Forest and Mangrove denudation)
- ❖ Anthropogenic activities (Reckless recreations, Aquarium fish traders)
- ❖ Coral Bleaching & El Niño Southern Oscillation
- ❖ Coral Reef Diseases (SED, PEY, BBD caused by deteriorating water quality)





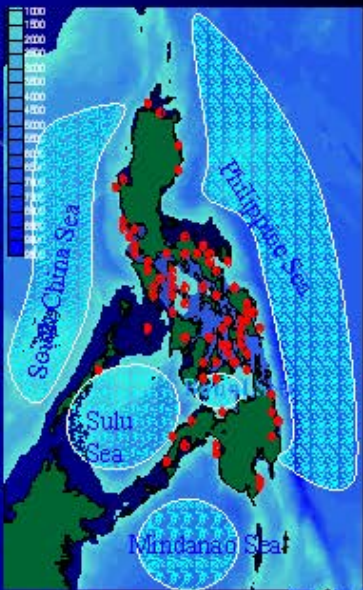

The Nationwide implementation of the establishment of Marine reserves and sanctuaries will protect the coral reefs from further degradation and destruction due to illegal and destructive fishing activities, pollution, sedimentation and human activities. Coastal and Municipal Fisheries has declined its production, from a peak of 1,070,195 (million) m.t. in 1988 to only 924,466 (33.4%) m.t. in 1997.

To address this dilemma, the Bureau of Fisheries and Aquatic Resources (BFAR) launched an innovative coral reef management and regeneration program: The Coral Gardening and Reef Rehabilitation Project, the initial implementing strategy for sustainable fisheries management.



The Program seeks to promote alternative livelihood to reduce community pressure on the reefs through "green" coral aquaculture. The BFAR with the LGU will identify and delineate the 10 ha. site/area for the said coral rehabilitation and marine resource conservation and protection project.

In addition to the 13 identified sites of the NFARMC (National Fisheries and Aquatic Resource Management Council), the BFAR-CO has identified 26 sites from ARMM (Autonomous Region of Muslim Mindanao) and 21 from BFAR-RFO 2. Overall, 60 sites/areas has been identified which needs prioritization and assessment as basis for introducing management interventions. To date, over 400 marine reserves and fish sanctuaries have been established all over the country with a total area of 8,313.90 has.



o Location of ARs

General:

- To conserve and initiate the rehabilitation of damaged reefs in the fish sanctuary in the Philippines initially in Puntod Reef, Tangalan, Aklan
- To uplift the standard of living conditions of the fisherfolk in the local fishing communities

Specific:

- To concentrate marine organisms to allow for more efficient but selective and regulated fishing activities
- To protect small/juvenile organisms and nursery areas from destructive fishing activities
- Increase the natural productivity eventually by supplying new habitats for sessile or permanently attached organisms and by allowing the establishment of an associated food chain
- To create habitats and stimulate natural reefs for desired target species
- Restore dead or degraded coral reefs
- Generate income through tourism
- To educate the primary stakeholders in the local fishing communities about coral reef conservation and rehabilitation and build their capabilities to monitor and manage their coral reef resources

DESCRIPTION OF THE PROJECT

The Bureau of Fisheries and Aquatic Resources (BFAR) has formed and organized the BFAR SCUBA Divers Task Force with a primary purpose to monitor, manage, safeguard the Coral Reef Resources of the Philippines.

**COMPONENTS OF THE PROJECT****Survey/Assessment**

A survey of the proposed site will be conducted using the Line Intercept Transect Method (LIT). This will determine the condition/status of the marine benthos communities (English et. al. 1997). Furthermore, the results of the survey will help stakeholders determine the appropriate actions and formulate ordinances, guidelines, etc. in the protection, management, and conservation of the marine resources with the recommendation of the BFAR and other concerned agencies.



Site Selection

The selection of the proposed coral garden site/area and the establishment of ARs were based on the following criteria:

- At least 600m away from natural reefs
- Near an alternative food source (i.e. sea grass beds)
- Constructed on a barren and stable substrate area of flat or gently sloping bottom of relatively good visibility.
- At depths of 15m to 25m, protected from wave action but still accessible to local fishermen.
- If coastal management project is already on going, or if site is a successful marine protected area
- Absence of sources of chronic damage to reefs. Otherwise, reef rehabilitation will not succeed.
- Relatively protected from wave action
- Deployment of Artificial reefs (AR's) may be considered in areas where there is no stable substrate available
- Accessible and manageable to the fisherfolk/stakeholders

Artificial Reef

Fifty (50) modules of concrete building block (1 module=16 units, 2m x 0.20m x 0.15m) served as artificial reefs (ARs). The artificial reefs were installed/sited within the marine reserve/sanctuaries.



Establishment of Marine Reserve/Sanctuaries

The BFAR and the Local Government units have deemed it important to establish marine reserves and fish sanctuaries to rehabilitate, regenerate, manage and protect the remaining fishery and marine resources.

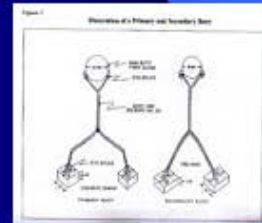




An area (10 ha.) with heavily depleted demersal/benthic fish stocks, coral, and coral reef species will be delineated using a Global Positioning System (GPS). Local Government Units (LGUs) will be encouraged to formulate Municipal Ordinances with the BFAR recommendation and technical assistance to enact and strengthen the protection, conservation and management of the Marine Sanctuary.



Marker buoys will be installed to delineate the identified sites for the proposed marine reserves and sanctuaries. Fifty (50) units of marker buoys (30 cm diameter, orange sphere, 8 mm thick) will be used.



Monitoring and Assessment of the Coral Garden and Reef Rehabilitation Project in Tangalan, Aklan

The ten (10) hectare Coral Gardening and Reef Rehabilitation Project is a collaborative project of the Marine Fisheries Development Center - Bureau of Fisheries and Aquatic Resources (MFDC - BFAR) and the Local Government of Tangalan, Aklan. It is situated inside the 60-hectares Marine Fish Sanctuary at Pungtod Reef, Barangay Jawili, Tangalan, Aklan. The sanctuary was declared through a municipal ordinance passed in 1993. The Fish Sanctuary is located at 11° 49.21 N and 122° 16.29 E



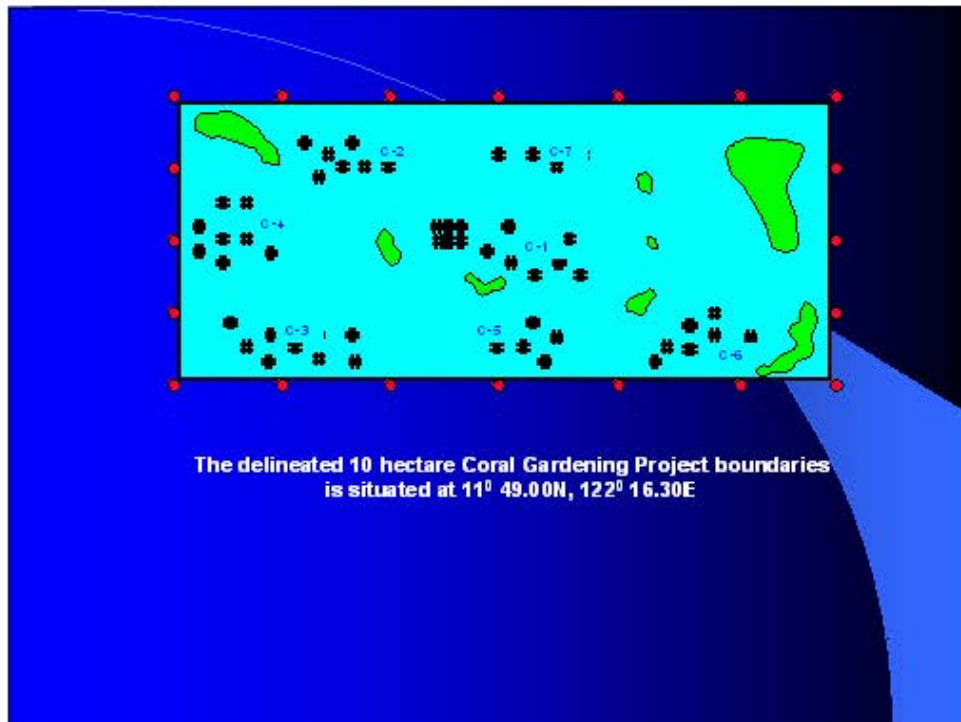
The members of the BFAR SCUBA Divers Task Force initially assessed the reef last August 4, 2002. The percent of live coral cover at Pungtod Reef registered only 12.09%, a poor coral cover as described by Mantachitra (1998).

As component of the Reef Rehabilitation project, artificial reefs were deployed within the site of the Coral Gardening and Reef Rehabilitation Project. Artificial reefs are means of increasing coastal productivity in the long term by providing substrates for growth of sessile organisms and establishing new food chains. In addition, artificial reefs serve as protection of shelter for fish juveniles, preventing their early harvest.



Preliminarily, red marker buoys demarcating the ten (10) hectare area and 49 artificial reef modules were deployed last July 11 - 22, 2003 composed of forty-eight (48) artificial reef modules of 16 slabs each and one (1) mother artificial reef composed of forty-eight (48) concrete slabs. These concrete slabs with a dimension of 10 inches by 8 inches by 2 meters were piled on top of each other, with the upper slabs inserted about 5 inches inward forming a pyramid type of module creating a larger surface area for benthic settlers and to capture wider range for sunlight. These artificial reefs were left in the area for a period of nine (9) months to allow growth and shelter for benthic and other marine organisms, with the local SCUBA Divers and Bantay Dagat members periodically monitoring and ocularly inspecting the status of the project.



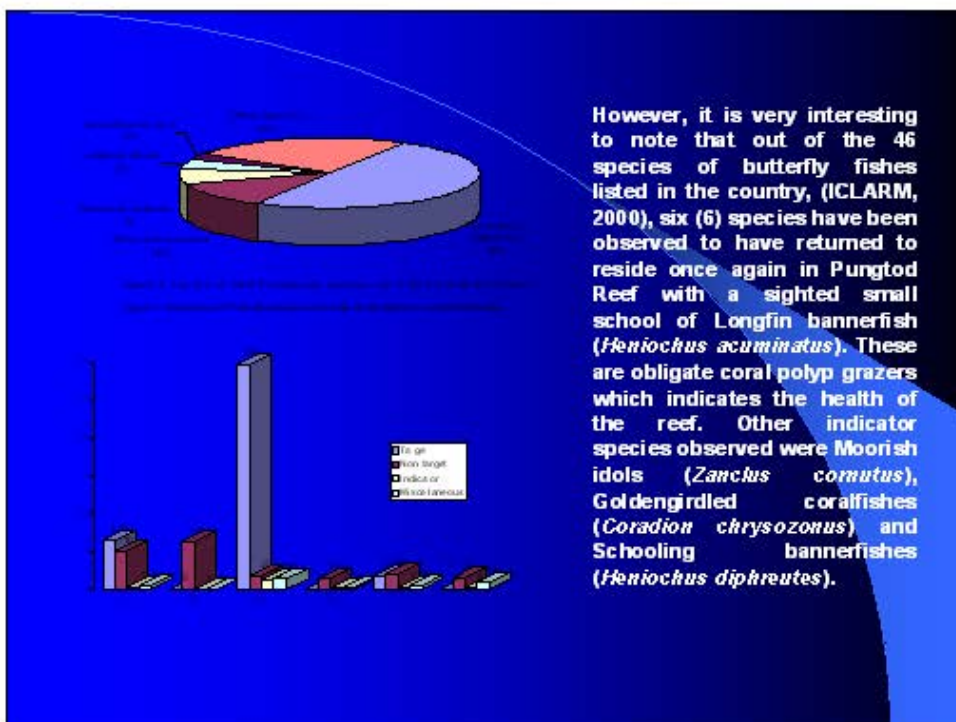
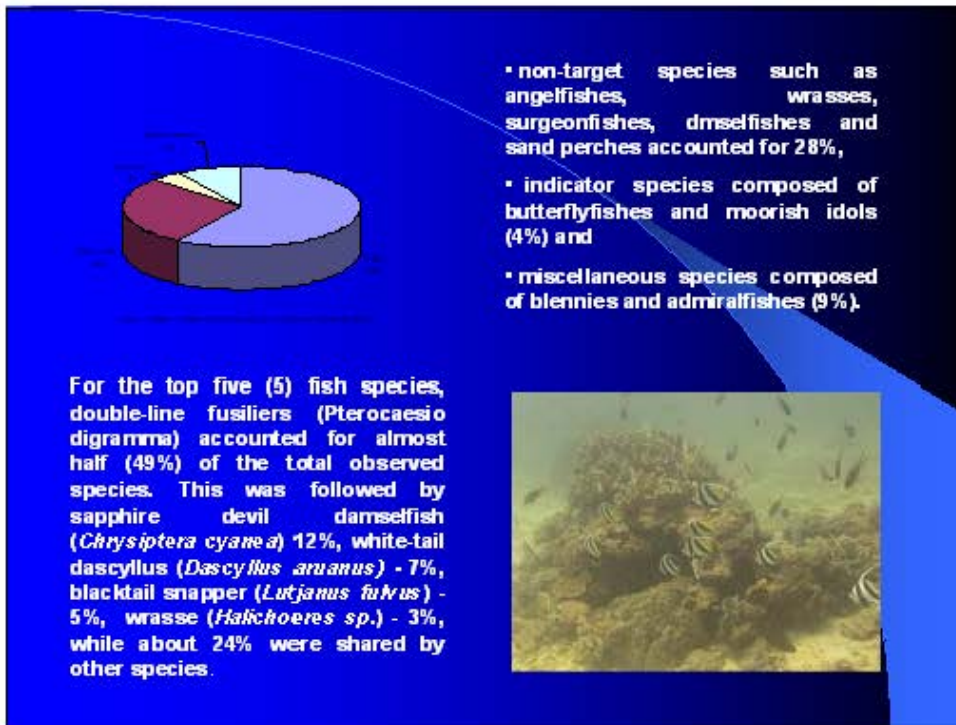


A total of 40 fish species and 22 genera belonging to 14 families were identified and recorded from the three (3) representative artificial reef clusters at the center of the Coral Garden Project posted the highest species count of 27.



In terms of reef fish composition, dominant target species were composed of

- snappers, fusiliers, nemipterids, goat fishes and parrotfishes composed more than half of the observed species present in the area with 59%,



Basing from the 6 sampled modules out of 49 artificial reefs deployed. There was a total of 1,281 fishes observed. The volume of water space per reef was 38.48 m³. For the 6 artificial reefs sampled, there were a total of 230.9 m³ available water space. From the above calculation, it can be deduced that there were approximately 6 fishes observed per cubic meter.



Other living creatures attached to or present on the artificial reef modules were soft corals, encrusting corals, turf algae, barnacles, mollusks, zoanthids, ascidians, sponges, starfishes and other invertebrates.



After only a period of nine (9) months, these were the marine organisms recruited on the artificial reef structures. Recruitment refers to the number of organisms that initially settle minus the number that die before a count is made (Gomez & Yap, undated).

The artificial reef modules, although devoid of any marine creatures at first, was eventually covered by benthic fauna and being utilized as breeding and feeding grounds for free-swimming marine fish species. As agreed by Chua and Chou (1994), a concrete artificial reef module was effective in terms of fish abundance per unit volume.

