

Status of Threatened Species and Stock Enhancement Activities in the Philippine Fisheries

Nelson A. Lopez

*Inland Fisheries and Aquaculture Division, Bureau of Fisheries and Aquatic Resources
2/F PCA Bldg., Elliptical Road, Diliman, Quezon City, Metro Manila, Philippines*

Introduction

The Philippine archipelago, with 7,100 islands endowed with freshwater, estuarine and marine resources, provides habitats to more than a million species of flora and fauna. Many of these species are commercial commodities for human consumption. Biological, geographical, population, and ecological assessments as to whether these species are over-exploited, near extinction, rare, endangered or threatened, are scarce. This paper reviews the country's threatened fishery resources (excluding exotic species) and describes the existing conservation and rehabilitation efforts, and recommends resource management interventions.

The Philippines is participant of the Convention on the International Trade of Endangered Species of Fauna and Flora (CITES), sharing lists of species common to each country which may be classified as threatened or endangered. Although the country has not formally adopted the categories and guidelines of the International Union for the Conservation of Nature (IUCN) (Francisco and Sievert 2004), it has implemented globally accepted measures for marine ecosystem conservation, particularly the establishment of Marine Protected Areas (MPAs).

Despite available listings to date, there is no systematic inventory or monitoring report which classifies whether flora and fauna in Philippine waters are extinct, endangered or threatened, over-exploited or totally depleted. As to what basis and by

whose authority species are declared rare, endangered, extinct, or threatened remains a grey area.

Endangered Species

The Philippine listings of fisheries related species perceived to be extinct, rare, threatened and endangered as covered under the CITES, IUCN and the Bureau of Fisheries and Aquatic Resources (BFAR)-Fisheries Administrative Order (FAO) No. 208 listed commodities in freshwater (Table 1) and marine environments (Tables 2 and 3) are presented as follows:

The listings of freshwater fisheries resources constitute mostly finfishes that are all, except for one, found in the CITES list, the rest under the IUCN red lists and none in the BFAR list. Majority of the listed species are also specific to some areas like Lanao Lake, few in the RINCONADA lakes of Bicol and scarce in some other minor lakes where they are found to be endemic. Most of the indigenous cyprinid species are of commercial value to the locality and are the main source of fish protein in the daily life of the fisherfolk.

The listings of marine finfishes constitute mostly sharks and seahorses which are all, except for one, found in the CITES list, the rest under the IUCN Red List and none in the BFAR-FAO list. Although BFAR listed 20 species of whales and dolphins under its FAO 208, marine mammals are not included in this report. Most of the indigenous shark species are becoming rare and extinct due to the rampant shark

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Table 1. List of endangered, rare and extinct freshwater fish species in the Philippines.

Scientific name	English name	Local name	Habitat/ distribution	Listings	
				IUCN	CITES
<i>Spratellicypris palata</i>	Lanao carp	Palata	Lake Lanao endemic	_/	
<i>Ospatulus truncatulus</i>	Lanao carp	Bitungo	Lake Lanao endemic	_/	
<i>Ospatulus palaemophagus</i>	Lanao carp		Lake Lanao endemic	_/	
<i>Mandibularca resinus</i>	Lanao carp	Bagangan	Lake Lanao endemic	_/	
<i>Puntius sirang</i>	Lanao carp	Sirang	Lake Lanao endemic	_/	
<i>Puntius tras</i>	Lanao carp	Tras	Lake Lanao endemic	_/	
<i>Puntius tumba</i>	Lanao carp	Tumba	Lake Lanao endemic	_/	
<i>Puntius amarus</i>	Lanao carp	Pait	Lake Lanao endemic	_/	
<i>Puntius baoulan</i>	Lanao carp	Baolan	Lake Lanao endemic	_/	
<i>Puntius katolo</i>	Lanao carp	Katolo	Lake Lanao endemic	_/	
<i>Puntius clemensi</i>	Lanao carp	Bagangan	Lake Lanao endemic	_/	
<i>Puntius disa</i>	Lanao carp	Disa	Lake Lanao endemic	_/	
<i>Puntius flavifuscus</i>	Lanao carp	Katapa-tapa	Lake Lanao endemic	_/	
<i>Puntius lanaoensis</i>	Lanao carp	Kandar	Lake Lanao endemic	_/	
<i>Puntius lindog</i>	Lanao carp	Lindog	Lake Lanao endemic	_/	
<i>Puntius manalak</i>	Lanao carp	Manalak	Lake Lanao endemic	_/	
<i>Puntius herrei</i>	Lanao carp		Lake Lanao endemic	_/	
<i>Puntius pachycheilus</i>	Lanao carp		Lake Lanao endemic	_/	
<i>Puntius manguaoensis</i>	Palawan carp		Lake Manguao endemic	_/	
<i>Puntius cataractae</i>			Mindanao	_/	
<i>Puntius hemictenus</i>	Naujan carp		Lake Naujan endemic	_/	
<i>Hampala lopezi</i>			Busuanga	_/	
<i>Stiphodon surrufus</i>	Goby		Leyte endemic	_/	
<i>Sicyopus auxilimentus</i>	Goby		Leyte endemic	_/	
<i>Mistichthys luzonensis</i>	Goby	Sinarapan	Lake Buhi endemic	_/	
<i>Redigobius bikolanus</i>	Bigmouth goby	Biya	Endemic in RINCONADA Lakes of Bicol region	_/	
<i>Pandaka pygmaea</i>	Dwarf pygmy goby	Bia	Malabon and Mindanao		_/

Sources: <http://www.cites.org>.2004. Listings of Philippine fisheries endangered species
<http://www.fishbase.org>.2004. Summary of Philippine fisheries species in red list status
<http://www.iucn.org>.2004. Red list of endangered fisheries species in the Philippines
 BFAR-FAO 208 (2001)

fisheries with the rising demand of shark fins smuggled or exported abroad.

These marine finfishes are distributed in coastal waters.

The listings of marine gastropods, mollusks, crustaceans and echinoderms are all found in the BFAR-FAO listings as Rare, Threatened and Endangered, while few and selective under the CITES and IUCN lists. Accordingly, these are the most common marine resource commodities that are over-exploited, gleaned and gathered illegally, and frequently exported or smuggled out of the country by unscrupulous traders.

Why rare, threatened and endangered?

The BFAR is mandated by law (Republic Act or RA 8550) to identify and manage species that are found to be rare, threatened and endangered. This prompted the issuance of FAO No. 208 classifying 26 gastropods and two bivalve species under the rare category; three gastropods and one crab as threatened species; 20 dolphins and whales as endangered species, including seven species of clams and one sea snake. These categories are defined under FAO No. 208 as follows:

rare - fishery or aquatic resources with small world populations that are not endangered or presently vulnerable

threatened - a general term which may be used to describe a fishery or aquatic species whose population is endangered, vulnerable or rare

endangered - refers to the species, subspecies, including the eggs, offspring, parts and derivatives of plants and animals as listed in the CITES Appendices.

The BFAR listings are based on results of field research conducted until 2001. They are shorter than the CITES list as of

2004 because there are no recent studies. At closer look, the CITES list only covers species that are traded and marketed but not those without market value, while IUCN gives emphasis to the preservation and conservation of the species heritage of the planet, which is the prime concern of the Department of Environment and Natural Resources (DENR).

Status of seed production technology

Many species listed by the IUCN, CITES and BFAR have no hatchery/seed production activities in the Philippines. However, some of the species that are being propagated on an experimental scale are the giant clams *Tridacna* spp., sea cucumbers and sea urchins as pioneered by the University of the Philippines-Marine Science Institute (UP-MSI); abalone and top shell *Trochus* spp., seahorse and groupers by the Southeast Asian Fisheries Development Center Aquaculture Department (SEAFDEC/AQD), and the native catfish, lobed-lip river mullet and weather loach currently being undertaken by BFAR.

Aquatic Resource Management

Resource management measures in the Philippines are supported by management programs, protected by policy rules and regulations, and implemented by many key players and stakeholders. But who plays what are the issues described in the following sections.

Fishery and other laws/regulations

There are three policy making bodies involved in the formulation and implementation of laws pertaining to aquatic resources management, namely: the DENR, Department of Agriculture Bureau of Fisheries and Aquatic Resources or DA-BFAR and the Local Government Units (LGUs). The following particular laws apply:

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Table 2. List of endangered, rare and extinct marine fish species in the Philippines.

Scientific name	English name	Local name	Listings	
			IUCN	CITES
<i>Aetomylaeus nichofii</i>	Banded eagle ray		/	
<i>Urogymnus asperrimus</i>	Porcupine ray	Pagi	/	
<i>Taeniura lymma</i>	Blue-spotted sting ray	Pagi	/	
<i>Aetobatus narinari</i>	Spotted eagle Ray	Pagi	/	
<i>Manta birostris</i>	Manta ray	Pagi	/	
<i>Rhina ancylostoma</i>	Bowmouth guitarfish	Pagi	/	
<i>Rhynchobatus australiae</i>	White-spotted wedgefish	Pating sudsod	/	
<i>Rhynchobatus djiddensis</i>	whitespot giant uitarfish	-do-	/	
<i>Pristis pectinata</i>	Wide sawfish		/	
<i>Anoxypristis cuspidata</i>	Knifetooth seafish	-do-	/	
<i>Carcharodon carcharias</i>	Great white shark	Pating	/	/
<i>Apristurus herklotsi</i>	Longfin catshark	Pating	/	
<i>Apisturus platyrhynchus</i>	Spatulasnout catshark	Pating	/	
<i>Atelomycterus marmoratus</i>	Coral catshark	Pating	/	
<i>Carcharhinus amblyrhynchoids</i>	Graceful shark	Pating	/	
<i>Carcharhinus borneensis</i>	Borneo shark	Pating	/	
<i>Carcharhinus brevipinna</i>	Spinner shark	Pating	/	
<i>Carcharhinus dussumieri</i>	Widemouth blackspot shark	Pating	/	
<i>Carcharhinus hemiodon</i>	Pondicherry shark	Pating	/	
<i>Carcharhinus leucas</i>	Bull shark	Pating	/	
<i>Carcharhinus limbatus</i>	Blacktip shark	Pating	/	
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	Pating	/	
<i>Carcharhinus melanopterus</i>	Black-tip reef shark	Pating	/	
<i>Carcharhinus sealei</i>	Blackspot shark	Pating	/	
<i>Carcharias taurus</i>	Sand tiger shark	Pating	/	
<i>Centrophorus isodon</i>	Black gulper shark	Pating	/	
<i>Centrophorus moluccensis</i>	Endeavour dogfish	Pating	/	
<i>Centrophorus squamosus</i>	Deepwater spiny dogfish	Pating	/	
<i>Centroscyllium kamoharai</i>	Jelly shark	Pating	/	
<i>Chiloscyllium griseum</i>	Grey bamboo shark	Pating	/	
<i>Chiloscyllium indicum</i>	Frog shark	Pating	/	
<i>Chiloscyllium punctatum</i>	Brown-spotted catshark	Pating	/	
<i>Galeocerdo cuvier</i>	Tiger shark	Pating	/	
<i>Eusphyra blochii</i>	Slender hammerhead	Pating	/	
<i>Hemipristis elongata</i>	Fossil shark	Pating	/	
<i>Hemitriakis leucoperiptera</i>	Whitfin topeshark	Pating	/	
<i>Hexanchus griseus</i>	Bluntnose sixgill shark	Pating	/	
<i>Megachasma pelagios</i>	Megamouth shark	Pating	/	
<i>Nebrius ferrugineus</i>	Tawny nurse shark	Pating	/	
<i>Prionace glauca</i>	Blue shark	Pating	/	
<i>Sphyrna lewini</i>	Scalloped hammerhead	Pating	/	
<i>Sphyrna mokarran</i>	Great hammerhead	Pating	/	
<i>Sphyrna zygaena</i>	Smooth hammerhead	Pating	/	
<i>Triaenodon obesus</i>	White-tip reef shark	Pating	/	
<i>Stegostoma fasciatum</i>	Leopard shark	Pating	/	
<i>Squalus acanthias</i>	Piked dogfish	Pating sudsod	/	

Table 2 (continued from p. 124)

Scientific name	English name	Local name	Listings	
			IUCN	CITES
<i>Squalus mitsukurii</i>	Green-eye spurdog	Pating sudsud	↓	
<i>Isurus oxyrinchus</i>	Shortfin mako shark	Pating sudsud	↓	
<i>Hippocampus barbouri</i>	Barbour's seahorse	Kabayong dagat	↓	
<i>Hippocampus bargibanti</i>	Pygmy seahorse	Koro-kabayo	↓	
<i>Hippocampus comes</i>	Tigertail seahorse	Koro-kabayo	↓	
<i>Hippocampus kelloggi</i>	Great seahorse	Koro-kabayo	↓	
<i>Hippocampus kuda</i>	Spotted seahorse	Koro-kabayo	↓	
<i>Hippocampus spinosissimus</i>	Hedgehog seahorse	Kabayong dagat	↓	
<i>Hippocampus trimaculatus</i>	Longnose sea horse	Koro-kabayo	↓	
<i>Pegasus volitans</i>	Long-tail sea moth		↓	
<i>Torquigener brevipinnis</i>	Pufferfish	Botete	↓	

Sources: <http://www.cites.org.2004>. Listings of Philippine fisheries endangered species
<http://www.fishbase.org.2004>. Summary of Philippine fisheries species in Red List status <http://www.iucn.org.2004>. Red list of endangered fisheries species in the Philippines BFAR-FAO 208 (2001)

- RA 8550, Article III - Operational Standards and Procedures Sec.1: Identification and management of rare, threatened or endangered species (except crocodiles, turtles and dugong) is bestowed upon BFAR
- RA 8550, Article IV - Mapping, Charting and Identification of Certain Areas Sec. 4: Fishery refuge, reserves and sanctuaries bestowed upon BFAR to establish criteria and procedures except in National Integrated Protected Area System (NIPAS)

Although BFAR is tasked to implement most of the provisions in the Revised Fisheries Code (RA 8550), the DENR and LGUs also have specific roles pertaining to management of aquatic resources. The NIPAS Act implemented by the DENR has provisions affecting coastal resource activities in fisheries that is, in fact the concern of the LGUs as administrators of local resources.

Enforcement

The following government agencies are responsible for implementing fishery regulations:

- DA-BFAR - lead agency in formulating regulatory mechanisms directly related

to fisheries, particularly outside municipal waters

- DENR - regulates foreshore and shoreline areas and mandated to conserve and protect coastal/marine environment jointly with the LGUs
- Department of Transportation and Communication (DOTC) - regulates commercial fishing vessel licenses and enforces anti-pollution measures in shipping through the Philippine Coast Guard (PCG) and the Maritime Industry Authority (MARINA)
- LGUs - share responsibility with the national government in maintaining ecological balance and enforcing fishery laws pertaining to municipal waters and mangrove conservation; and formulation and enforcement of local ordinances based on national laws and regulations.

Territorial Use Rights (TURFs)

The concept of TURFs as applied to the present management of aquatic resources in the Philippines is also governed by basic national laws. The Local Government Code (RA 7140) assigns to the municipal governments the responsibility of creating and implementing guidelines for local fisheries, granting duly registered organizations and

Table 3. List of endangered, rare and extinct marine bivalves, gastropods, cephalopods and echinoderm species in the Philippines.

Scientific name	English name	Local name	Distribution	Listings		
				IUCN	CITES	FAO 208
<i>Amusium oblitteratum</i>	Smuggled moon scallop		Philippine Coastal Waters			/ R
<i>Eufistulana mumia</i>	Club-shaped boring clam		-do-			/ R
<i>Hippopus hippopus</i>	Bear paw giant clam	Kabibe	-do-	/	/	/ E
<i>Hippopus porcellanus</i>	Porcelain giant clam	Kabibe	-do-	/		/ E
<i>Pholas orientalis</i>	Angel wing clam	Diwal-do-	Endemic in Capiz, Iloilo, Negros	/		/ T
<i>Tridacna gigas</i> ^a	Giant clam	Taclobo	Philippine marine waters	/	/	/ E
<i>Tridacna maxima</i>	Small giant clam		-do-	/		/ E
<i>Tridacna squamosa</i>	Scaly giant clam		-do-	/	/	/ E
<i>Tridacna derasa</i>	Giant clam		-do-		/	/ E
<i>Tridacna crocea</i>	Southern giant clam		-do-	/	/	/ E
<i>Trochus niloticus</i> ^a	Trochus shell		-do-	/	/	/ T
<i>Bolma girgyllus</i>	Girgyllus star shell		-do-			/ R
<i>Clypeomorus aduncus</i>	Bent cerith		-do-			/ R
<i>Recluzea lutea</i>	Recluzia snail		-do-			/ R
<i>Separatista blainvilliana</i>	True separatista		-do-			/ R
<i>Malluvium lissus</i>	Deep sea cap		-do-			/ R
<i>Strombus thirsites</i>	Thersite stromb		-do-			/ R
<i>Varicospira crispata</i>	Network beak shell		-do-			/ R
<i>Tibia martini</i>	Martini's tibia		-do-			/ R
<i>Cypraea childreni</i>	Children's cowrie		-do-			/ R
<i>Cypraea beckii</i>	Beck's cowrie		-do-			/ R
<i>Cypraea guttata</i>	Great spotted cowrie		-do-			/ R
<i>Cypraea porteri</i>	Porter's cowrie		-do-			/ R
<i>Cypraea teramachii</i>	Teramachi's cowrie		-do-			/ R
<i>Cypraea martini</i>	Martini's cowrie		-do-			/ R
<i>Cypraea saulae</i>	Saul's cowrie		-do-			/ R
<i>Cypraea katsuae</i>	Katsue's cowrie		-do-			/ R
<i>Cypraea leucodon</i>	White toothed cowrie		-do-			/ R
<i>Cypraea aurantium</i>	Golden cowrie		-do-			/ T
<i>Cypraea valentia</i>	Prince cowrie		-do-	/		
<i>Phenacovolva dancei</i>	Dance volva	Tatus	Quezon Islets, Batan Is.	/	/	/ T
<i>Cypraeacassis rufa</i>	Bullmouth helmet	Trepang, Balat	-do-		/	
<i>Phalium coronadoi wyvillei</i>	Wyville's bonnet					/ R
<i>Phalium glabratum</i>	Glabratum smooth bonnet					/ R
<i>Morum kurzii</i>	Kurzi's morum					/ R
<i>Morum grande</i>	Giant morum					/ R
<i>Morum watsoni</i>	Watson's morum					/ R

Legend: ^aHatchery technology available; R- Rare; T- Threatened; E- Endangered

Sources: <http://www.cites.org>.2004. Listings of Philippine fisheries endangered species;
<http://www.fishbase.org>.2004. Summary of Philippine fisheries species in Red List status;
<http://www.iucn.org>.2004. Red list of endangered fisheries species in the Philippines;
 BFAR-FAO 208 (2001)

cooperatives of marginalized fishermen preferential rights to fishery privileges and setting municipal fisheries 15 km from the shoreline. The Fisheries Code (RA 8550) on the other hand, implies the return of resource management from national agencies to municipal governments and gives preferential use rights in municipal waters to municipal fisherfolk.

Habitat protection and rehabilitation

The Resource Enhancement Projects (REPs), which combine fish sanctuary, fisheries reserve, and mangrove rehabilitation, are pioneering activities of the Fisheries Resource Management Program (FRMP) of DA-BFAR. As of September 2003, 215 REPs (123 fish sanctuaries and 92 mangrove projects) were established in 18 FRMP bay areas throughout the country (FRMP 2003).

Sanctuaries and protected areas

Marine Protected Areas (MPAs), also known as “no-take zones”, sanctuaries, reserves, harvest refugia, and marine parks, are marine areas protected by law or other mechanism from one or more activities. There are 459 known MPAs nationwide (White et al 2004), probably the most numerous in Southeast Asia, but most are referred to as “paper parks” due to lack of sustainable management strategies. Nonetheless, there are well established, successful parks in the Philippines such as the Hundred Islands National Park. It was created by Presidential Proclamation in 1970 followed by PD 564 establishing the first national park in the Philippines jointly managed by the Philippine Tourism Authority and the LGU of Alaminos, Pangasinan.

This was followed by the Sumilon Marine Reserve (1974) and Apo Island Marine Reserve (1985), the first fishery reserves established in the country. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) declared Puerto Galera a Biosphere Reserve

in 1977, and the Tubattaha Reef a Biosphere Reserve in 1990 and World Heritage Site in 1993. Despite the good start and all-out efforts of the government, management levels of Philippine MPAs are considered “low” at 16-38% (Aliño et al 2004). Therefore, the establishment of non-government organizations e.g., the Pambansang Alyansa ng Maliliit na Mangingisda at Komunidad sa Nangangalaga ng Karagatan at Sanktuaryo sa Pilipinas (PAMANA) and Haring Ibon (HARIBON) Foundation, in the late 1980s has been essential to the information-education campaign to sustain the management of MPAs. To evaluate the effectivity and efficiency of MPAs, a Management Rating System was formulated in 2001 by the Coastal Conservation and Education Foundation.

Artificial reefs

Artificial Reefs are structures installed at the sea bottom that serve as shelters, feeding and breeding areas of fish, whereas Fish Aggregating Devices (FADs, locally known as *payaw*) are structures anchored at the surface or drifting at the mid-water levels which attract and aggregate fish. Originally set up to protect fish communities, FADs instead encouraged overfishing often with the use of dynamite, cyanide, and unregulated mesh size nets (Babaran 2004).

National Restocking or Stock Enhancement Program

“National Stock Enhancement” or “Restocking Program” in the Philippines does not virtually exist as a matter of written policy, yet it has recently been practiced and implemented independently by concerned institutions and fisheries agencies according to their program mandates. BFAR, for example, over the years since its existence as the Philippine Fisheries Commission, has carried out an annual “Fish Dispersal Program” in Laguna de Bay and major inland lakes (Villadolid 1965). This was carried on

through tradition by reseeded lakes and inland waters on special occasions during annual Fish Conservation Week celebrations or when a President of the state visits a particular inland lake area as part of a ceremonial activity. The implications, however, may result in negative diversities in the reseeded areas since no regular follow-up nor monitoring has been done to check whether the reseeded areas have been overstocked or have been critically depleted of their resources. This is especially true since there have been no available biological productivity and carrying capacity studies, stock recruitment and Catch per Unit Effort (CPUE) data. It was not until 1980 that successful hatchery breakthroughs in the Philippines were reported and stock enhancement activities in marine waters as initiated by UP-MSI (especially the giant clam mariculture technology) were undertaken (Juinio-Menez 2004). This was followed by UP-MSI's sea urchin hatchery production in the 1990s, after the collapse of the sea urchin population in Bolinao. Moreover, UP-MSI pioneered in sea cucumber, top shell and abalone seedstock production in 2002 and recently, SEAFDEC/AQD also initiated the culture and stock enhancement of abalone and top shells.

Impact on catches

To determine the impact of stock enhancement on existing aquatic resources, the following factors should be given due attention:

- Loss of genetic diversity – negative impact on stock enhancement;
- Unregulated stock enhancement – may lead to displacement of other species in the natural environment
- Information needed to assess the potential benefits of restocking (Bell and Garces 2004):
 - a) Stock delineation or the size and distribution of stocks supporting a particular fishery to enable the development of an appropriate stock enhancement program

- b) Stock assessment or the status of the population should be identified
 - c) Capacity of hatcheries to produce sufficient juveniles
- Other components of restocking program
 - a) Hatchery protocols to maintain the genetic diversity of the stock
 - b) Requirement of released juveniles
 - c) Quarantine procedures
 - d) Management measures to maximize benefits and determine the contribution of restocking to recovery
 - Other components of a responsible stock enhancement program
 - a) Maintaining sufficient spawning biomass for replenishment
 - b) Rotational fishing
 - c) Integration with aquaculture
 - d) Artificial habitats
 - e) Removal of predators

Monitoring

Monitoring, Control and Surveillance (MCS) under the FRMP integrates various elements of fisheries resource management into a three-tiered system of data collection (monitoring), legislation (control) and enforcement (surveillance). The MCS Investment plan includes setting up of one national and eight regional MCS coordination centers.

Co-management by local communities/stakeholders

Since LGU funding is not always enough, Eisma (2004) suggested the following list of possible funding mechanisms to initiate co-management efforts:

- a) Amend specific provisions of the Local Government Code (LGC) to make Coastal Resource Management (CRM) a basic service similar to health, agriculture, etc.
- b) Include municipal waters in the computation for sharing in Internal Revenue Allocations (IRA)

- c) Develop guidelines for use of the Environment Guarantee Fund to include CRM
- d) Appropriate special funds for CRM programs for LGUs in the Government Annual Appropriations (GAA)
- e) Review/revise guidelines to include use of 20% development fund for CRM
- f) Expand the menu of projects in the Rural-Urban development fund for CRM
- g) Include through an amendment, CRM as a priority area in coming up with the Annual Investment Plan
- h) Legislate through an ordinance, a special assessment tax or fee for a local CRM fund similar to the Special Education Fund as collected via the real property tax; and
- i) Tap the private sector and/or NGOs through their vested interests as a source of funds and donors of equipment, honoraria for “Bantay Dagat” (or deputized fisherfolks as law enforcers in charge of patrolling the municipal waters and apprehending illegal fishers).

Summary, Conclusions and Recommendations

The Philippines is endowed with a diversity of marine resources valuable to the economic livelihood of the fishing community. The demand to supply the domestic and foreign market has caused the overexploitation and depletion of these aquatic resources. Conservation, management, preservation and the wise utilization of these marine species are the prime concern of the government. However, lapses in the regulations, policies and implementation of existing laws are still intricacies which require sound governance to systematic and scientific approaches as well as intervention involving the resource users and policy makers.

International agreements which relate to the classification of these species as to their degrees of exploitation, are governed

by CITES which is compulsory, and IUCN, though non-obligatory. But in the domestic fisheries trade and industry, specific regulations are set forth in FAO 208 which prohibits the taking, catching, or gathering of species that are categorized as rare, endangered and threatened. Yet there is still a need for the government to collaborate with the international regulatory bodies in assessing the biological, geographic, ecological population of these species to come up with a systematic inventory, monitoring report and updating as to which species are to be classified as over-exploited, in near extinction, rare, endangered or threatened.

The Philippines employs various aquatic resource management programs and has also formulated numerous laws, rules and regulations towards conservation, rehabilitation, enhancement and management as a whole, but most of these are focused on the establishment of MPAs, artificial reefs, sanctuaries, reserves and mangrove habitat protection. Unfortunately, none of these laws has addressed fish seed stock enhancement in fisheries. There are but few independently implemented laws on pilot-test cases either under research, demonstration or on program/project-based interventions by concerned agencies and institutions.

With the establishment and commercialization of hatchery technologies, it is high time that a sound policy on fisheries National Stock Enhancement and Reseeding Program is implemented. A holistic, unified and harmonized program by the government where concerted efforts of concerned agencies, institutions, LGUs and stakeholders are bound into one systematic initiative on how, where and when restocking or reseeded interventions have to be made.

References

- Aliño PM, Arceo HO and Uychiaoco AJ. 2004. Marine protected areas, pp. 219-222. In: DA-BFAR. In Turbulent

- Seas: The Status of Philippine Marine Fisheries. Coastal Resource Management Project, Cebu City, Philippines
- Babaran RP. 2004. Artificial reefs and fish aggregating devices: Help or hindrance, pp. 237-240. In: DA-BFAR. In *Turbulent Seas: The Status of Philippine Marine Fisheries*. Coastal Resource Management Project, Cebu City, Philippines
- Bell J and Garces L. 2004. The potential role of restocking and stock enhancement in the management of marine invertebrate fisheries in the Philippines, pp. 246-251. In: DA-BFAR. In *Turbulent Seas: The Status of Philippine Marine Fisheries*. Coastal Resource Management Project, Cebu City, Philippines
- BFAR. 2001. FAO 208 s. 2001, Conservation of rare, threatened and endangered fishery species. BFAR flyer. 3 p.
- BFAR. 1998. Philippine Fisheries Code of 1998. Quezon City, Philippines. 60 p.
- Eisma RV. 2004. Local governance for municipal fisheries: can local governments afford to have coastal resource management as a basic service responsibility?, pp. 180-183. In: DA-BFAR. In *Turbulent Seas: The Status of Philippine Marine Fisheries*. Coastal Resource Management Project, Cebu City, Philippines
- Francisco BS and Sievert RF. 2004. Guidelines and considerations in the establishment and management of marine protected areas in the Philippines. In: Ablaza EC (ed) FRMP Technical Monograph Series, No. 7. 14 p.
- FRMP. 2003. Flyer on FRMP program implementation. Quezon City, Philippines, 18 p. <http://www.cites.org>
2004. Listings of Philippine Fisheries Endangered Species <http://www.fishbase.org>
2004. Summary of Philippine Fisheries Species in Red List Status <http://www.iucn.org>
2004. Red list of Endangered Fisheries Species in the Philippines
- Juinio-Menez MA. 2004. Invertebrate stock enhancement, pp. 241-245. In: DA-BFAR. In *Turbulent Seas: The Status of Philippine Marine Fisheries*. Coastal Resource Management Project, Cebu City, Philippines
- Villadolid DV, Montalban HR, Blanco GJ and Acosta PA. 1965. Popular Bulletin No. 45. Fish Cultivation in Freshwater Units in the Philippines. Department of Agriculture and Natural Resources Manila, Philippines
- White AT, Meneses AT and Ovenden MF. 2004. Management rating system for marine protected areas: An important tool to improve management, pp. 226-231. In: DA-BFAR. In *Turbulent Seas: The Status of Philippine Marine Fisheries*. Coastal Resource Management Project, Cebu City, Philippines