

SAVING A PHYSICALLY-CHALLENGED ECOSYSTEM: Who takes charge of the Mt. Talinis - Twin Lakes Forest Reserve?

Angelita M. Cadelina, Apolinario B. Cariño, and
Cynthia N. Dolino

ABSTRACT

This paper gives an overview of the wildlife conservation concerns of Lake Balinsasayao Protected Area, which form the basis for the objections by environmentalists to the efforts of influential politicians to reduce the Protected Area. Several major reasons have been advanced for the retention of the existing PA size. First, the area is a major watershed supplying water to municipalities of Southern Negros; reduction will mean conversion to other land uses that might impinge on its water-storing capacity. Second, the area is home to about 16 threatened species of mammals, amphibians, reptiles, and birds; and reduction of the area would also mean reduction of their roosting and feeding range. Third, the encroachment by other land users of the reduced buffer and protection zone will hasten the loss of biodiversity and resiliency after major perturbations like tornado or severe storms.

Introduction

Addressing the question about his environmental vision, Yitzhak Goren, Director General of the Ministry of Environment of Israel said, "I believe that the time has come to develop such tools as green accounting and green taxes which impose financial responsibility on those who generated pollution." Although the "polluter pays" principle is not a new thing, it will not be out of place to invoke it here if only to remind the Filipinos of their part in the continuing devastation of the environment. As it is now, the victims of pollution are the ones paying—the cancer victims, the deformed children, the barren, unproductive land, the silted rivers,

the hungry people. It is still a struggle between those who want to protect the remaining natural heritage and those who want to advance their own economic agenda. Those belonging to the latter group never take into account the environmental concerns when carrying out their economic policy decisions.

It should be noted that the Philippines is called one of the ten biodiversity "hotspots" in the world and a priority for biodiversity conservation. In terms of biodiversity and endemism, it is probably the richest country in the world. Nearly one third of the country's 12,000 plant species are found nowhere else. Its waters have more than 500 of the world's 700 known species of corals. The country is recognized to have the highest endemism of plants and vertebrate animals per area in the world. It is for this reason that protecting the remaining treasures is of utmost urgency.

The Mt. Talinis-Twin Lakes (MTTL) Forest Reserve is one of the most important but critically endangered ecosystems in the Philippines. Known popularly as the Southern Negros Forest Reserve, it is within the jurisdiction of the 133,000-hectare Philippine National Oil Company (PNOC) geothermal reserve. The area is marked by several lakes, which were once the sites of volcano craters from which the name crater lakes comes. But the largest and the most beautiful of the lakes are the Twin Lakes of Balinsasayao and Danao (see Fig. 1 in Dolino, *et al.*, this volume). The lakes are about 850 m ASL (coordinates 9° 21' N, 123° 10' E) and the submontane forest surrounding it rises about 1,050 m. Although Mt. Talinis rises above 6,000 m ASL, these days the lake area can be reached by a motor vehicle such as a motorcycle or a non-4 wheel drive vehicle due to improved road system, 15 km northbound and to the west's all-weather roads 17 km off the highway. With a surface area of 76 ha, Lake Balinsasayao is three times bigger than its twin, Lake Danao, which has 28 ha. Maximum depth of Balinsasayao is 90 m and Danao 55 m. Variations in depth and hectarage coincide with rainfall intensities. The Twin Lakes are bordered by Mt. Kalbasaan on the north, Mt. Nahungot on the south, Mt. Balinsasayao on the west, and Mt. Guintabon on the east.

Economic and Environmental Dilemma: The Proposed Excision of the Twin Lakes Area Size

In the Philippines the environmental agenda has always been subordinate to the economic one and the government's environmental policy has never been one of prevention but treatment, except that the treatment always comes too late. This situation is very well reflected in the poverty alleviation agenda of the present government. It is clear that widespread poverty is a result of the decimation of our environmental resources by government-sanctioned economic activities which license the affluent few to carry out massive exhaustion of mineral and biological resources without the need to share profits equitably with those who are supposed to manage these resources – the rural dwellers.

And yet this country is not lacking in preventive laws meant to “conserve, check or deter environmental degradation.” For example, RA 6147 declares the Philippine Eagle as a protected bird while the Natural Integrated Protected Areas System Act “sets up a system to protect and preserve natural areas for future generations by granting rights and prohibiting certain acts”. Proclamation 2146 lists environmentally critical areas (ECA) and projects within the scope of the EIA system (1981). But in the same instance, LOI 1179 authorizes the President to exempt projects from the EIA system. This means that the President can allow the taking out of a portion of the previously proclaimed area (e.g. Proc. No. 414 series of 2000 declaring the 8000 ha Twin Lakes area as a Protected Area, now called Balinsasayao Twin Lakes Natural Park pursuant to RA 7586) so that a state-sponsored project such as mining or geothermal exploration may be carried out in this portion.

Historical Background

Data from surveys, researches, and technical working group (TWG) outputs carried out from the 1980s and from 1994 to the 2003 provide the historical basis for this paper. The management

strategies implemented in the area by the communities have been drawn from the collaborative work between CenTrop-TMF staff and participants from People's Organization. Technical assistance to local managers is based on community-validated outputs of surveys done by researchers from the academe and from the biomonitoring activities learned by the local people from the Biomonitoring and Evaluation (BIOME) staff of CenTrop.

The Mt. Talinis-Twin Lakes Area Management Framework Plan and the PAMB Managed Balinsasayao Twin Lakes Natural Park

The Plan is a set of policies that lays the framework for the management of the 15,287 hectare Mt. Talinis-Twin Lakes Area situated within the 133,000 ha geothermal reserve. Facilitated by FPE-CENTROP-TMF partnership staff in December 2000, the Plan was formulated by the area stakeholders comprising of officers of Peoples Organization, Local Government Units, and officials of the Department of the Environment and Natural Resources. It is intended as a guide for all concerned agencies, institutions, and private groups which undertake conservation activities and intervention initiatives aimed at protecting the environmental integrity of Mount Talinis and Twin Lakes areas.

With the assistance of the technical working group, the stakeholders divided the area into various zones and laid down the permitted and allowable activities within each zone. The strict protection zone is similar to a "forest sanctuary." In July of 2002, the Protected Area Management Board (PAMB), whose members were appointed by DENR, was given the authority to manage the 8000 ha Balinsasayao Twin Lakes Natural Park, pursuant to the National Integrated Protected Area System (NIPAS) Act. The PAMB members then started the zoning of the Protected Area into: 1) strict protection zone; 2) buffer zone; 3) multiple use zone, and others. The rationale

for zoning was similar in principle to that of the broader Area Management Framework Plan.

Then House Bill No. 1462 was introduced proposing the reduction of the Balinsasayao Twin Lakes Natural Park from 8749 ha to a mere 3,749 ha. This sparked a massive protest from all sectors of Dumaguete – students, environmentalists, researchers, and academics (CenTrop Files, Vol. 5, Issue No. 1, February 2004). Although Congress has quashed the bill in October 2004, there is some possibility that influential sectors might still lobby to revive the idea.

Why Protect the Mt. Talinis-Twin Lakes Area

The most urgent reason for protecting the Mt. Talinis-Twin Lakes area is that it is a major watershed. The two major watershed systems of Negros Oriental, the Mt. Talinis watershed and the Lake Balinsasayao watershed, supply water to most of southern Negros and vicinity. It has the largest contiguous forest in southern Negros Oriental (about 16,992 ha or 13% of timberland). It is home to many birds, plants (predominantly *Shorea polysperma*, *S. negrosensis*, *Syzygium nitidum*), and animals (high biodiversity) some of which are found only in the Philippines (high endemism) and even limited only to Negros and Panay area. It is reputed to be the habitat of the Visayan spotted deer, an endemic but endangered species. It is located within the area of the 133,000 ha geothermal energy reserve. It is known to be rich in mineral deposits. Its lower slopes are vast and fertile agricultural lands. Up to 87% of its 126,745 hectare timberlands have been deforested and converted to other land uses such as agriculture and settlement.

The area is forest habitat for globally threatened species of herps, birds, and mammals. The Twin Lakes area harbors 180 tree species, 49 herpetofaunal species, 126 bird species, and 27 mammalian species. The table below provides a list of the globally threatened species.

Species Name	IUCN status
1. Philippine Spotted Deer – <i>Cervus alfredi</i> ¹	Endangered ¹
2. Visayan Warty Pig – <i>Sus cebifloris</i> ¹	Critically Endangered ¹
3. The Philippine Tube-nosed Fruit Bat – <i>Nyctimene rabor</i> ¹	Critically Endangered ¹
4. The Golden-crowned Flying Fox – <i>Acerodon jubatus</i> ¹	Endangered ¹
5. Little Golden-mantled Flying Fox – <i>Pteropus pumilus</i> ¹	Vulnerable ¹
6. The Negros Shrew – <i>Crocidura negrina</i> ¹	Critically Endangered ¹
7. The Philippine Leopard Cat – <i>Prionailurus bengalensis</i> ¹	Endangered ¹
8. Negros Bleeding Heart – <i>Gallicolumba keayi</i> ²	Critically Endangered ²
9. Writhed-billed hornbill – <i>Aceros waldeni</i> ²	Critically Endangered ²
10. Visayan Hornbill – <i>Penelopides panini</i> ²	Endangered ²
11. Flame-templed Babbler – <i>Dasyrotapha speciosa</i> ²	Endangered ²
12. White-throated Jungle Flycatcher – <i>Rhinomyias albigularis</i> ²	Endangered ²
13. White-winged Cuckoo-shrike – <i>Coracina ostenta</i> ²	Vulnerable ²
14. Visayan Flowerpecker – <i>Dicaeum haematosictum</i> ²	Vulnerable ²
15. Celestial Blue Monarch – <i>Hypothymis coelestis</i> ²	Vulnerable ²
16. Negros Forest Frog – <i>Platymantis negrosensis</i> ³	Endangered ³
17. Hazel's Forest Frog – <i>P. hazelae</i> ³	Endangered ³
18. Common Forest Frog – <i>P. dorsalis</i> ³	Near Threatened ³
19. Visayan Fanged Frog – <i>Limnonectes visayanus</i> ³	Near Threatened ³
20. Everett's Frog – <i>Rana everetti</i> ³	Near Threatened ³
21. Sailfin Water Lizard – <i>Hydrosaurus pustulatus</i> ¹	Vulnerable ¹
22. Rough-necked Monitor Lizard – <i>Varanus salvator mitchells</i> ¹	Near Threatened ¹
23. Reticulated Python – <i>Python reticulatus</i> ¹	Near Threatened ¹

The herpetofauna of Negros Island is the best-studied in terms of systematics and ecology compared to those of the larger islands of the Philippines. Scientists associated with Silliman University and their research collaborators have been conducting research on frogs, lizards, and snakes since the mid-1950s of which a number of scientific papers, monographs, and books have been published by W. C. Brown and A. C. Alcala (1950s to 1998), R. M. Brown, W. C. Brown, A. C. Alcala, and A. C. Diesmos (early 2000s) and others. Much of the fieldwork has been conducted in the remaining tropical rain forest of Cuernos de Negros and Twin Lakes Balinsasayao area. These studies provide reliable data in making an annotated list of herpetofaunal species that are common, rare, or threatened with extinction.

Habitat alteration, hunting, and persistent pollutants (sulfur dioxide from the geothermal plant) are the common stress factors impacting on the avifauna of the Twin Lakes area. The outputs for birds and the result of anecdotal reports have been gathered from the 10 different barangays of the MTTL since 1994 and from actual visual censusing using transect walk done by the participants of the Biomonitoring and Evaluation (BIOME) in 2003. Bird hunters were also asked to identify the bird species and the place where the birds were caught or hunted. The birds reported in 1994 included those found in highly disturbed areas such as the brushland and grass meadows. The frequency of mention by respondents for all bird species in 1994 indicates that species diversity is high in the Calinawan area compared to other areas in the MTTL. There were 62 species of birds mentioned out of the total species, and these include the critically endangered bleeding heart pigeon (*Gallicolumba keayi*) and the hornbills (*Penelopides panini* and *Aceros waldeni*). Since the bird species are the most numerous in the 4 major areas monitored in the MTTL they constitute the bulk of species listed from the transect walk and cruise. (Please see Annex C in Dolino, *et al.*, this volume, for the complete listing).

Previous pioneering studies on the mammalian fauna of the Twin Lakes Balinsasayao and Danao include those of Rabor *et al.* (1970), Heaney *et al.* (1981), Heaney *et al.* (1989), Heaney and Utzurrum (1991), Heideman *et al.* (1987), Heideman and Heaney (1989), Utzurrum (1984), Utzurrum (1992), RSA (1994) and unpublished reports of the CenTrop-FPE biomonitoring project (2001-2003).

The lake waters do not harbor any native fish. The bigger lake is stocked with tilapia (*T. mosambica*), carp (*Lyprinus carpio*) and haloan (*Opliscephalus stuatus*). Fishing in the lake is done purely for leisure if not for subsistence consumption.

Resource Users Against Constricting the PA in the Twin Lakes Area

The Twin Lakes area represents the only remaining forest patch in southern Negros. In the 70s the primary forest cover was still 30-40%. However, based on Swedish Space Satellite data of 1988, it has dwindled to a mere 4%. The 2 major factors for the decrease are illegal logging and *kaingin*. These two activities continue to this day in spite of the presence of POs and DENROs *bantay-lasang* (forest guards). The perpetrators of these illegal activities do not belong to any of the established people's organizations whose activities are facilitated by TMF and CenTrop. Neutralizing these illegal activities is indeed a big challenge to the POs. There is therefore a need for PAMB to double its efforts in managing the area and putting a stop to these illegal activities. To date, the zonation of the protected area is still going on. Reducing the area further would make this task more difficult.

It must be recalled that although a number of conservationists, and later CenTrop, through its FPE-partnership, started lobbying for the inclusion of MTTL as a NIPAS area since the mid and late 90s, it was only in November 2000 that Proclamation No. 414 was signed by the then President Joseph E. Estrada declaring the Balinsasayao Twin Lakes as Natural Park. The proclaimed area is just 8000

hectares and is under the management and jurisdiction of DENR-PAMB. Therefore, this area excludes the Mt. Talinis region. Considering that the entire forest is situated within the 133,000-hectare geothermal reserve, this 8000-hectare protected area is indeed very small. Reduction of the protected area would mean further constricting the PAMB's protective jurisdiction. During PAMB meetings, representatives from various barangays of Mt. Talinis-Twin Lakes have fully expressed their sentiments against the exploration work of INDOPHIL and the possible reduction of the protected area.

Summary of Reasons for the Retention of Protected Area Size and Recommendations

The management of extractive activities in the Philippines has still not improved. These activities have not in anyway enhanced the economic life and health of the community as reflected in the experience of Basay CDCP mining in 1979. The abandonment scheme was so poorly planned that the rehabilitation was a massive task. The MARCOPPER mining disaster, which caused serious health and environmental problems and placed the community of Marinduque at risk, is another classic example. Unless there is an improved mining exploration management, the Natural Park and the surrounding communities will be doomed to extinction along with the globally threatened species earlier mentioned.

As cited by Tiempo, *et al.* (2001), the sustained programs of habitat rehabilitation and protection in the MTTL area could develop forest corridors among the remaining forest fragments adjoining the bat sanctuary in Calinawan (partly of Sta. Catalina and Sibulan mainly) giving better chances of wildlife survival. A reduction of the area will definitely eliminate this chance.

Providing security of tenure (e.g. Community-Based Forest Management Agreement in a non-NIPAS Calinawan area) and environmentally friendly alternative livelihood programs has been found to be effective in the FPE CenTrop-

TMF project areas. There is no known PO member who is doing *kaingin* or illegal logging of trees in the area. The PO members are currently doing sustainable agriculture, organic fertilizer production, duck and vegetable raising. The only alternative livelihood that can be offered in mining activities are wage-work and unskilled labor and therefore short-term economic return. That such activities pose hazards to human and environmental health is well known.

A lot remains to be done for the protection of MTTL. Since it is supporting an electricity generating plant, it should be proclaimed as a critical watershed to prevent exploitative activities and settlement in the area. Yet, until 2003 it has not been listed as such. For the same reason, it should be considered an environmentally critical area and should belong to (ECA) network. This will ensure protection of this environmentally vulnerable area. In addition, the management of the area should be given to the indigenous inhabitants. This legal and enabling framework along with NIPAS and PAMB Management Framework will hopefully deter moves to counter the protective efforts done by those who have a high stake in the area.

Wildlife Biomonitoring Activities done by various POs are already in place under the aegis of the FPE-CenTrop BIOME project. Members of various people's organizations who took part in the BIOME training using the combined methods of transect cruise and walk, ocular survey using field diaries and photodocumentation, and focus group discussions have participated in wildlife biomonitoring activities. The participants carried out the ethnobiological survey and monitoring in the major mountain areas of MTTL. As a result of participation in the BIOME project, members of people's organizations have learned the value of wildlife protection. In this work, a wider range of protected area will give them more freedom of movement. Conversely, reducing the area will restrict their movement to the SPZ (Strict Protection Zone) to be declared by PAMB officially. Since the portion outside this area would no longer be under the jurisdiction of DENR, the

wildlife protection and monitoring activities of the POs would be difficult to sustain.

PNOC's environmental responsibility of maintaining the forest vegetation has not met with success. "Bowl" forests, where the middle of the forest is cleared, have left great expanse of clearing planted to abaca or *cayote* in the middle of the MTTL. Clearings for recreation sites were also allowed in the reserve area. This is the order of the day for areas outside the current PA.

Acknowledgments

We wish to acknowledge the Foundation for the Philippine Environment (FPE) for almost a decade of support in the conservation of the Mt. Talinis and Twin Lakes. The same goes to the cooperating communities, especially the PO members who have always involved themselves in various conservation activities. Likewise, we are grateful to the Fauna and Flora International (FFI) through its Coordinator of the Philippine Programme, William Oliver, for supporting the captive breeding and research studies of endangered endemic species. Other partners in conservation that supported our research studies include: Bat Conservation International, Lube Foundation, AZA Bat Taxon Advisory Group Small Grants Program, BP Conservation Programme, and Bristol Zoo. Our appreciation goes to the Ting Matiao Foundation for its biodiversity conservation efforts in Mt. Talinis and surrounding communities. We also thank in particular, the Biology Department through its chairperson, Mrs. Mirasol N. Magbanua, and the rest of the faculty and staff for their continuing logistical support and the much-needed encouragement. To the support staff and volunteers of CenTrop: S. Villegas, S. M. Villagante, G. Flores, Dr. G. Acuña, J. Diputado, A. Inocencio, L.J. Cerial, V. Futralan, L. Futralan, R. Vendiola, C.C. Catan, P. Lumhod, F. Catalbas and US Peace Corps Volunteers H. Fairbank, J. Hanna, M.L. Van Hoffman, M. Slavin, N. Sanchez, H.I. Roberts and J. Speicher go our

heartfelt thanks for the various types of assistance to carry out the objectives of our conservation initiatives. To the Governor of the Province of Negros Oriental, Hon. George Arnaiz, and Vice Governor, Hon. Jose "Petit" Baldado, together with the Local Government Units of the municipalities of Valencia (Mayor Rodolfo Gonzales), Sibulan (Mayor Antonio Renacia), Dauin (Mayor Rodrigo Alanano), and San Jose (Nelson S. Ruiz) our gratitude for their support and assistance. Most importantly, we thank Prof. Felina A. Tiempo for her technical assistance, and Neil Aldrin D. Mallari and Dr. Angel C. Alcala for the initial review of the manuscript.

Suggested Readings

- Alcala, A.C. 1986. Guide to Philippine flora and fauna. Amphibians and reptiles. Natural Resources Management Center, Ministry of Natural Resources and the University of the Philippines, Vol. 10, JMC Press, Inc., Quezon City, Philippines. 195 pp.
- Alcala, A.C. and W.C. Brown. 1998. Philippine amphibians. An Illustrated Field Guide. Bookmark, Inc., Makati City, Philippines. 114 pp.
- Area management framework plan. Draft Report of FPE-Stakeholders and TWG 2000.
- Brooks, T. M., L. P. Stuart, and N. J. Collar. 1997. Deforestation predicts the number of threatened birds in insular Southeast Asia. *Conservation Biology* 11 (2): 382-394.
- Brown, R.M., A.C. Diesmos, and A.C. Alcala. 2001. The state of the Philippine herpetology and the challenges for the next decade. *Silliman Journal* 42 (1):18-87.
- Cadelina, A.M.L., L. Dolar, R.C.B. Utzurrum, and E.L. Alcala. 1985. The socioeconomic impact of Lakes Balinsasayao and Danao on the lake users population. *Silliman Journal* 32(14).
- Conroy, M. J. and B. R. Noon. 1996. Mapping of species richness for conservation of biological diversity: Conceptual and methodological issues. *Ecological Applications* 6:763-
- Heaney, L.R., P.D. Heideman, and K.M. Mudar. 1981. Ecological notes on mammals in the Lake Balinsasayao region, Negros Oriental, Philippines. *Silliman Journal* 28:122-131.

- Heaney, L.R., P.D. Heideman, E.A. Rickart, R.B. Uzzurum, and J.S. Klompen. 1989. Elevational zonation of mammals in the central Philippines. *Journal of Tropical Ecology* 5:259-280.
- Heaney, L.R. and R.C.B. Uzzurum. 1991. A review of the conservation status of Philippine land mammals. Association of Systematic Biologists of the Philippines Communication NO. 3:1-13.
- Heaney, L.R., D.S. Balete, M.L. Dolar, A.C. Alcala, A.T.L. Dans, P.C. Gonzales, N.R. Ingle, M.V. Lepiten, W.L.R. Oliver, P.S. Ong, E.A. Rickart, B.R. Tabaranza, and R.C.B. Uzzurum, 1998. A synopsis of the mammalian fauna of the Philippine Islands. *Fieldiana, Zoology* No. 88, Field Museum of Natural History, Chicago, USA. 61 pp.
- Heideman, P.D., L.R. Heaney, R.L. Thomas, and K.R. Erickson. 1987. Patterns of faunal diversity and species abundance of non-volant mammals on Negros Island, Philippines. *Journal of Mammalogy* 68:884-888.
- Heideman, P.D. and L.R. Heaney. 1989. Population biology and estimates of abundance of fruit bats (Pteropodidae) in Philippine submontane rainforest, *Journal of Zoology* (London) 218:565-586.
- IUCN, 2003. International Union for the Conservation of Nature. Red list of threatened species.
- Mt. Talinis-Twin Lakes community-based biodiversity conservation Project, Center for Tropical Conservation Studies, June 2002-July 2003.
- Process Evaluation of Mt. Talinis and Twin Lakes Biodiversity Conservation Program in Negros Oriental. A.C. Development Foundation Inc. Dumaguete City. 2003.
- Rabor, D.S., A.C. Alcala, and R.B. Gonzales. 1970. A list of the land vertebrates of Negros Island, Philippines. *Silliman Journal* XVII (3):297-316.
- Rapid Site Assessment of Mount Talinis and Twin Lakes, Negros Oriental, Center for Tropical Conservation Studies (CenTrop), April-August 1994.
- Scott, J.M. 1993. Gap analysis: A geographic approach to protection of biological diversity. *Wildlife Monographs* 123.
- Tiempo, F.A., S.T. Villegas, S.M.B. Villagante, and A.B. Cariño. 2002. Management of a non-NIPAS protected area by a People's Organization: The case of the Calinawan Sanctuary in building on lessons from the field. *Conference on Protected Area Management in the Philippines*. Haribon Foundation, DENR, FPE and BI. World Press Inc. pp. 98-102.

- Utzurum, R.C.B. 1984. Fig fruit consumption and seed dispersal by frugivorous bats in the primary tropical rainforest of Lake Balinsasayao, Negros Oriental, Philippines, Unpublished M.S. Thesis. Silliman University, Dumaguete City.
- Utzurum, R.C.B. 1992. Conservation status of Philippine fruit bats. *Silliman Journal* 36(1):27-43.
- Worthen, J.B. 1995. Community composition and nested-subset analyses: Basic descriptors for community ecology. *Oikos* 76:417-426.

In Turbulent Seas: The Satus of Philippine Marine Fisheries

by Department of Agriculture - Bureau of Fisheries and Aquatic Resources, Coastal Resource Management Project, Cebu City, Philippines. 378pp. (ICLARM Contrib. No. 1379).

May I begin with a historical note. Several decades ago, my favorite elementary school teacher taught me one important fact. She said that the Filipino people cannot live without rice and fish. Rice and fish since that day have been symbols of food for me. At that time, marine fish was so abundant and so cheap—a kilogram of Spanish mackerel, Grouper or Snapper, the three most highly desired species in the place I lived, cost only several centavos. In contrast, these fish species have become very costly nowadays, costing 100-140 Philippine pesos a kilogram, almost equal to an ordinary laborer's daily wage today! The reason is simple and is explained by the law of supply and demand: these fish are rare but too many people want to eat them.

Fish then was so abundant and marine habitats so pristine that nobody ever imagined that these resources were not inexhaustible. Hence, nobody (including government) ever entertained any idea of fishery management or environmental protection.

Marine fish as a major source of protein will probably be around for ages to come, unless fish in our waters should suddenly vanish like the Canadian cod in the early 1990s, despite the combined expertise and effort of fishery scientists and managers. On a hopeful note, though, Silvestre and Pauly (1997) believe the nature of the Asian tropical fisheries is such that this scenario will probably not occur. Let's hope so. As I understand it, one of the goals of fishery management is to prevent occurrences like the collapse of the cod fishery. What is true, however, is that there are examples, probably only undocumented, of local fishery collapse in the country in recent past decades. An example would be the chambered nautilus fishery in Tañon Strait between Negros and Cebu and in some areas of the Sulu Sea. Another one could be

the dogfish fishery in many marine areas of the country. And still another is the sea cucumber fishery throughout the country.

The multi-authored book of 378 pages that we are concerned with here is organized into 5 sections, with an introduction and an overview at the beginning, and a conclusion and recommendations at the end; these make up 2 sections of the book proper. The 3 other main sections, consisting of 57 main papers, are (1) Status of Marine Fisheries and Habitats, (2) Fisheries Management, Policies and Tools, and (3) Case Studies in Fisheries Assessment and Management.

The book presents a comprehensive and up-to-date treatment of the various types of Philippine marine fisheries, including the larval and juvenile fishery and deep-water potential for fishery, topics which are usually not given much attention in fishery assessment books. At the same time, it also discusses the fisheries of various marine communities (sea-grass beds, mangroves, coral reefs, open sea), relatively small fishing areas (islands, bays), larger inland seas in the country, and a large eco-region (Sulu-Sulawesi) controlled by three countries, showing various scales of fishery and biodiversity management occurring in the country. The 57 main papers discuss practically all kinds of marine fishery resources, large and small, in the country and practically all aspects of Philippine marine fisheries including problems, management policies, management tools, economics, such issues as gender and poverty, and the needed management interventions in a language easily understood by laypersons.

However, missing in this collection are the results of management efforts on enhancement of fisheries yield in large marine areas. Many papers in this volume are well written and offer new information, but generally they are uneven in quality. Some reviews appear hurriedly done and offer no new information. Worth mentioning, a good feature of the book not usually seen in works of this type is the inclusion of an article on water quality, thus implying the need for an ecosystem approach to fisheries. Overall, this book is a useful volume for all marine scientists and all libraries, despite omissions and shortcomings discussed below.

With regard to water pollution, the book is silent on perhaps the major pollution that has a tremendous direct impact on seawater quality and the shallow-water fishery habitats as well as indirectly, on near-shore fisheries. This pollutant is the sediment carried by large volumes of flood and river waters emptying into the sea during the rainy season. The contribution of nutrients present in these freshwaters to marine primary production is nullified by the destructive effects of sedimentation such as the smothering of coral reefs, sea-grass beds, and mangroves. Sediment dumped by river systems to coastal areas is carried and circulated to offshore islands more than 20 kilometers away from shore, an urgent reminder that the definition of coastal resource management must encompass the barren uplands in an archipelago like the Philippines. This land-sea connectivity would have been a worthy subject for the book.

A couple of fishery resources of substantial value have been omitted from this book—the shell (mollusk) fishery and the sea cucumber fishery. Shell and sea cucumber species, like their finfish counterparts, have been over-fished. The great market demand has resulted in local extirpations of certain species, such as the chambered nautilus earlier mentioned and two species of giant clams. The demand has driven the highly-sought after and overly expensive cones and cowries to the brink of extinction. It is a common observation that Philippine coral reefs all over the country, except those with actual protection, have been “swept” clean of shells and sea cucumbers. The shells are now stored in large warehouses in Cebu City, and the dried sea cucumbers (*trepang*) are in restaurants.

The inclusion in the book of the classic 1997 paper of Silvestre and Pauly, “Management of Tropical Coastal Fisheries in Asia: An Overview of Key Challenges and Opportunities,” is an attractive feature of this book as it sets the stage for the third section on the subject of fisheries management, in addition to linking Philippine fisheries to those of other countries in Asia.

The articles in the third section may be considered elaborations of the fishery problems and issues that Silvestre and Pauly had earlier pointed out or intimated way back in 1997.

Similarly, the reviews of the status of fisheries and fishery habitats in the first section of the book have pointed out essentially similar problems and issues discussed in the Silvestre and Pauly paper. For example, 13 of the 16 papers in the first section conclude that over-fishing, decline in fisheries production, overexploitation, potential for over-fishing, fishery reduction, and habitat degradation describe Philippine fisheries and fishery habitats. All of these issues have been confirmed by the authors of the last chapter. Needless to stress, the inclusion of an article summarizing the advances or gains in the management of marine capture fisheries between 1997 and 2003-4 in this collection would have been immensely useful in giving us a picture of where we were then, where we are now, and where we expect to be at some future time.

This brings me to Section 5, *Conclusion and Recommendations*. The authors of this section have summarized the key findings and key issues in Philippine fisheries in terms of 8 characteristics, namely depleted fishery resources, degraded environment and critical fisheries habitats, low fishery catches/incomes, physical losses and/or reduced values of catches, inequitable distribution of benefits, inter-sectoral and intra-sectoral conflicts, poverty of small-scale fishers, and inadequate systems and structures for fisheries management. The authors have proposed interventions and critical actions as well as opportunities to reverse the decline of marine fisheries. They recommend 6 critical actions in order to achieve sustainability of marine fisheries, all of which appear reasonable, but fail to go far enough to suggest who will implement these actions or how the results may be evaluated. Thus, the question of who will implement each of these actions and how the progress of the implementation of these recommendations be measured and evaluated remains a critical issue. The authors of this chapter themselves have explicitly stated the inadequacy of the Philippine government to manage fisheries. It would therefore be helpful if the implementers of these 6 actions were identified this early in order to pinpoint accountability.

Here I would take issue with the writers of this section on *Conclusion and Recommendations*. They have but ignored the most critical issue that requires urgent action: the reduction of population growth rate to stabilize the Philippine population within a period of time. Otherwise, all these proposed actions and interventions would have little or no chance to move fisheries forward. It is well known that the issue of population has always been a "hot potato" only those groups genuinely concerned with sustainable development would touch. The non-inclusion of the population issue in the book is a missed opportunity to effect changes in the present thinking of the national government with regard to fisheries and natural resources utilization and conservation.

Simply stated, the status of the marine fisheries may be described as one where there are too many fishers chasing a few fish. No one has ever expressed the role of population in fishery more succinctly than the fishers themselves who realize that their small catch owes to the fact that there are just too many of them and too few fish. In the words of one of them: "there are too many of us so my share is small, not like before." The painful reality then is that not only are fish depleted, there are also just too many people dependent on them. Unfortunately, this country's population is increasing in an exponential fashion at the rate of 2.5% annually, with a doubling time of 28 years, from a low figure of 0.8%, with a doubling time of 87 years in the first few years of the 20th century. (Incidentally, I am reminded that this is the present growth rate of Thailand after years of family planning, now with 60+ million people and a better economy than the Philippines.)

In making the recommendations on how to attain sustainable fisheries, authors in this collection put forward a number of assumptions. One of them is that over time marine habitats and water quality will recover to their previous states. However, the grim possibility that our fishery habitats and the marine environment will no longer recover their previous productive states within our lifetime continues to haunt us. We are seeing trends of how depleted fisheries in coastal areas can trigger certain ecological phase-shifts,

for example, from autotrophic to heterotrophic communities, with negative implications for fishery production. The other assumption is that depleted stocks of fisheries will recover over time. But are there sufficient scientific bases for this assumption? Silvestre and Pauly (1997) have stated that one of the characteristics of tropical Asian fisheries is their rapid turnover rates, that is, most species are short-lived, r-strategists, and maximizing reproduction. This is shown by some species on the lower trophic levels. But this is apparently not true of the more valuable and highly desired piscivores and carnivores, as our own research findings indicate decadal recovery process from a depleted state. The natural processes, of which only little is known, will ultimately determine the course of fisheries, and our human interventions, we call management, will influence the direction to some extent. Let us hope that this influence will result in sustained marine fisheries in the future.

Let me quote from a paper presented last month at the National Academy of Science and Technology Annual Meeting by a well known Filipino marine biologist who is essentially looking at the marine fishery sector from the outside: "A survey of the trends in world fisheries production reveals that, as a whole, it has leveled off from the high positive growth in the middle of the 20th century. A closer examination indicates some negative trends among many fish stocks. The only sector that continues to show a consistent increase is aquaculture, with yet unknown ecological consequences. In the meantime, world population grows at an alarming rate. [These]... trends apply to the Philippines as well, with a negative slope characterizing the municipal fisheries sector, that is, the segment of our society where the largest number of fishers earning the lowest incomes fall, the epitome of rural poverty." He continues: "On the governance side, institutions are making too little effort too late to rescue marine resources from their downhill slide... In such a scenario we are losing our intergenerational equity, which bodes ill for ... our country unless there are profound changes in attitude [and] ... there is a quantum improvement in our governance system, which may not yet be on

the horizon.” This statement succinctly expresses the interrelations among fisheries, population growth rate, people’s attitudes, and poverty in this country.

Ten years ago, former President Fidel V. Ramos said that the way to make the Philippines move forward is to reduce the number of fishermen and fisherwomen and to give them opportunities to develop value-added industries based on marine resources. At that time I did not understand what he was driving at. But now I get his point, that is, reducing the number of fishermen and engaging in value-added activities, such as developing marine aquaria for public exhibit, promoting local eco-tourism in order to generate jobs and incomes, among others, is one way to solve the poverty of coastal communities. But all of these possibilities are now, so to speak, “water under the bridge.” As to our marine fishery resources and marine environment, what are the prospects of reversing the downhill trend and/or maintaining our marine fisheries now that we have the recommendations? Only time will tell.

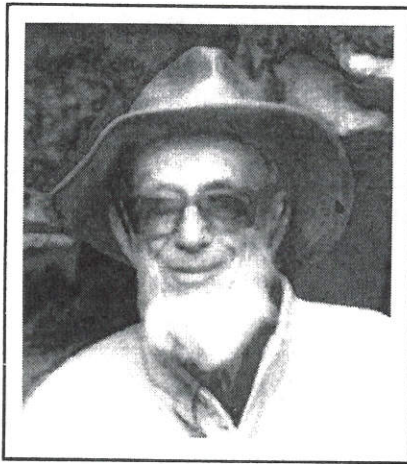
Angel C. Alcala

Silliman University - Angelo King Center

for Research and Environmental Management (SUAKCREM)

IN MEMORIAM

DR. WALTER CREIGHTON BROWN
1913 - 2002



Former Dean of Faculty, Menlo College, California, USA
Fellow, California Academy of Sciences, San Francisco, CA USA
Fulbright Visiting Professor, Silliman University, 1954-55