Water Use Zoning for the Sustainable Development of Batangas Bay, Philippines

GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas

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Published by the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS)/ Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)

Printed in Quezon City, Philippines

MPP-EAS. 1999. Water use zoning for the sustainable development of Batangas Bay, Philippines. MPP-EAS Technical Report No. 25/PEMSEA Technical Report No. 3, 50 p. Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS)/Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Quezon City, Philippines.

A GEF Project Implemented by UNDP

ISBN 971-812-004-1

MISSION STATEMENT

The primary objective of the Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas is to support the efforts of the eleven (11) participating governments in the East Asian region to prevent and manage marine pollution at the national and subregional levels on a long-term and self-reliant basis. The 11 participating countries are: Brunei Darussalam, Cambodia, Democratic People's Republic of Korea, Indonesia, Malaysia, People's Republic of China, Republic of the Philippines, Republic of Korea, Singapore, Thailand and Vietnam. It is the Programme's vision that, through the concerted efforts of stakeholders to collectively address marine pollution arising from both land- and sea-based sources, adverse impacts of marine pollution can be prevented or minimized without compromising desired economic development.

The Programme framework is built upon innovative and effective schemes for marine pollution management, technical assistance in strategic maritime sectors of the region, and the identification and promotion of capability-building and investment opportunities for public agencies and the private sector. Specific Programme strategies are:

- Develop and demonstrate workable models on marine pollution reduction/prevention and risk management;
- Assist countries in developing the necessary legislation and technical capability to implement international conventions related to marine pollution;
- Strengthen institutional capacity to manage marine and coastal areas;
- Develop a regional network of stations for marine pollution monitoring;
- Promote public awareness on and participation in the prevention and abatement of marine pollution;
- Facilitate standardization and intercalibration of sampling and analytical techniques and environment impact assessment procedures; and
- Promote sustainable financing mechanisms for activities requiring long-term commitments.

The implementation of these strategies and activities will result in appropriate and effective policy, management and technological interventions at local, national and regional levels, contributing to the ultimate goal of reducing marine pollution in both coastal and international waters, over the longer term.

Dr. Chua Thia-Eng
Regional Programme Manager
GEF/UNDP/IMO Regional Programme
for the Prevention and Management
of Marine Pollution in the East Asian Seas

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List of Acronyms

BBCICM	-	Batangas Bay Council for Integrated Coastal Management
BBRT	-	Batangas Bay Rail Transit
BFAR	-	Bureau of Fisheries and Aquatic Resources
CALABARZON	-	Cavite, Laguna, Batangas, Rizal, Quezon
CRMP	-	Coastal Resources Management Project
CTD	-	Conductivity-Temperature-Depth
DA	-	Department of Agriculture
DAO	-	Department Administrative Order
DENR	-	Department of Environment and Natural Resources
DILG	-	Department of the Interior and Local Governments
EPC	-	Environmental Protection Council
FARC	-	Fisheries and Aquatic Resources Council
GEF	-	Global Environment Facility
ICM	-	Integrated Coastal Management
IMO	-	International Maritime Organization
LGC	-	Local Government Code
LGU	-	Local Government Unit
MARINA	-	Maritime Industry Authority
MDC	-	Municipal Development Council
MG-ENRO	-	Municipal Government Environment and Natural Resources Office
MPDC	-	Municipal Planning and Development Coordinator
MPP-EAS	-	Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
NGA	-	National Government Agency
NGO	-	Non-Government Organization
PCG	-	Philippine Coast Guard
PG-ENRO	-	Provincial Government Environment and Natural Resources Office
PPA	-	Philippine Ports Authority
UNDP	-	United Nations Development Programme
VTSS	-	Vessel Traffic Separation Scheme

Foreword

Land use planning in the Philippines has always been restricted to the terrestrial portion of the overall territorial jurisdiction and oriented towards agriculture. Despite the archipelagic characteristic of the nation, sea or water use planning is practically non-existent. There is selective zoning of certain sea areas but these are mainly vessel traffic separation schemes, conservation areas (e.g., Tubbataha Reef National Park) and areas for coastal tourism which are loosely associated with land use planning.

Land use planning has been devolved to the local government units as stipulated under the Local Government Code of 1991 (Republic Act 7160). However, the lack of technical expertise at the local level, particularly on environmental management, hampers the proper integration of environmental issues such as marine pollution into the comprehensive land use plans. Further, policies governing coastal and territorial waters are oriented to single resource management (e.g., fisheries) and sectoral marine uses (e.g., security, shipping) rather than considering them as an interactive system that has ecological and socioeconomic implications.

Water use zonation scheme is a response to the increased occurrences of multiple resource use conflicts. It is seen as an effective tool in integrating environmental considerations into the coastal development planning, particularly in the context of integrated coastal management (ICM) for the sustainable development of the coastal and marine areas. As part of the ICM process, the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas helped in developing a functional water use zonation scheme for Batangas Bay. As a pioneering effort, some legislative and other institutional considerations have to be established before it will be implemented.

This document describes the key issues that need to be addressed to properly plan Batangas Bay for sustainable development, the guidelines and the process in developing the water use zonation, the proposed zonation scheme and recommendations to refine the scheme and, eventually, to implement it.

Although the document describes a draft water use zonation scheme, it is hoped that littoral municipalities and the national government as a whole could benefit from this effort.

Dr. Chua Thia-Eng
Regional Programme Manager
GEF/UNDP/IMO Regional Programme
for the Prevention and Management of
Marine Pollution in the East Asian Seas

Acknowledgments

This report was prepared by Prof. Ernesto M. Serote of the School of Urban and Regional Planning, University of the Philippines, in fulfillment of a contract with the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas. The work represents a component of the Batangas Bay Demonstration Project which is coordinated by Dr. Huming Yu, Senior Programme Officer of the Regional Programme.

The assistance of the following in the preparation of this document is gratefully acknowledged:

- James Paw and Noel Robles for the preparation of the maps, and Stella Regina Bernad for her notes on delineating boundaries in municipal waters;
- IMO Field Office in Batangas City, particularly Dr. Corazon Abansi and Mrs. Josefina Matangguihan for providing helpful leads and facilitating field visits;
- PG-ENRO headed by Evelyn Estigoy for assistance in making contacts and coordinating public consultations in various places around Batangas Bay;
- Other provincial officials for making available valuable information particularly Arsenio M. Cay, Jr., provincial planning and development coordinator; Vilma Mortel, provincial fisheries in-charge; and Kabaitan Dinglasan and Jaida Luistro of the Provincial Tourism Office;
- Officials of the Philippine Ports Authority at Batangas Base Port for information on development plans and port operations, particularly Edmond Moreno, General Manager; Victor A. Arellano, Port Services Manager; Benito A. Carnero, Engineering Services Manager; and Carlos L. Aguado, Harbor Master;
- MARINA Regional Director Romeo R. Gaqui for vital information on vessel traffic and the shipping industry in Batangas Bay;
- Municipal Mayors Bienvenido Castillo of Bauan; Mario Magsaysay of San Pascual; and Ruben Amurao of Mabini;
- Municipal Assessors Rodezinda Pargas of Batangas City; Esteban T. Dalangin of Bauan; Charito M. Bilale of Mabini; Raymundo Atienza of Tingloy; and Manolo Castillo, Assessment Operation Officer of San Pascual for information on tenure status of property along the Bay;
- Community Environment and Natural Resources Officer Pancrasio Alcantara for information on forest lands and reservations;
- Karl Mohn, Vice President for Manufacturing, Caltex Refinery, as informant from private business;
- Sanny Leviste, Director, Management Training Development Center, De La Salle Lipa, as advocate for fisherfolk;
- Faculty of the University of the Philippines Marine Science Institute, particularly Gil Jacinto, Cesar Villanoy and Porfirio Aliño for the use of their technical papers as inputs in various aspects of this study; and
- Huming Yu and James Paw, senior officers of IMO, for carefully and critically reviewing several drafts of this paper.
- Dr. Chua Thia-Eng, Regional Programme Manager and Mr. Adrian Ross, Senior Programme Officer, for their technical advice and support.

Abstract

This study covers a long-neglected aspect of natural resource management in an archipelagic state like the Philippines. Focusing on the water and on the coastal zone, it analyzes the issues arising from the multi-layered claims over, and multiple uses of, Batangas Bay. The Bay is located on the southern part of the main island of Luzon, facing the Verde Island Passage.

At the base of the multi-layered claims is the extent of municipal waters of five coastal municipalities whose authority to dispense territorial use rights for fisheries has been extended from 7 to 15 km from the shoreline under the Local Government Code (R.A. 7160). The topmost layer represents the claim of the national government over the Bay as a major port of entry and an important water body for shipping and navigation. Sandwiched between these two layers are the numerous private users of the bay water for fisheries, recreation, transport, residential and industrial purposes.

This document builds the rationale for water use zonation upon the need to address these issues and to avert their possible escalation into open conflicts or worse, disasters. The proposed zonation scheme designates three categories of use zones: restricted use, exclusive use and multiple use zones. The restricted use zone is assigned to activities that cannot tolerate the presence of other uses of the bay water. Exclusive use zones are reserved for activities the viability of which depends on continued unhampered access to the water. The multiple use zone accommodates water use activities that tolerate other water use activities through time sharing.

The water use zonation scheme also has developmental functions particularly as it enriches the content and context of plans and policies on the land side of the coastal zone. In this connection, the study offers a liberal helping of ideas on how to improve the quality of existing land use plans of the coastal municipalities specifically as regards the use of their waterfront areas.

Whether it is used as an instrument for regulation or to spur development in the right places, the water use zonation scheme seeks to strike a balance among the three objectives of economic growth, social equity and ecological health.

Finally, the innovative institutional arrangements for implementing the scheme consistent with the principles of local autonomy and people empowerment are explored.

Summary of Recommendations

To enhance the replicability of the water use zonation scheme, the following steps are suggested:

1. The pilot study should be extended into the implementation stage to complete the documentation of this pioneering effort.

2. The establishment of planning databases for ICM to be housed in mandated agencies such as BFAR and related service bureaus of the DENR should be supported. At present, scientific information and data-generation skills are scattered among educational institutions, private consultancy groups and international aid agencies. Often this information is not accessible to planners in the public sector especially those from local governments.

3. Local planning guidelines, which are land-focused, should be revised to incorporate policies for the marine portion up to the limit of municipal waters. Technical assistance in the proper delineation and marking of boundaries on the water should be extended to all coastal LGUs.

4. Corollary to No. 3, the powers of LGUs over their municipal waters should be expanded to include taxation, regulation and developmental intervention other than municipal fisheries. Amendments to this effect should be made in the Local Government Code.

5. To be able to develop such an integrated guideline for local land use planning, a pilot study to actually relate the zonation scheme to the land use policies of one of the Batangas Bay municipalities should be undertaken. The municipality of Tingloy may be a good project site considering the fact that there is no existing comprehensive land use plan or zoning ordinance and that it is increasingly coming under pressure from both developers and conservationists.

6. All coastal LGUs should be encouraged to create organizational structures similar to the BBCICM at the provincial level and the Municipal Environment Protection Council as described in Chapter 6. These Councils will provide a mechanism for the deliberation of issues and concerns relative to the coastal zones and marine environments of municipal waters. Amendments can be introduced into the Implementing Rules and Regulations of the LGC further defining the scope of functions of the EPC and its relationship to the local development council.

7. An alternative to No. 6 is the expansion of the powers and functions of the Fisheries and Aquatic Resources Councils (FARCs) authorized to be created by the Revised Fisheries Code of 1998 (RA 8550). Although the mandate of the FARC is limited to fisheries matters, the possibility of "piggy-backing" a broader set of ICM concerns into its functions deserves further study.

Chapter 1
Introduction

The combined land and water area of the Philippines to the exclusive economic zone (EEZ) is about 250 million ha. Of this, 220 million ha (88%) is marine water and the rest comprises land and freshwater areas. Traditionally, physical planning is exclusively land-based, and although the Philippines is an archipelago, it has no sea use planning. The country's coastal and marine environments are managed in the context of navigation, tourism, fisheries and mining, etc. Protection and conservation of coastal and marine resources and special marine areas are recent programs of the government and are loosely linked to physical planning. This is because protection and conservation efforts are largely focused on the terrestrial environment, particularly on forest and wildlife. To achieve sustainable development as promoted under Philippine Agenda 21, it is imperative to have a balanced emphasis on terrestrial and marine environments such as the development of coastal and marine policy, legislation, programs and activities covering the littoral zone, EEZ, submarine areas and continental shelves on use and governance, economic development, management of resources and environmental quality, security, sea use zoning, navigation and maritime activities, conservation and protection including institutional arrangements, among others.

Project Overview

The Batangas Bay Demonstration Project (BBDP) is one of two demonstration projects of the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas that apply the integrated coastal management (ICM) framework in the management and prevention of marine pollution, particularly from land-based sources.

The Batangas Bay Region is located in the southern part of Batangas Province along the Verde Island Passage and comprising the cities and municipalities of Batangas, Lipa, Alitagtag, Bauan, Cuenca, Ibaan, Mabini, Padre Garcia, Rosario, San Jose, San Pascual, Taysan and Tingloy. The Bay region, whose catchments drain into the Batangas Bay, is becoming industrialized with concomitant urban expansion.

A major concern of the BBDP is the establishment of management, technical, legal, institutional and environmental monitoring mechanisms for marine pollution and the sustainable development of Batangas Bay. A complementary focus is the resolution of conflicts arising from multiple uses of the Bay by various sectors and stakeholders.

Among the activities of the BBDP is the development of a water use zonation scheme for the Batangas Bay as a management tool for the sustainable development of the Batangas Bay Region. The objective of this activity is to draft a water use zonation scheme for Batangas Bay with appropriate definition and criteria for water use zoning including policy statements and guidelines that will enable its adoption and implementation by the provincial and municipal/city governments or relevant authorities.

The study highlights the major issues arising from the multiple claims of various users and stakeholders and presents a set of policies and a draft zonation scheme as a means to resolving some of the existing issues and conflicts or pre-empt the emerging ones. For issues whose resolution depends on the proper management of the landward side of the coastal zone, this report discussed a number of principles to guide land use planning and zoning of the coastal municipalities, particularly in respect of their waterfront areas. Since Batangas Bay is shared by no less than five local government units (LGUs), the study explores alternative institutional arrangements for the implementation of the scheme. The conclusion summarizes the major lessons learned from the study and recommends certain measures to enhance its replicability in other areas of the Philippines.

Rationale for Water Use Zonation

Water use zonation is one of the management or regulatory instruments to address the issues arising from the multiple use of water bodies by various sectors and stakeholders. Considering that many water uses are related to land-based activities, water use zonation and coastal land use planning and

the existence of extensive coastlines and dozens of bays and coves and fishing grounds, local planning and zoning in the Philippines have been confined to the terrestrial side of the municipal territory. This is also true at the national level because water use zoning is not yet an established practice in the Philippines. This leaves the coastal zone seaward to the limit of municipal waters virtually open access, generally subject to various activities with associated environmental consequences.

To be more effective, therefore, a water use zonation should be anchored within the ICM framework which addresses multi-users and multi-dimensional coastal issues. Implicit in this study is the assumption that zonation can resolve or pre-empt some, but not all, of the conflicts among the different claimants to water use rights of a particular water body. The reason for this is the lack of adequate baseline information and precedents to guide policy and action. As more experience and better understanding about the functions of the Bay's ecosystems and its linkages with socioeconomic factors become available, zonation may be refined and applied with increasing effectiveness.

Admittedly, many of the water use issues can be traced to the existing pattern of coastal land uses. For water zonation to work, the proper institutional arrangements and management capabilities among the public, private and voluntary sectors that have a stake in the sustainable use of Batangas Bay and of the adjoining land must be identified. Finally, insights derived from this study could be incorporated into an integrated land and water use policy thereby enriching the content and enlarging the scope of planning and zoning in the Philippines.

SOURCES OF INFORMATION

The preparation of the zonation scheme was guided, among others, by insights drawn from the following reports and studies conducted under the auspices of the Regional Programme:

- Coastal Environmental Profile of the Batangas Bay Region (MPP-EAS, 1996a)
- The Strategic Environmental Management Plan for the Batangas Bay Region (MPP-EAS,1996b)
- A Hydrodynamic and Pollutant Dispersal Model of Batangas Bay, Philippines for ICM Applications (Villanoy, 1997)
- Fisheries Assessment (Aliño et al., 1997)
- Marine Pollution Monitoring and Assessment in Batangas Bay (Jacinto, 1997)
- Rapid Appraisal of Environmental Risk from Pesticide Pollution in Batangas Bay and Xiamen Waters (Calamari and Delos Reyes, 1997)

Also, reviews of other existing documents and interviews with key stakeholders were conducted. The draft zonation scheme is undergoing refinement through a series of public consultations being facilitated by the Environment and Natural Resources Office of the Provincial Government (PG-ENRO) of Batangas.

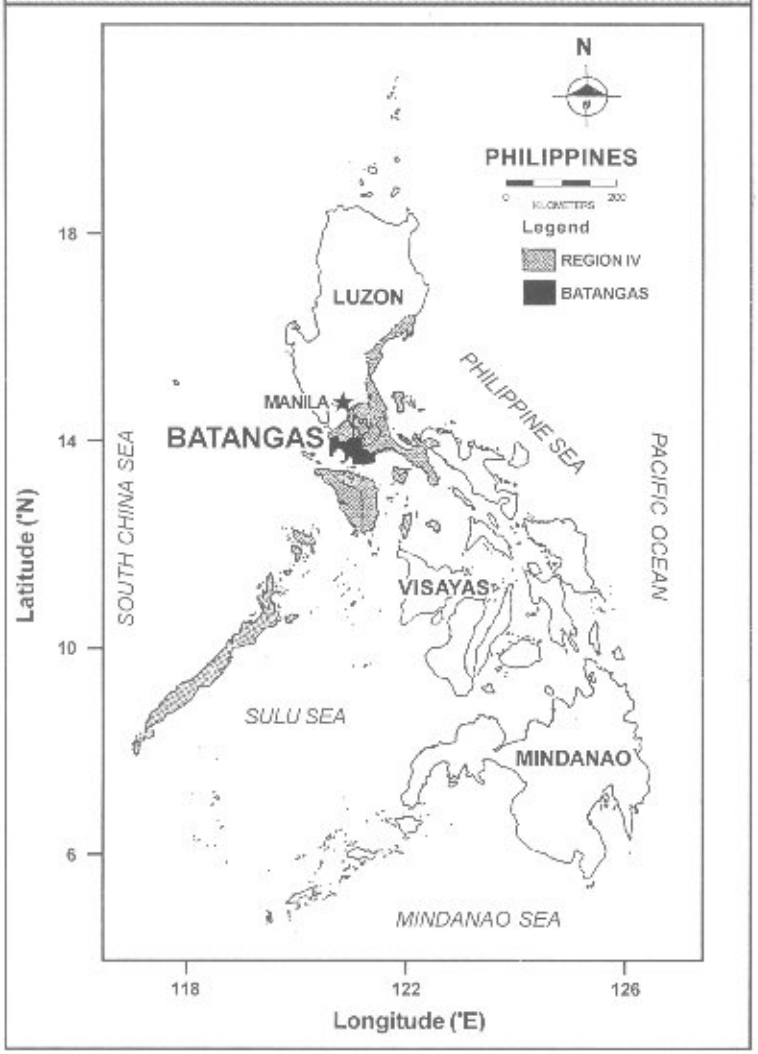
BATANGAS BAY AS A STUDY SITE

Batangas Bay is a challenging area of this pioneering study. The Bay accommodates a variety of conflicting water use rights, e.g., fisheries, heavy industries, recreation, shipping and navigation, among the major ones. Also, the small size of the Bay poses potential jurisdictional problems. The width of the Bay from shore to shore is not more than 15 km which makes it entirely within the scope of "municipal waters" as defined in RA 7160 [Sec. 131,(r)]. Because five LGUs share the shoreline with varying lengths and orientations, the task of delineating municipal boundaries is quite complicated. Then, on top of these municipal jurisdictions, the use rights of the national government for the management and regulation of coastwise and international shipping, as well as those of other users are superimposed.

Geography

Batangas Bay forms part of the province of Batangas, one of the 77 provinces of the Philippines (Figure 1). Batangas Province is one of the 11 provinces comprising the Southern Tagalog Region (Region IV). It is about 150 km south of Metro Manila, the national capital. Batangas Bay lies between 13°36' and 13°48'N latitude and between 120°49' and 121°6'E longitude.

Figure 1. Batangas Province, Philippines.



The study area in its regional context

The study area lies within the Batangas Bay Region which consists of 13 LGUs that are traversed by all rivers draining into Batangas Bay. Five of the 13 LGUs border the Bay, herein referred to as Bay Area municipalities. Within these five LGUs, there are 45 barangays[1] along the coast. The study area covers the Bay and the five municipalities bordering it (Figure 2).

Surface area and coastline

The combined land area of five LGUs bordering the Batangas Bay is 453.8 km². The water surface area of Batangas Bay is estimated at 220 km². Altogether, the surface area (land and sea) covered by this study is 673.8 km². The total coastline stretches to over 90 km.

Within the five coastal towns, a total of 45 barangays directly abut on the Bay: 13 in Batangas City, 8 in Bauan, 12 in Mabini, 3 in San Pascual and 9 in Tingloy. These coastal barangays comprise one-fifth of the total number of barangays in the coastal municipalities which is 223.

The coastal LGUs have varying shares of the Bay coastline. The most extensive coastline is that of Batangas City which includes Verde Island. The municipality of Tingloy in Maricaban Island, comes next. For its part, Mabini, being a peninsula, has a long coastline but only about one-half of it is located in Batangas Bay. Its western coast is located in Balayan Bay. Bauan also has coastlines in both Batangas Bay and Balayan Bay. San Pascual has the smallest share with only a little over a kilometer of coastline. The approximate lengths of coastlines by municipality along Batangas Bay are shown below:

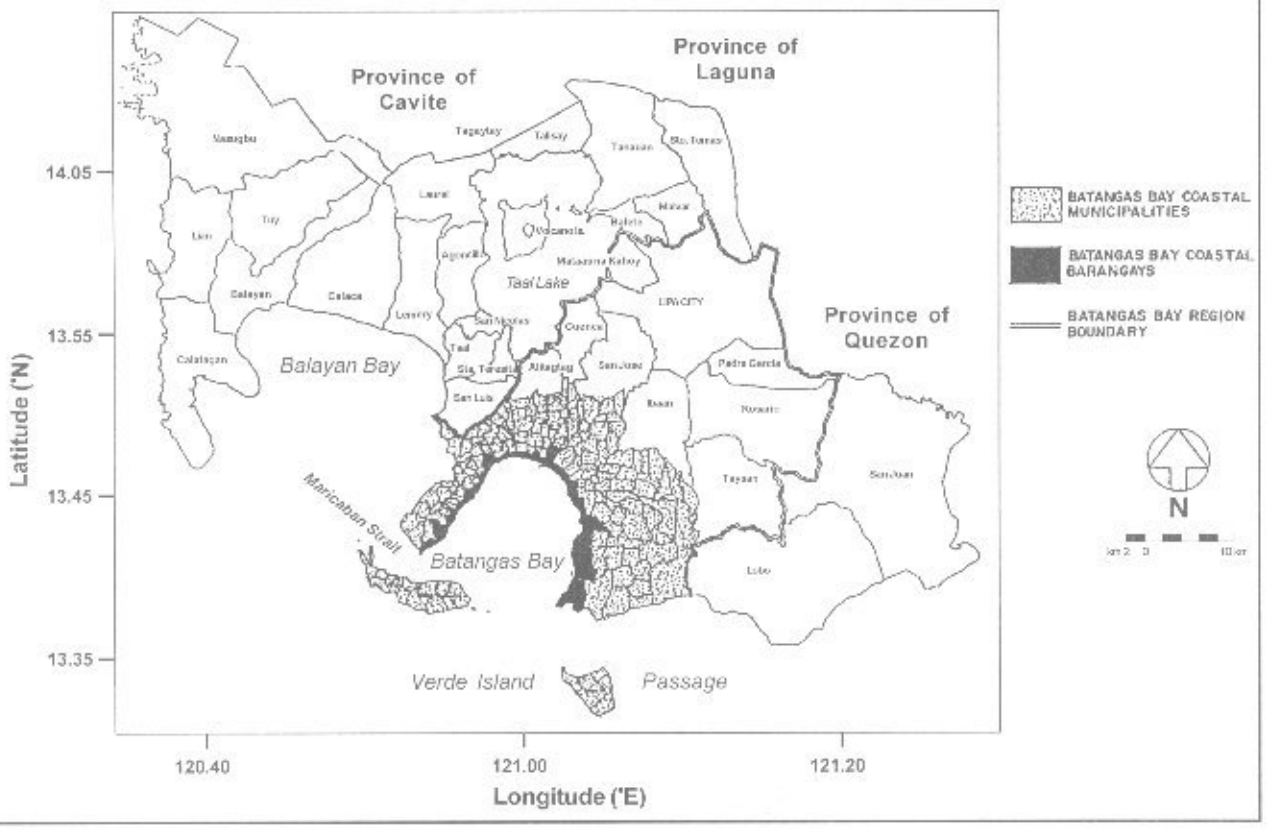
Batangas City	24.00 km
Verde Island	19.90 km
San Pascual	1.43 km
Bauan	6.52 km
Mabini	16.75 km
Tingloy and Maricaban Island	23.52 km
Total Coastline	92.12 km

Bathymetry of Batangas Bay

Batangas Bay has an average depth of 200 m. Maximum depth is recorded at 457 m near the mouth of the Bay. Off the mouth of the Bay, it slopes further downward to a depth reaching 1,000 m. For the

[1] *The barangay is the lowest level in the hierarchy of political units in the Philippines. Unless otherwise specified, a Local Government Unit (LGU) in this paper refers to a city or a municipality, the next higher tier of political units. The province represents the third tier and these three levels constitute the scope of local government units as defined in the Local Government Code.*

Figure 2. ICM Operational Area in the Batangas Bay Region.



most part, the Bay coastline has very steep slopes. The average depth within 1 km from the shore is 55 m. Shallow portions of less than 50 m depth account for only 7% of the total surface area. The Maricaban Strait which separates Tingloy from the mainland has a maximum depth of 125 m (Figure 3).

Tidal characteristics of Batangas Bay

The average tidal range (differences between high and low tides) in Batangas Bay is about 1.1 m. The maximum tidal range occurs during spring tides, where tides are diurnal. The minimum tidal range is experienced during neap tides with semidiurnal tides. Overall, the tides in Batangas Bay are characterized as mixed, dominant full diurnals (Villanoy, 1997).

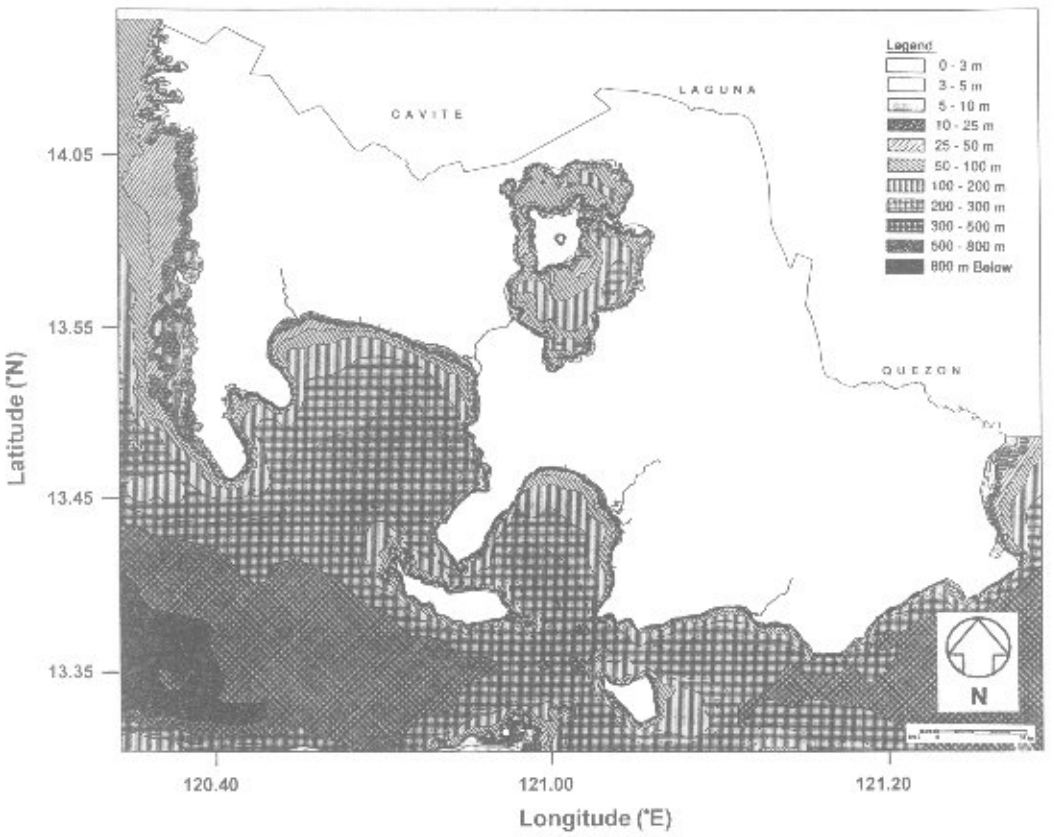
Hydrography of the Batangas Bay

Measurements made by Villanoy (1997) on the conductivity-temperature-depth (CTD) profiles of Batangas Bay extending from the surface down to 200 m depth show that seasonal variability affects the 50 m upper layer during the colder months from November to March. During the warm months (April to September), the mixed layer extends to a depth of 100 m. The salinity profile also showed that the top 70 m of the water column contains a significant amount of freshwater. Villanoy (1997) theorizes that this freshwater input cannot be attributed mainly to the rivers surrounding the Bay of which there are a dozen (Figure 4). It is highly possible that the large freshwater component is part of the oceanic water that comes in through the wide mouth of the Bay.

Flushing potential of Batangas Bay waters

Due to the coastline geometry and bottom topography of the Bay, complete flushing (zero net transport) is not possible. Circulation of the Bay waters is dominated by the tidal component of the flow. Villanoy (1997) estimates that the maximum tidal excursion in the northern half of the Bay is 2 km, suggesting that there is very limited flushing at the head of the Bay. Flushing is more rapid at the southern half through the mouth of the Bay and through the Maricaban Strait (Figure 5).

Figure 3. Bathymetry of Batangas Bay and Surrounding Areas.



Coral reefs and fisheries

The coral reefs of Batangas Bay are not extensive except in Maricaban Island. Economic development has largely been responsible for their deteriorating quality, especially along the inner Bay. In Maricaban Island, the coral reefs have relatively higher live cover and are economically important as the major attraction for SCUBA diving tourists to the area. Maricaban is the closest dive site to Metro Manila. This activity is an important source of supplementary livelihood for fishers in the area, renting out their boats during peak season on weekends and in summer. Although fisheries resources are not diverse in Batangas Bay, it is not certain whether the stocks are overexploited. Fishing occurs in nearshore waters, particularly along coral reefs for jacks and groupers.

With the exception of Matoco Point at the extreme southeastern part of Batangas Bay, there are no reefs on the eastern side of the Bay. Aliño et al. (1997) found that Matoco Point actually exhibited the highest coral cover (~20%) of the areas surveyed. Some coral communities, however, live on the soft substrate fronting barangay Tabangao where large industries are located. On the western side of the Bay, there exist some reefs (Mainaga Point and Dilaw Point) though many areas have already been smothered by sediments. Coral cover is generally low in this area (<15% hard coral) and bare rock and sand are prevalent.

The best reefs in the Bay are to be found around Maricaban Strait. Arthur's Rock (barangay Bagalangit) and Twin Rocks (barangay San Teodoro) in Mabini actually have well-enforced fish sanctuaries protected by local ordinances and the Haribon Foundation (Plate 1). Tabunan Cove near the town center of Tingloy is somewhat polluted and silty (Plate 2). The western side of Tingloy (Sombrero and Caban Islands) possesses the best diving sites in the area (Plate 3) while the highest number of reef fishes was observed off Bonito Island in barangay Pisa (eastern Tingloy).

The most common fishes observed in Batangas Bay reefs were damselfishes (*Pomacentrus, Chromis* and *Dascyllus*), wrasses (*Cirrhilabrus cyanopleura*) and

Figure 4. River Systems of the Batangas Bay Region.

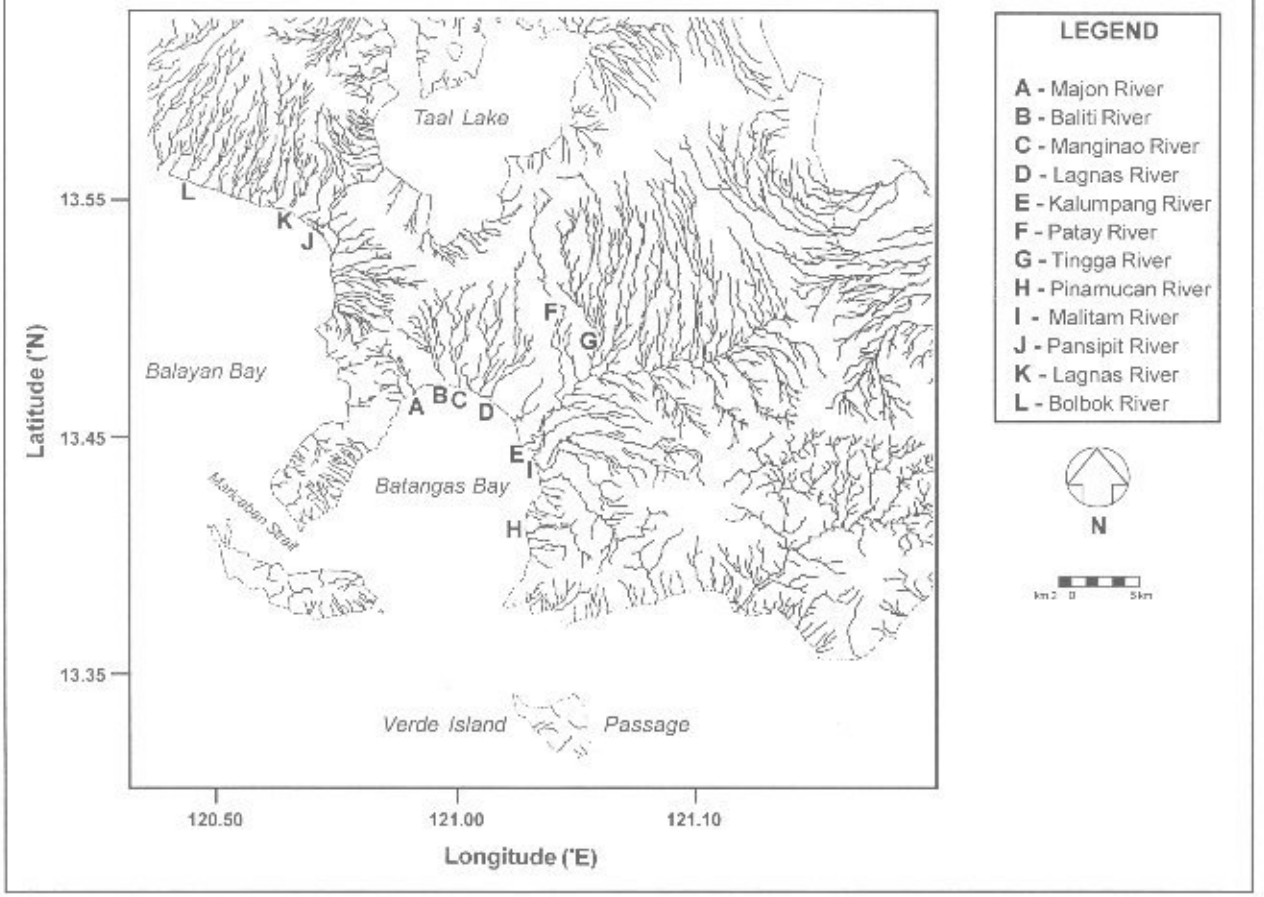
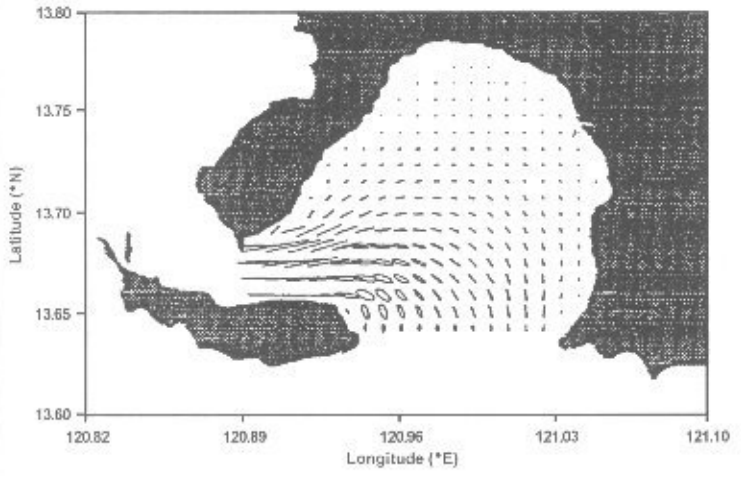


Figure 5. Flushing Potential of the Batangas Bay Region.



Source: Villanoy (1997)

fairy basslets *(Pseudanthias)* (Aliño et al., 1997). There were hardly, if any, fish of commercial importance observed on the reef. Arthur's Rock and Bonito Island are the sites with the most number of economically important food fish such as catfishes, surgeon fishes and fusiliers. The most common juvenile fishes sighted among the sites were *Chromis retrofasciata* (damselfishes), *Pseudanthias squamipinnis* (fairy basslets), *Chrysiptera rollandi* and *Pomacentrus alexanderae* (damselfishes).

Plate 1. Maricaban Strait viewed from Tingloy Island. In the background are the fish sanctuaries of Mabini.

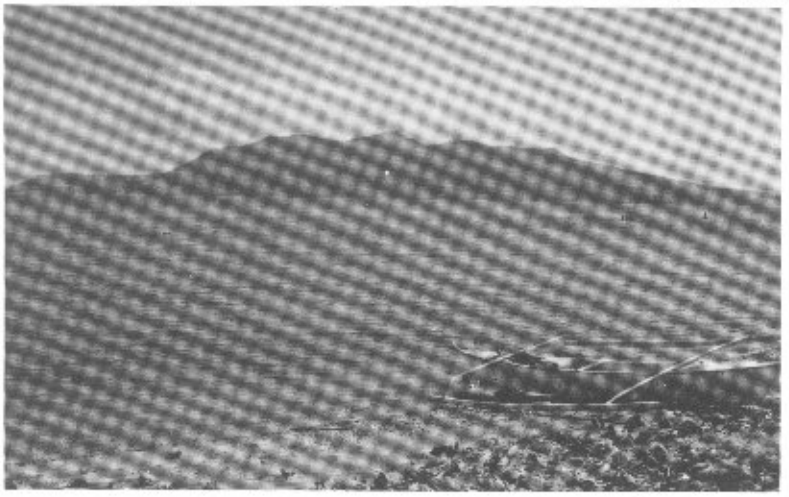
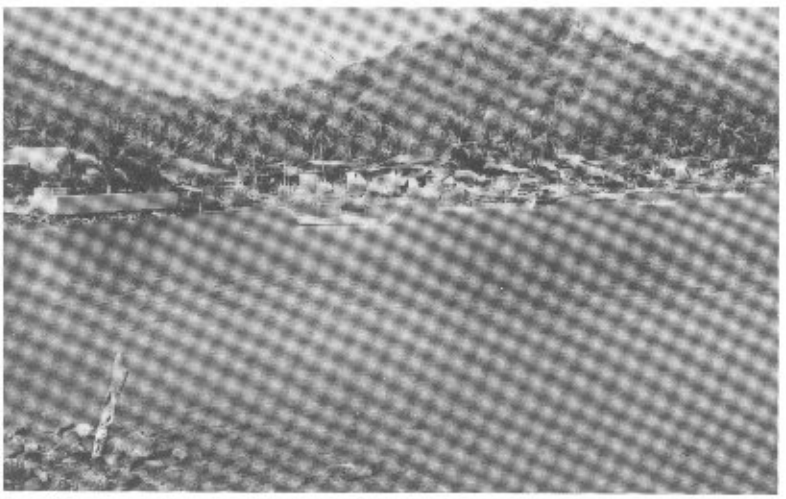


Plate 2. Tabunan Cove is somewhat silty and polluted due the concentration of population.



DEMOGRAPHY OF THE STUDY AREA

Population Size, Growth and Distribution

Population size. Batangas province is the most populous province in the Southern Tagalog region (Region IV). The 1995 census placed the provincial population at 1,658,567, distributed among two cities and 32 municipalities. Out of this total population, over one-fifth (22%) is accounted for by the five coastal LGUs of Batangas Bay (see Table 1).

Of the 223 barangays in the five coastal municipalities, the 45 coastal barangays account for more than one-fourth (28.68%) of the 1995 total coastal municipal population. In each coastal municipality except Batangas City, the share of coastal barangays to total municipal population is over 30%, both in the 1990 and 1995 census periods (Table 2).

Growth rate. In terms of growth rate, the population of the study area has grown faster than that of Batangas province in general. From 1975 to 1995, the annual provincial growth rate was 2.36%. During the same period, the Batangas Bay coastal LGUs grew at a higher rate of 2.55% annually. In contrast, all other towns had a slower growth rate compared to the Bay Region and the province, respectively (see Table 1). Among the five LGUs of the Bay area, only three LGUs had higher growth rates than that of the province. These are San Pascual, Bauan and Batangas City (Table 3).

Table 1. Comparative Population Size and Growth Rate, 1975 and 1995.

	Population		Annual Growth Rate (%)
	1975	1995	
Batangas Province	1,032,009	1,658,567	2.36
Batangas Bay coastal towns	218,981	365,314	2.55
Other towns combined	813,028	1,293,253	2.31

Source: NSO Census Reports.

Table 2. Share of Coastal Barangays to Municipal Population, Batangas Bay Area, 1990 and 1995.

Municipality	1990			1995		
	Total Municipal	Coastal Barangay	% of Total	Total Municipal	Coastal Barangay	% of Total
Batangas City	184,970	43,903	23.74	211,879	51,277	24.20
Bauan	59,258	18,366	30.99	64,190	19,553	30.46
Mabini	30,477	11,322	37.15	33,499	12,599	37.61
San Pascual	34,629	10,933	31.57	40,849	13,399	32.80
Tingloy	15,430	8,188	53.04	14,897	7,932	53.25
Total	324,764	92,712	28.55	365,314	104,760	28.68

Source: NSO Reports 1990, 1995.

During the same 20-year period (1975-1995) the coastal barangays of the study area had a high growth rate of 3.01% compared to the interior barangays (2.40%) of the coastal LGUs. This trend is observed in all of the LGUs except Tingloy. Bauan, for its part, exhibited a uniform growth rate among its coastal and interior barangays (Table 4).

During the first half of the 1990s (1990 to 1995), a number of barangays posted spectacular growth such as Pinamucan Ibaba, Pinamucan Proper, Malitam, Cuta and Tabangao Aplaya in Batangas City; New Danglayan in Bauan; Bulacan and Calamias in Mabini and San Antonio in San Pascual. The extreme case, however, is observed for Tingloy in that all but two of the barangays facing the study area posted negative growth rates (Table 5).

Distribution trend. The percentage share and growth rate suggest a tendency of the population to concentrate in the Batangas Bay coastal area over the last two decades. Province-wide, the Batangas Bay coastal towns had a larger relative share of total population than the rest of the towns. Similarly, in terms of average growth rate, the study area had a higher performance.

Within the study area, the coastal barangays had a bigger relative share and a higher growth rate compared to the interior barangays. The Batangas Bay coastal barangays of Tingloy are however, losing their population in absolute and relative terms. Out-migrants probably move to the other Bay towns or elsewhere.

Plate 3. Sombrero and Caban Island in the western side of Tingloy are the best diving sites in the area.

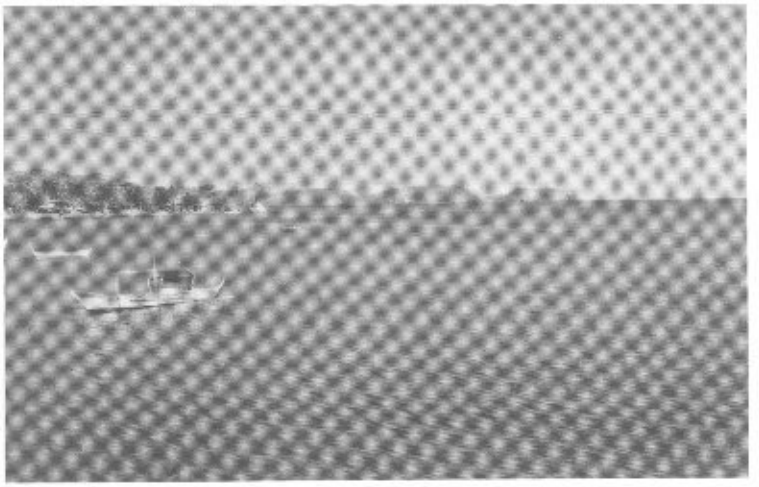


Table 3. Population Size and Growth Rate, Batangas Bay Coastal Towns and Batangas Province, 1975 and 1995.

Batangas Bay Coastal Towns	Population 1975	Population 1995	Annual Growth Rate (%)
Batangas City	125,363	211,879	2.62
Bauan	38,200	64,190	2.59
Mabini	21,694	33,499	2.16
San Pascual	21,761	40,849	3.15
Tingloy	11,963	14,897	1.08
Batangas Province	1,032,009	1,658,567	2.36

Source: NSO Census Reports.

Table 4. Population Size and Growth Rate, Batangas Bay Coastal Town Barangays, 1975 and 1995.

Barangay Groups	Population		Annual Growth Rate (%)
	1975	1995	
BATANGAS CITY	7,747	211,879	2.62
Batangas Bay coastal barangays	25,931	51,297	3.41
All other barangays	99,432	160,582	2.39
BALIAN	38,200	64,190	2.59
Batangas Bay coastal barangays	11,662	19,563	2.58
All other barangays	26,538	44,627	2.59
MABINI	21,694	33,499	2.16
Batangas Bay coastal barangays	125,363	12,599	2.42
All other barangays	13,947	20,900	2.01
SAN PASCUAL	21,761	40,849	3.15
Batangas Bay coastal barangays	5,351	13,399	4.62
All other barangays	16,410	27,460	2.56
TINGLOY	11,963	14,897	1.08
Batangas Bay coastal barangays	6,625	7,934	0.89
All other barangays	5,338	6,963	1.32
All Batangas Bay coastal barangays	57,316	104,792	3.01
All other barangays of coastal towns	160,873	260,522	2.40

Source: NSO Census Reports.

Table 5. Population in Batangas Bay Coastal Barangays, 1990 and 1995.

Coastal Municipality and Barangay	Population 1990	1995	Annual Growth Rate (%)
BATANGAS CITY	184,970	211,879	2.75
Ambulong	2,302	2,752	3.64
Cuta	6,191	8,028	5.33
Libjo	5,943	7,081	3.57
Mabacong	1,066	1,256	3.33
Malitam	1,952	2,989	8.90
Pagkilatan	893	952	1.29
Pinamucan Ibaba	891	2,794	25.64
Pinamucan Proper	2,440	3,504	7.51
Simlong	2,294	2,678	3.14
Sta. Clara	11,903	9,949	-3.52
Sta. Rita Aplaya	2,090	2,084	-0.75
Tabangao Aplaya	2,359	2,874	4.03
Wawa	3,579	4,336	3.91
BAUAN	59,258	64,190	1.61
Aplaya	7,188	7,467	0.76
New Danglayan	904	1,125	4.47
San Andres I	648	661	0.40
San Andres Proper	2,671	2,633	-0.86
San Miguel	1,255	1,315	-0.94
San Pedro	1,311	1,593	3.97
Sta. Maria	2,707	3,031	2.29
Sto. Domingo	1,682	1,738	0.66
MABINI	30,474	33,499	1.91
Bulacan	749	926	4.33
Calamias	550	716	5.42
Gasang	1,809	1,794	-0.66
Mainaga	905	931	0.57
Mainit	819	945	2.90
Malimatok I	708	798	2.42
Malimatok II	819	875	1.33
Pulong Balibaguhan	606	637	1.00
Saguing	985	1,085	1.95
San Juan	1,044	1,215	3.08
Talaga East	1,302	1,518	3.12
Talaga Proper	1,026	1,159	2.47
SAN PASCUAL	34,629	40,849	3.36
Danglayan	614	693	2.45
Poblacion	5,798	7,034	3.94
San Antonio	4,521	5,672	4.64
TINGLOY	15,430	14,897	-0.61
Gamao	1,200	1,158	-1.00
Maricaban	1,005	919	-1.77
Poblacion I	474	507	1.36
Poblacion II	784	719	-1.72
Poblacion III	640	693	1.60
San Jose	886	862	-0.48
San Pedro	676	654	-0.59
Sto. Tomas	1,387	1,330	-0.36
Talahib	1,132	1,090	-1.69
Total Municipal	324,764	365,314	2.38
Total Coastal Barangays	92,712	104,760	2.47

Source: NSO Census of Population 1990, 1995.

Chapter 2
Present Pattern of Utilization of Batangas Bay

This chapter describes the activities that directly or indirectly make use of the Bay water, viz. fisheries, industries, shipping and navigation, tourism and recreation, and human settlements.

HUMAN SETTLEMENTS ALONG THE COAST

As discussed in the previous chapter, the population of the coastal municipalities reached over 365,000 in 1995 accounting for 22% of the provincial population. In general, coastal zone residents of the Batangas Bay may be classified according to tenure types and in terms of their main motivation for residing there.

Three types of tenure prevail in the area: tenured, renters and non-tenured residents. Non-tenured residents may be further classified into those occupying their premises with the permission of the owner and those without. Owner-occupants may have acquired tenure by inheritance, purchase, donation and other forms of conveyance. Renters may be further split into those who lease the lot and build their dwelling, those who rent only the dwelling unit, or both lot and dwelling.

Owner-occupancy is the dominant form of tenure in the study area. This is due principally to the fact that the lands in the coastal zone are almost entirely classified as alienable and disposable (A&D). The A&D areas have since undergone cadastral surveys and are now titled to private claimants. Private lot owners normally devote their property for residential purposes. Depending on their perception of housing demand, they let out part of their lot or their dwelling or both to renters.

The renters are mostly migrant workers employed in the numerous industrial and commercial establishments along the coastal zone. When these migrant workers are later joined by their families they start looking for more permanent accommodations and convert to owner-occupiers in established residential communities.

In recent years, what were originally residential areas in the coastal zone are increasingly being bought up by industrial estate developers or investors. Pending development by the new owners, some people, either individually or in organized groups, enter and occupy these "vacant" lots. Thus, communities of non-tenured residents are formed. Non-tenured residents are observed to concentrate near the ports in Batangas City and Bauan and in the reclamation area of Mabini.

In the absence of empirical studies, it can be surmised that the main attraction of the coastal zone is the availability of jobs and livelihood opportunities (Plate 4). The free access to fishing and other sources of fresh food items may be a strong attraction to many coastal zone residents. Some coastal zone residents may also have been attracted by the generally high amenity value of waterfront locations (Plate 5). The search for jobs among low-skilled workers tends to focus on the port area. In many cases, these workers bring along with them their families which find the port area convenient to reside in even though

Plate 4. The existence of large industries attracts workers and job seekers to live along the coast for easy access.

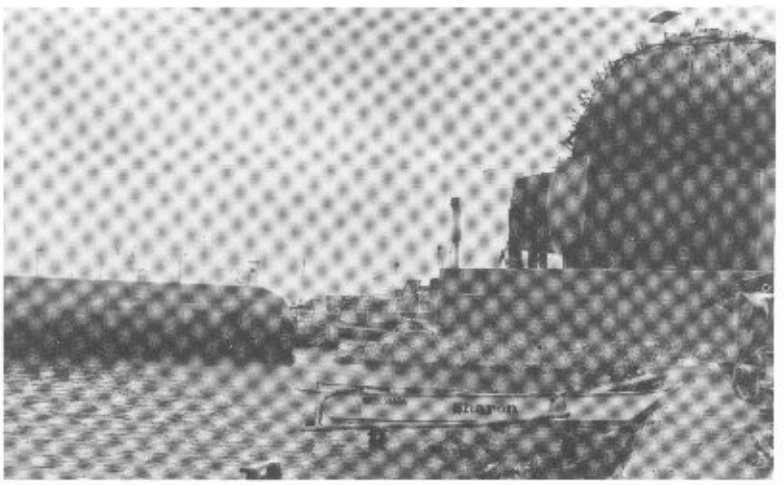
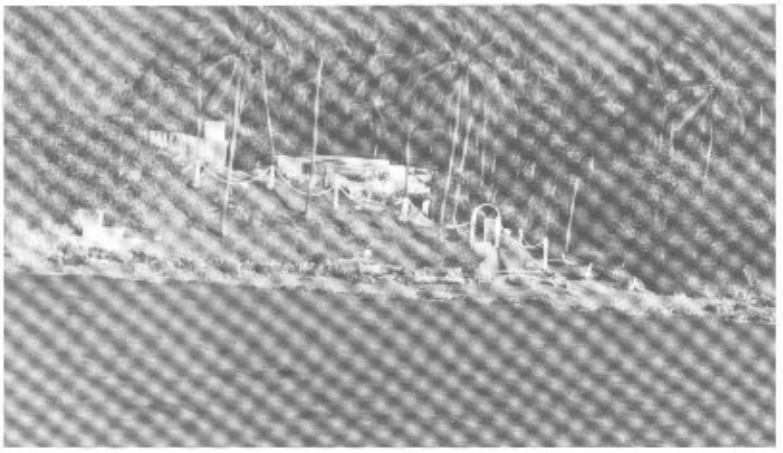


Plate 5. Some well-off residents may have been attracted to the coastal zone by the high amenity value of waterfront locations.



they can be displaced when the port expansion plans take effect. Still others live in the coastal zone because they have no other place to go. Accordingly, coastal zone residents can be classified into:

1. Families that depend directly on the use of the water for their livelihood, consisting of fisherfolk with or without boats, and boat operators whether for transport or for pleasure (Plate 6).
2. Families that depend on water-based activities such as port workers, service employees of passenger and cargo vessels, service employees of pleasure craft and employees of beach resorts (Plate 7).
3. Families that depend for jobs on land-based firms located along the shore.
4. Families residing in the coastal zone but whose livelihood is located elsewhere.
5. Tribal groups whose traditional habitat is the coastal zone.

The last group refers to the 250-plus residents of barangay Malitam Dos, the tiny islet at the mouth of Calumpang River in Batangas City. As reported by Esplanada (1997), these coastal dwellers are Badjaos, the so-called sea gypsies of southwestern Mindanao who have been forced to flee their homes due to insurgency problems and the deteriorating peace and order situation there.

In terms of motivation, coastal zone residents may be classified into those who use the coastal zone as their domicile. These are the families residing in the coastal zone but whose livelihood is located elsewhere. They may either be tenured or renters. The Badjaos whose traditional habitat is the coastal zone but who earn a living doing odd jobs in the urban market place can be classified under this category although they are completely non-tenured.

The other category consists of families who consider the coastal zone as both a domicile and a work place. These include families directly dependent on the use of the water for their livelihood. They may either be owner-occupants, renters or non-tenured. Families employed in water-based activities can be classified under this category also. These are mostly either renters or non-tenured. Another group under this classification comprises the families who depend for jobs on land-based firms located on the shore. These families are mostly renters but may graduate into owner-occupiers over time. Table 6 summarizes the types of coastal zone residents.

Plate 6. Many families depend on the water directly for fishing and renting out boats for transport or pleasure trips.

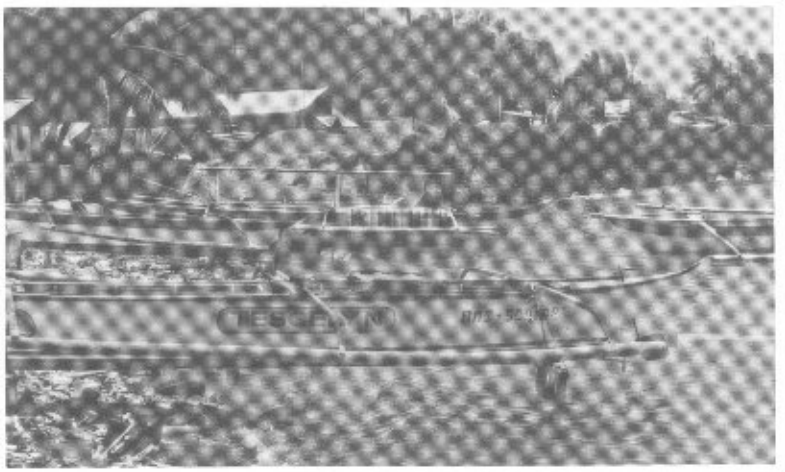


Plate 7. The Batangas Port provides jobs to hundreds of workers whose families find living along the coast most convenient.

Table 6. Batangas Bay Coastal Zone Residents by Tenure Type.

Residents by Motivation	Residents by Tenure Type		
	Tenured	Renters	Non-tenured
Coastal zone as living environment only			
• Families residing in coastal zone but whose livelihood is located elsewhere	X	X	
• Tribal groups whose traditional habitat is the coastal zone			X
Coastal zone as environment for living and working			
• Families directly dependent on the use of water for livelihood	X	X	X
• Families who depend on water-based activities		X	X
• Families that depend on employment in land-based activities located on the shore	X	X	

Source: Interviews with municipal officials.

FISHERIES IN THE BATANGAS BAY AREA

Two forms of fisheries still exist in the study area: brackishwater aquaculture and capture fisheries. Capture fisheries consist of the municipal and commercial subsectors.

Brackishwater aquaculture

Brackishwater fishponds are confined to the former mangrove swamps of Sta. Rita and Sta. Clara Aplaya in Batangas City, where milkfish and shrimps are cultured in small scale. However, pollution from industries and shipping is threatening the seawater supply of these fishponds. Also, plans for the expansion of the Batangas Port call for the conversion of remaining fishponds in Sta. Rita into sites of port-related structures and other non-agricultural activities (Plate 8).

Municipal fisheries

Due to the extension of the territorial limit of municipal waters to 15 km under R.A. 7160, the entire Batangas Bay has fallen under the jurisdiction of the five coastal LGUs and in terms of fisheries, the Bay waters can be reserved exclusively for municipal fisheries. The most popular fishing ground for municipal fisherfolk is near and around the Batangas Port, followed by the eastern coast of Mabini (Figure 6).

Figure 6. Existing Water Use Pattern of Batangas Bay.

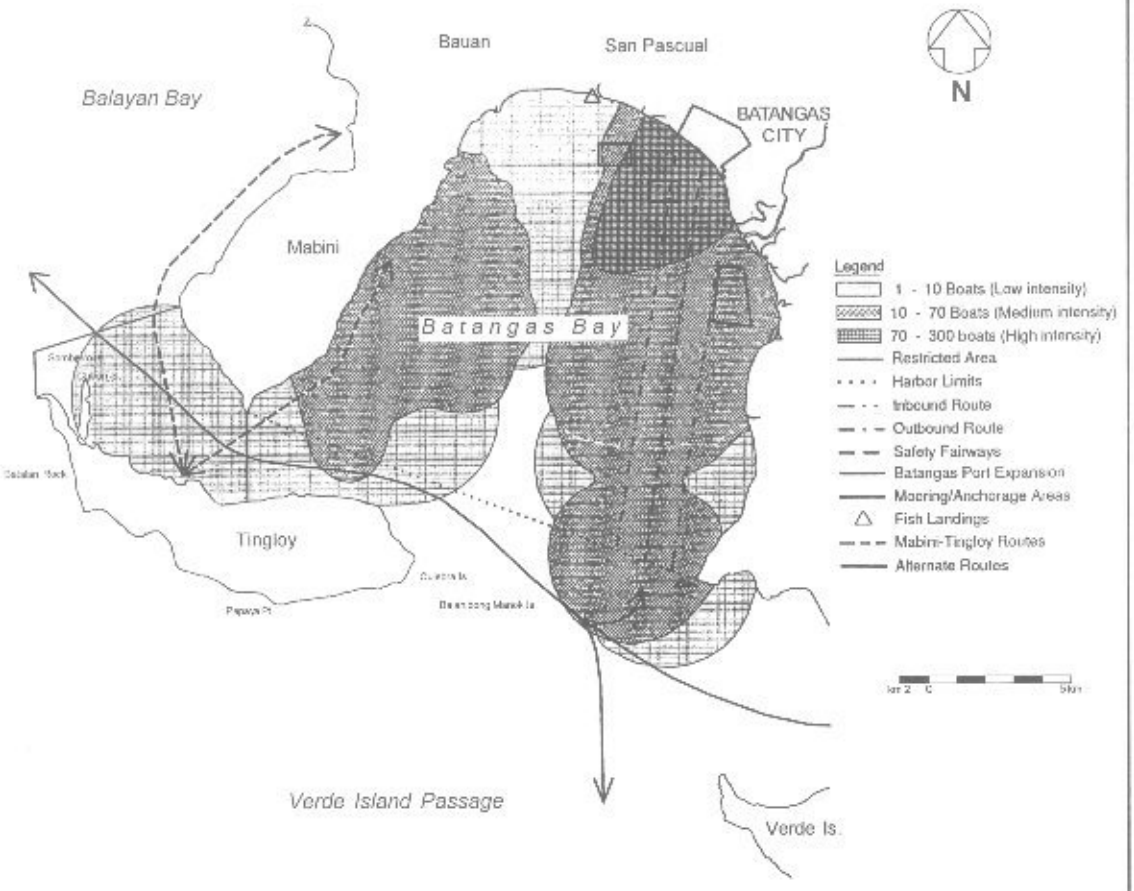


Plate 8. The remaining fishponds in Sta. Rita, Batangas City, will soon give way to the planned expansion of the port.

Commercial fishing

Commercial fishing of low frequency and intensity is reported to occur in the Bay. Most commercial fishers, however, operate in other fishing grounds outside Batangas Bay. The Philippine Fisheries Code of 1998 (RA 8550) allows commercial fishing within the outer 5 km of municipal waters (10.1 to 15 km) but in the case of Batangas Bay, the extent of municipal waters does not reach 10 km.

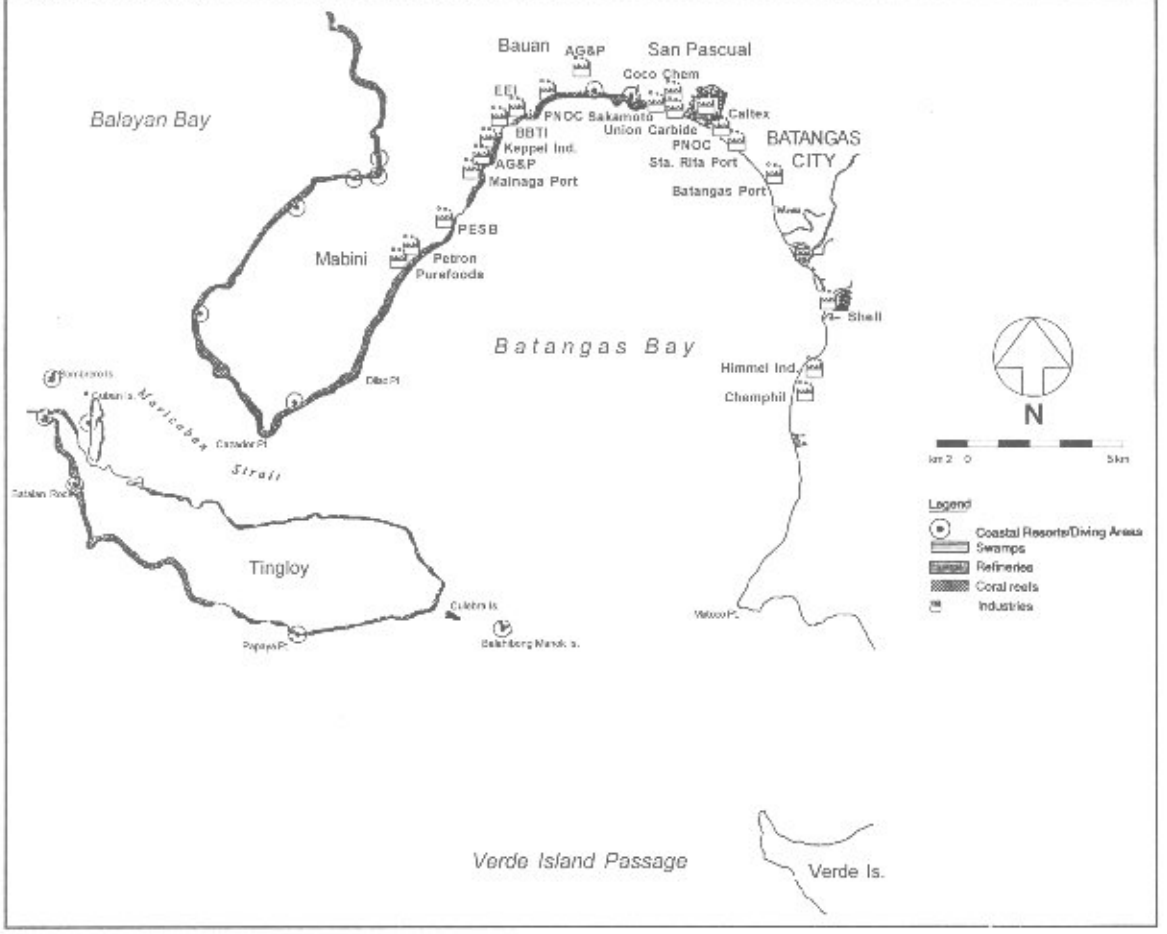
INDUSTRIAL ACTIVITIES ALONG THE BAY AREA

Heavy industries that include oil refineries, chemical manufacturing, shipyard and steel fabrication, power generating plants and petrochemical complexes, among others, are the more conspicuous users of the Bay. Most of the industries are concentrated in Bauan and Batangas City (Figure 7). Aside from their extensive facilities that claim a significant portion of the shoreline, some of these heavy industries maintain their own port or berthing facilities. They also use the Bay for mooring or anchorage.

One major industrial installation is the planned gas pipeline by Pilipinas Shell that will convey natural gas from Malampaya Sound in Palawan. It will have its first landfall in Tabangao, in the Shell Refinery Complex in Batangas City. The pipeline will enter Batangas Bay from the Verde Island Passage and will take an almost parallel alignment to the existing shipping lanes. It will cross the latter as it approaches the Tabangao landfall.

Not all industrial firms located on the coast, however, have anything to do with water. Nonetheless, it can be said that all firms located on the coast regard the Bay as the final receiver of their effluents. Many of these industrial firms treat their wastes properly before releasing them into the Bay. A system of self-regulation is now slowly being put in place through the instrumentality of a voluntary agreement among the stakeholders in the Bay, that

Figure 7. Major Industries in the Batangas Bay Area.



is, private industrial firms, national government agencies and the local governments concerned.

SHIPPING AND NAVIGATION

Batangas Bay is increasingly becoming an important handler of coastwise and international trade. With the ongoing expansion and modernization of the Batangas public port to become an international port, the volume of vessel traffic of both the domestic and the foreign has been rising steadily (Plate 7).

Potential conflicts are expected to arise from increased volumes of ship calls. The need for more berthing and anchorage space by both passenger and cargo vessels including those from the private industries will increase in the future. Shipping and navigation take up the largest operational area in the Bay. The Batangas Port, when completed, will have the widest water frontage and claim the most extensive foreshore land. This is not counting the private ports belonging to large industrial firms as well as municipal ports.

Since maritime activities are widespread and pervasive in Batangas Bay, it can be said that the entire Batangas Bay falls within the jurisdiction of the Philippine Coast Guard, the Philippine Ports Authority and MARINA. In fact, the harbor limit runs across the mouth of the Bay from Cazador Point in Mabini to Matoco Point in Batangas City. Maricaban Strait between Mabini and Tingloy is also designated as a restricted area for coastwise navigation. This alternate route is usually taken by vessels seeking shelter from the southwest monsoon winds.

Inside the Bay, the shipping lanes for inbound and outbound vessels are concentrated on the eastern side. Also, the existing anchorage areas are located close to the shore in Bauan, San Pascual and Batangas City. Vessels that are inbound or outbound through the Maricaban Strait, however, take a more direct route by cutting diagonally across the Bay. This significantly reduces the access to the Bay for other users. One other route is the Mabini-Tingloy ferry service across Maricaban Strait. During the northeast monsoon, the route shifts to the Balayan Bay side of Mabini and returns to the Batangas Bay side during the southwest monsoon (Figure 8).

TOURISM AND RECREATION

Another use of the Bay is for water-based tourism and recreation. Some beach resorts are found in Bauan and Batangas City. However, these establishments are slowly being supplanted by industrial establishments and also being affected by oil pollution, largely from shipping operations of private ports along the Bay.

The island municipality of Tingloy has potential advantage in tourism and recreation over the other coastal LGUs due to the absence of industries on the island. However, a major concern is about solid waste originating from the mainland coastal towns being washed ashore in Tingloy.

In the mainland, Mabini and Bauan are better placed than the other municipalities as far as tourism and recreation are concerned. Mabini has a relatively pollution-free shoreline starting from the southern tip of Pinamucan peninsula to the west in Balayan Bay. In fact, Mabini has reserved certain areas of its southern coastline as fish sanctuary (Plate 8). Bauan has coastal areas on both Batangas Bay and Balayan Bay. These two municipalities practice *de facto* zonation by locating industries in Batangas Bay and tourism-related activities in Balayan Bay (Figure 9).

The eastern coastline of the Bay within Batangas City is being appropriated by heavy industrial firms. The recreational use in that part of the Bay is now being diverted to the southern shoreline of Batangas City facing Verde Island along the Verde Island Passage in barangays Pagkilatan, Ilijan, Pulot and Dela Paz. However, several factors interfere with the recreational use of Verde Island Passage. One is the steep slope of the foreshore/intertidal zone which makes beach swimming dangerous. Another potential hazard to tourists is the effluent discharge from the increasing number of industries being established towards the municipality of Lobo. Thirdly, the Verde Island Passage is actively being utilized for vessel traffic. The wake of passing vessels can easily spoil the fun among tourists.

Among the coastal LGUs, there is no coastal tourism in San Pascual. Its short coastline located in Batangas Bay is entirely claimed by heavy industries. The municipality plans to extend its shoreline by reclamation ostensibly to accommodate more industries.

Figure 8. Shipping Lanes, Ports and Anchorages.

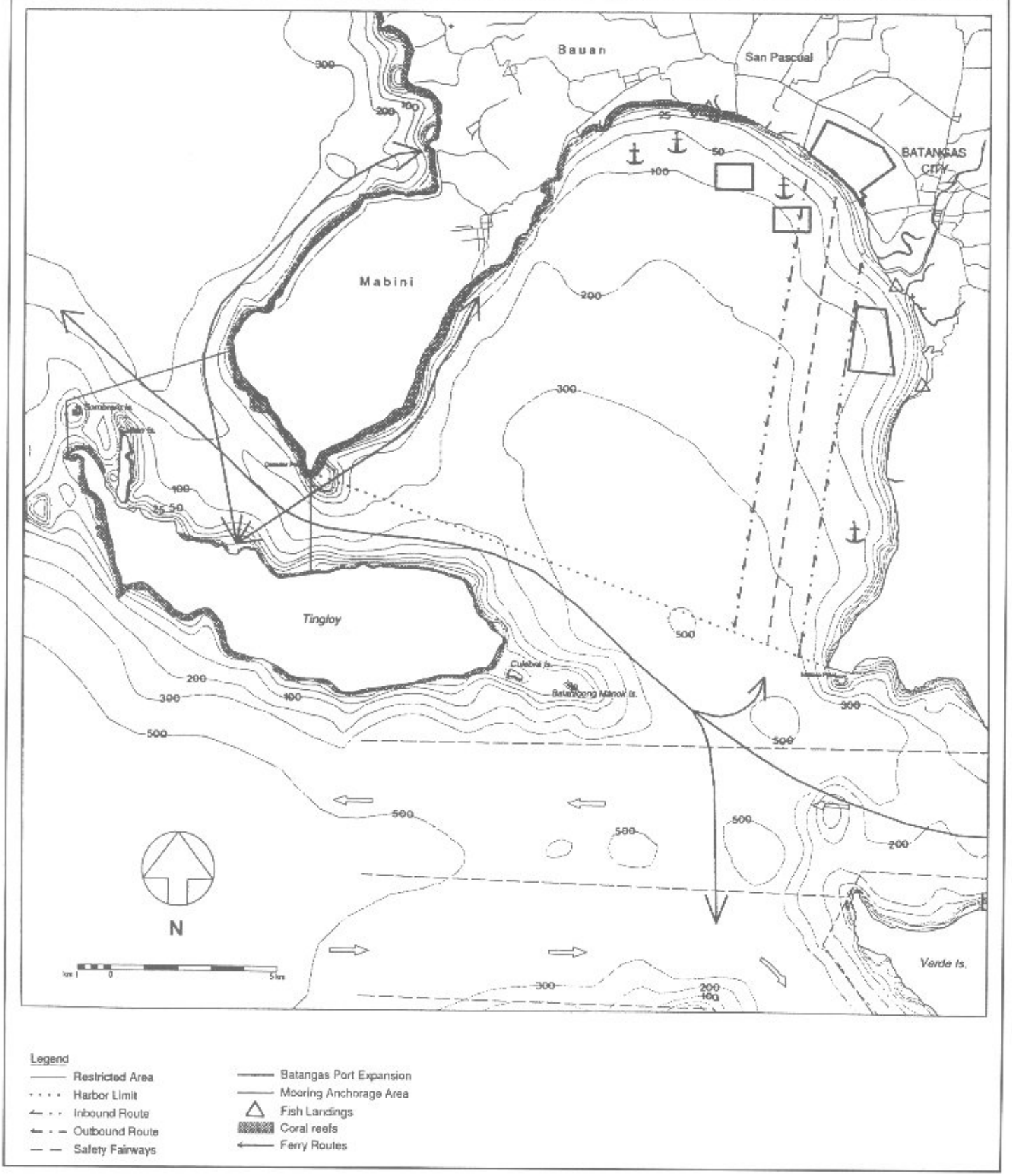
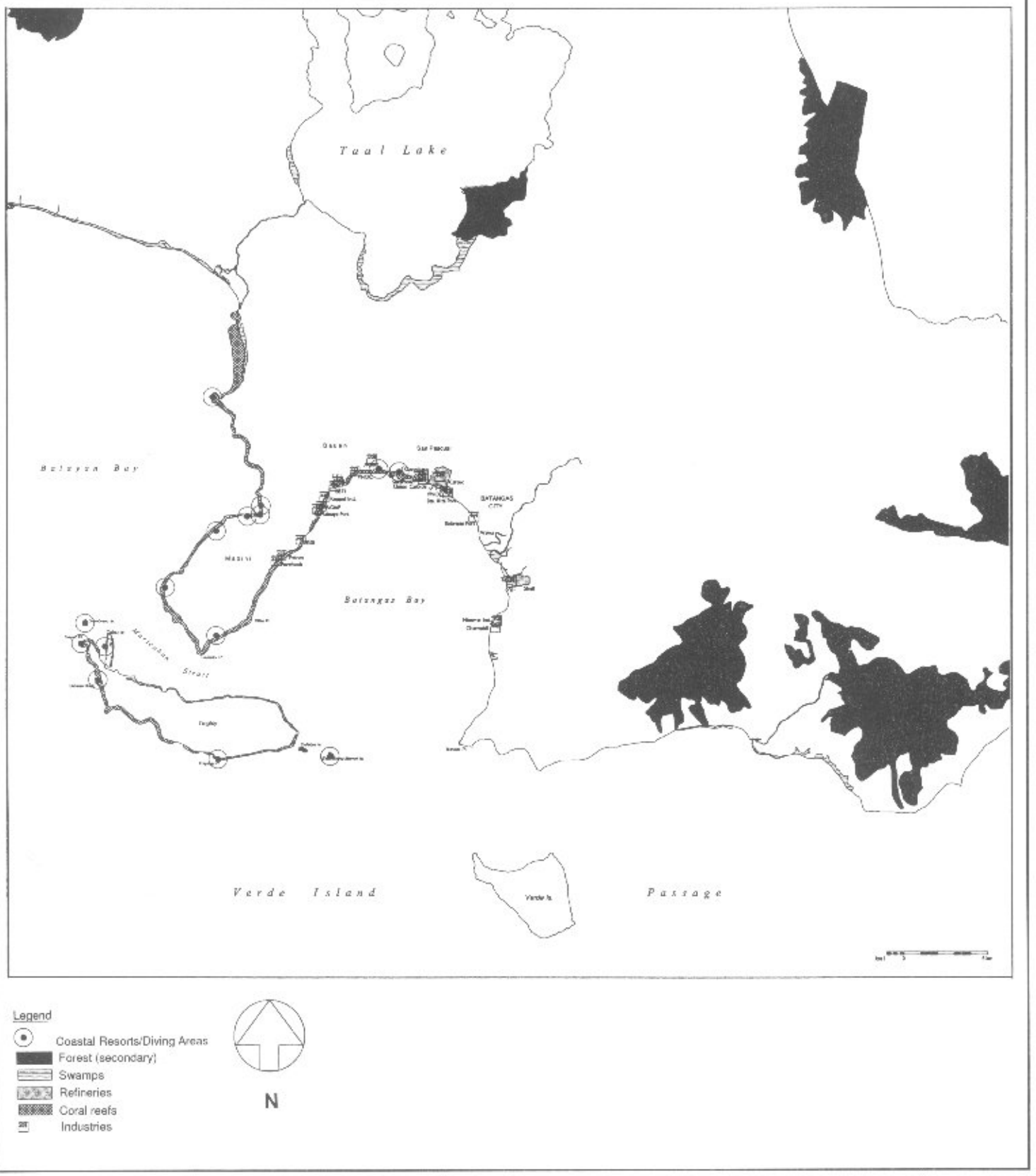


Figure 9. Secondary Forests and Selected Economic Sectors.



Public Access and Easement

Public access to the waterfront and foreshore areas is limited along Batangas Bay due to industrial occupation, port facilities and rugged geomorphology (e.g., cliff, very narrow beach/foreshore areas). In general, there is virtual loss of public access to the waterfront in Batangas Bay. None of the coastal LGUs has reserved any portion of its shoreline for public easement. Instead, all coastal areas are open for alienation to private firms which invariably fence off their property upon acquisition thereby excluding the rest of the population from getting access to the sea.

Chapter 3
Issues Related to Water Use in Batangas Bay

Issues related to water use in Batangas Bay can be clustered around three themes:

1. the implications of local territorial jurisdiction versus the operational jurisdiction of national government agencies over the Bay;
2. incompatibilities between and among the major uses of the Bay; and
3. linkages between land use and water use in the coastal zone.

The first cluster of issues emanates from the fact that Batangas Bay in its entirety is considered as "municipal waters" of the five coastal LGUs. At the same time, the Bay is the operational jurisdiction of national government agencies (NGAs) dealing with shipping and navigation and port management. The second cluster is derived by pairing off the five major uses of the Bay and determining areas of incompatibilities. The third set of issues deals with the disjointed or irrational use patterns of the coastal zone due to the apparent failure of concerned stakeholders to consider the reciprocal relationship between land use and water use and the area "where land meets water".

JURISDICTIONAL ISSUES

Delineation of municipal waters

The entire Batangas Bay can be regarded as "municipal waters" as defined in the Local Government Code (RA 7160). As such, the municipalities may exercise their authority, rights and priorities over the use of the territory within their jurisdiction. The law excludes from the authority of LGUs areas that are privately owned and those considered within national parks, public forests, timberlands, forest reserves or national fishery reserves. No such reservations apply to any part of Batangas Bay. Theoretically, therefore, each of the LGUs abutting on the Bay can claim a portion of the Bay as part of its municipal waters.

Within the territorial limits of each coastal LGU, the Sangguniang Bayan (municipal legislative body) or the Mayor can exercise the rights and powers devolved under RA 7160 and other issuances. These powers are catalogued in DENR/DILG/DA-BFAR/CRMP (1997) and shown in Table 7.

According to RA 7160; the actual geographical limit of each municipality's jurisdiction is defined as comprising:

"...marine waters included between two lines drawn perpendicularly to the general coastline from points where the boundary lines of the municipality or the city touch the sea at low tide and a third line parallel with the general coastline and fifteen (15) kilometers from it. Where two (2) municipalities are so situated on the opposite shores that there is less than fifteen (15) kilometers of marine waters between them, the third line shall be equally distant from opposite shores of the respective municipalities..." [Sec. 131 (r)].

In delineating the territorial limits of coastal LGUs in Batangas Bay, the median-line boundary formula devised by Pearcy (1959) was used. Pearcy's formula takes into account the peculiarities of a concave coastline where coastal localities are adjacent to each other and/or are situated on opposite shores. The resulting delineation is shown in Figure 10. It is apparent that the surface area of the territorial jurisdiction of each municipality is more or less proportional to its shoreline. Thus, the smallest share goes to San Pascual and the biggest portions are allocated to Batangas City, Mabini and Tingloy. The share of Bauan is limited due to the concave configuration of its shoreline.

Reservation as harbor limit

Although the Batangas Bay is considered municipal waters under the Local Government Code, there are claimants other than LGUs which can restrict the devolved powers and functions of the coastal LGUs even within their territorial jurisdiction. Based on use pattern, a significant portion of the municipal waters of Bauan, San Pascual and Batangas City are appropriated by shipping (sea lanes) and ship operation (ports, anchorage, berthing facilities). Only the municipal waters of Mabini and Tingloy are relatively free from permanent use claimants.

Table 7. Relevant Functions Devolved to Local Governments.

	Devolved Functions	Enabling Laws
	1. FISHERIES	
1.1	Grant fishery privileges to erect fish corrals, oysters, mussel or other aquatic beds or bangus fry areas within a definite zone of municipal waters.	LGC sec. 149 (b) (1)
1.2	Grant privileges to gather, take or catch bangus fry, prawn fry or kawag-kawag or fry of other species from municipal waters to marginal fishermen free of charge.	LGC sec. 149 (b) (2)
1.3	Issue licenses for operation of fishing vessels 3 gross tons (GT) or less.	LGC sec. 149 (b) (3)
1.4	Penalize use of explosives, noxious or poisonous substances, electricity, muro-ami and other deleterious methods of fishing; enforce fishery laws in municipal waters.	LGC sec. 149 (b), sec 17 (b) (2) (1)
1.5	Prosecute any violation of the provisions of applicable fishery laws.	LGC sec. 149 (b)
1.6	Enact ordinances for the protection of the marine environment and impose appropriate penalties for actions which endanger the environment such as dynamite fishing and other activities which result in ecological imbalance.	LGC sec. 447 (a) (1) (vi)
1.7	Approve measures and adopt quarantine regulations to prevent the spread of diseases.	LGC sec. 447 (a) (5) (xii)
1.8	Disperse fingerlings and other seeding materials for aquaculture.	LGC sec. 17 (20) (i)
1.9	Issue permits to construct fish cages, gather aquarium fishes, gather kapis shells, gather/culture shelled molluscs, issue licenses to establish seaweed farms, establish cultured pearl farms, issue auxiliary invoice to transport fish; establish closed seasons.	DA-DILG MOA dated April 1994
1.10	Amicably settle boundary disputes between 2 or more municipalities within the same province or involving municipalities or component cities of different provinces.	
	2. FORESTRY	
2.1	Ensure conservation of mangroves.	LGC sec. 447 (a) (1) (vi)
2.2	Protect the environment and impose appropriate penalties for acts which endanger the environment such as illegal logging and smuggling of logs, smuggling of natural resources products and endangered species of flora and fauna, slash-and-burn farming and such other activities which result in pollution, acceleration of eutrophication of rivers and lakes or of ecological imbalance.	LGC sec. 118
2.3	Provide for the settlement, maintenance, protection and conservation of communal forests (with an area not exceeding 50 km^2) and watersheds, tree parks, greenbelts, mangroves and implementation of other similar forest development projects, including: Integrated Social Forestry Projects, new regular reforestation projects, completed family and community forestry projects subject to DENR guidelines.	LGC sec. 17 (2) (ii)
2.4	Enforce forestry laws in community-based forestry areas (province/city).	LGC sec. 17 (b) (2); sec.447 (a) (5) (i); DAO 30, s1992

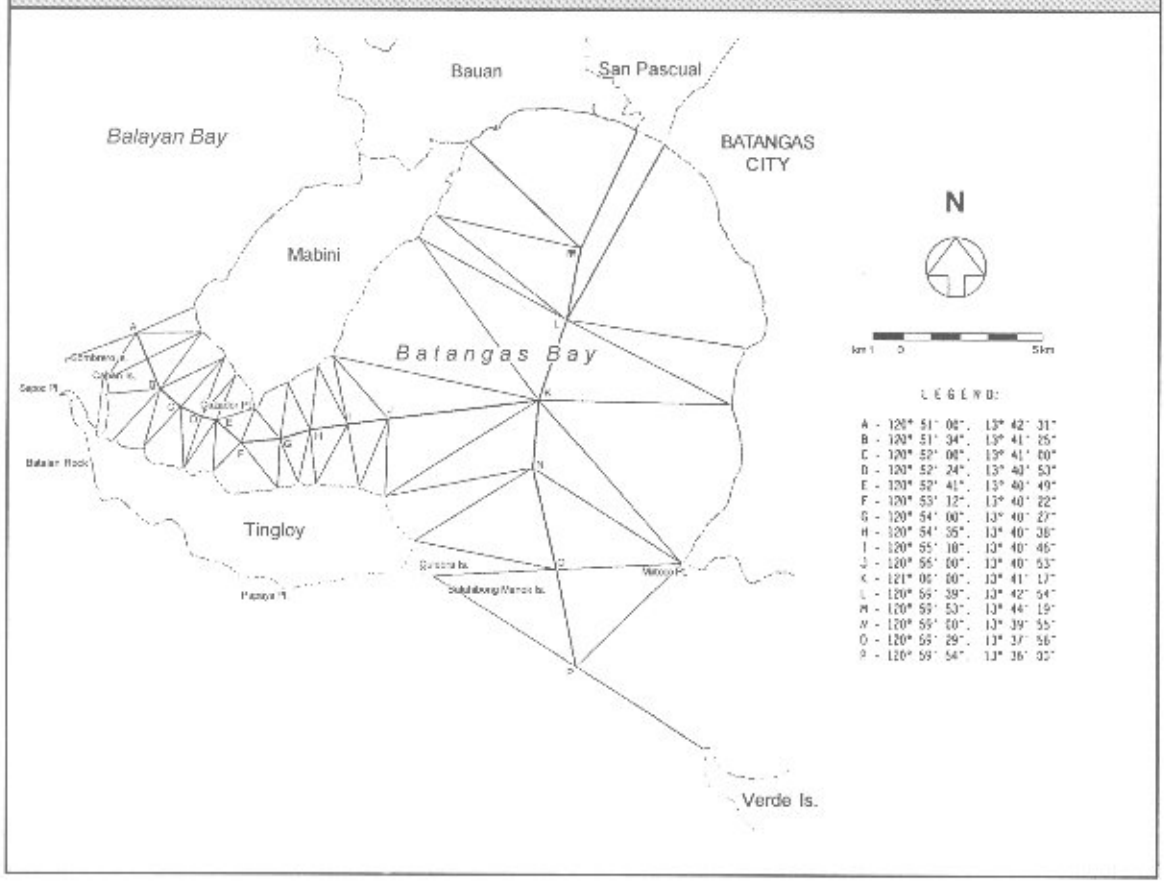
	3. MINING	
3.1	Issue permit and collect fees for guano collection and to extract sand, gravel and other quarry resources (provincial governor).	DAO 30, s1992; LGC sec.138
3.2	Verify and adjudicate conflicts over guano collection and sand, gravel and other quarry resources (province/city)	LGC sec. 17 (b) (3) (iii); DAO 30, s1992
	4. LAND USE	
4.1	Adopt a comprehensive land use plan; reclassify land with jurisdiction of municipality; enact integrated zoning ordinances in consonance with approved comprehensive land use plan; conduct cadastral, special and isolated surveys.	LGC sec. 447 (a) (2) (vii-ix); DAO 30, s1992
4.2	Regulate activities relative to the use of land, buildings and structures within the municipality in order to promote the general welfare.	LGC sec. 447 (a)(4)
	5. ENVIRONMENT	
5.1	Implement solid waste disposal system or environmental management system, and services or facilities related to general hygiene and sanitation.	LGC sec. 17 (2) (vi); DAO 30, s1992
5.2	Enforce laws and regulations related to pollution control and protection of the environment (barangay).	LGC sec. 389 (b) (8)
5.3	Adopt measures and safeguards against pollution and for the preservation of the natural ecosystem in the province, in consonance with approved standards on human settlements and environmental sanitation.	LGC sec. 468 (a) (4) (i)
5.4	Issue Environmental Clearance Certificate (ECC) for projects and businesses under Kalakalan 20.	DAO 30, s1992
5.5	Adjudicate cases involving complaints against businesses under the Kalakalan 20.	DAO 30, s1992
5.6	Implement cease-and-desist orders issued by the Pollution Adjudication Board.	DAO 30, s1992
5.7	Approve ordinances and pass resolutions that will protect the environment and impose appropriate penalties for acts which endanger the environment, ...and such other activities which result in pollution, acceleration of eutrophication of rivers and lakes or ecological imbalance.	LGC sec. 447 (a) (I) (vi); sec. 458 (I) (vi); sec. 468 (a) (I) (vi)

For navigation and other maritime concerns, the entire Bay is virtually within the harbor limit defined by an imaginary straight line from Cazador Point in Mabini to Matoco Point in Batangas City and is the operational area of the Philippine Coast Guard (PCG) and the Philippine Ports Authority (PPA), both national government agencies (Figures 6 and 8). The designation of the entire bay as "harbor limit" grants the PCG, the PPA and the MARINA prior and superior right over the use of Bay waters. In summary, Batangas Bay can be claimed by coastal LGUs as their municipal waters and yet, is effectively reserved by the NGAs as their operational jurisdiction.

INCOMPATIBILITIES IN WATER USES

Sandwiched between the national and local level claimants are the various private and public activities vying for the right or privilege to use the Bay waters. These uses, when paired off, will themselves exhibit actual or potential conflicts or at least some degree of incompatibility. These activities will also at times become in conflict with the territorial rights of the coastal LGUs and the operational areas of the NGAs. Conversely, the rights of LGUs could pose a constraint or a threat to the continued undertaking of the major activities, namely, shipping and navigation, fisheries, tourism and recreation, industries and human settlements (Figure 11).

Figure 10. Territorial Limits of Coastal Municipalities by the Pearcy Formula.



Issues related to shipping and navigation

The upgrading of the Batangas Port into an international port will increase the volume of traffic, particularly for foreign vessels. There will be a need for more berthing and mooring space close to the shore as well as more efficient traffic control of navigational lanes.

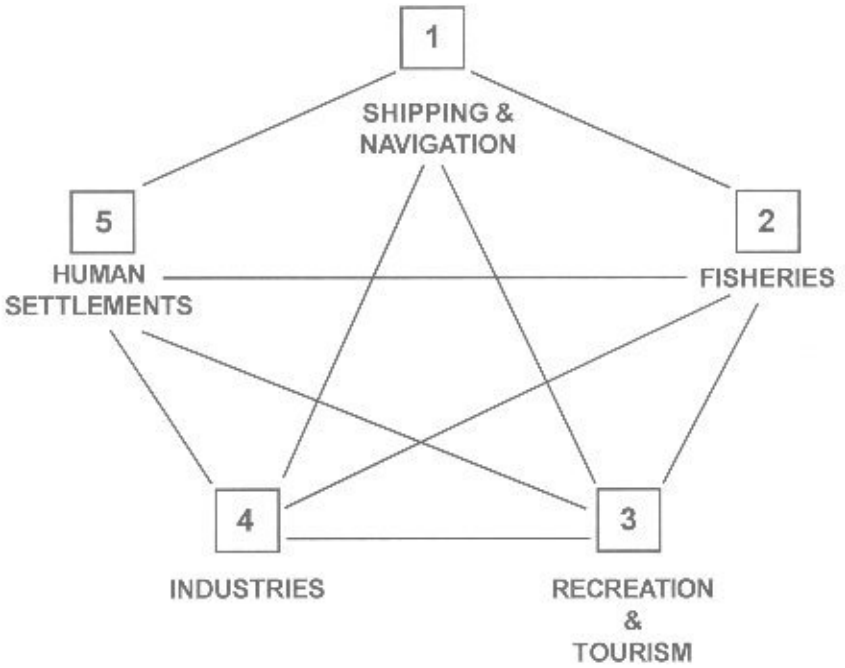
The Philippine Ports Authority in Batangas has adopted a *de facto* vessel traffic separation scheme (VTSS) for inbound and outbound vessels in Batangas Bay. Maritime traffic is being enforced by the Philippine Coast Guard while a more comprehensive VTSS is currently under study. For anchorage needs, there are four areas that are actually used for mooring, two in Bauan, one in San Pascual and one in barangay Pinamucan, Batangas City (Figure 8).

The problem with shipping and its associated activities like port facilities is that it pre-empts the use of space to the exclusion of other uses. Active navigational lanes are generally unsafe for fishing, water-based recreation and tourism not only for the physical disturbance created by passing vessels but also for the risks of indiscriminately disposed shipping wastes, oil spills and collision. However, the most intensively fished areas are near and around the Batangas Port and along the shipping lanes which are considered unsafe for fishing (see Figure 6). Possibly, the presence of port structures (wharf) serve as fish aggregating devices attracting fishes to these areas as well as the water may be nutrient-rich due to waste discharge associated with activities around the port area.

On the other hand, no less than 20 other ports, mostly owned by large private industrial firms are located along the Bay. How private shipping affects general shipping in terms of traffic management and anchorage has not been studied systematically. Moreover, it is not known what authority do LGUs have over the private ports and whether they are exempt from the authority of LGUs [Sec. 131(r), LGC].

Another potential incompatibility between shipping and industries is the chosen alignment of

Figure 11. Issues Related to Water Use of Batangas Bay.



BETWEEN ACTIVITY	CONFLICTS/ISSUES
1&2	Active navigational lane unsafe for fishing Shipping waste degrades fishing grounds
1&3	Shipping lanes unsafe for recreation Shipping waste degrades water quality in recreation/tourism areas
1&4	Some industrial firms own and operate private ports and wharves Easement of gas pipeline might conflict with shipping lanes
1&5	Port facilities attract human settlements that usually turn into slums Port expansion displaces coastal residents
2&3	Some fishing methods/gears interfere with recreational activities, e.g., spear fishing and diving
2&4	Industrial waste degrades fishing grounds Fishponds give way to port expansion
2&5	Fisherfolk need to live along the coast but they are often displaced Municipal solid and liquid wastes degrade fishing grounds
3&4	Industrial waste degrades recreational areas Recreational areas give way to location of industries
3&5	Tourist resorts impede public access to waterfront Urban and agricultural wastes degrade recreational areas
4&5	Presence of industries attracts more people to reside along the coast Industries pre-empting coastal areas at the expense of residential uses Continuous mass of industrial frontage prevents public access to the waterfront

the gas pipeline. The longer the pipeline section that crosses the shipping lane the more vulnerable it is to accidents such as due to emergency anchor drops.

Sustainability of municipal fisheries

Brackishwater aquaculture in Batangas City will eventually disappear with the expansion plans of the Batangas Port and further urbanization of the coastal areas. Likewise, the municipal fisheries are being threatened by conflict with other Bay users and from marine pollution by discharge of industrial effluents, shipping and domestic waste. Preliminary findings by Jacinto (1997) showed that coliform, oil and grease are significant pollutants of the Bay. Also, pesticides from agricultural activities inland have been detected near the mouth of Calumpang River (Calamari and Delos Reyes, 1997). Compounding the pollution problem is the fact that this particular part of the Bay has limited flushing potential.

Given the above situation, some local officials predict that municipal fisheries will eventually disappear. Others, however, believe that fishing in the Bay will go on as it remains the most available and accessible safety net for the unskilled job-seekers and laid off workers. Obviously, the sustainability of fishing in Batangas Bay will hinge on the ability of different stakeholders to resolve use conflicts and the management of pollution as well as the regulation of fishing and other activities.

Resorts and water-based recreation

The physical configuration of the Bay, i.e., very steep coastlines and the absence of extensive beaches, have curtailed the growth of coastal tourism. Rising pollution levels have also discouraged any form of contact recreation (Figures 12 and 13). Some local officials have expressed the view that tourism and recreation shall no longer be allowed in Batangas Bay and instead diverted to Balayan Bay. At present, the Provincial Tourism Office does not have any significant promotional programs or development projects in Batangas Bay. This puts San Pascual at a singular disadvantage because its territory does not extend to the Balayan Bay coastline. Batangas City has relatively unspoiled beaches on its southern shores towards Matoco Point and along Verde Island Passage but these are also under increasing stress by industrial development. On the other hand, Tingloy is uniquely in an advantageous position due to the absence of industries and the existence of relatively unspoiled beach and coral resources. However, the lack of tourism infrastructure puts Tingloy at a disadvantage compared to Mabini and Bauan so that local residents are not earning enough from this sector. Another issue affecting the tourism sector is the diminishing number of resorts/recreational areas as these are being sold to industrial investors. This is also true for some seafront residential properties along the Bay. Proper zoning and its enforcement as well as the provision of public easement along the Bay's shore are measures that will enhance public access to the Bay waters. It will also discourage land conversion of the waterfront.

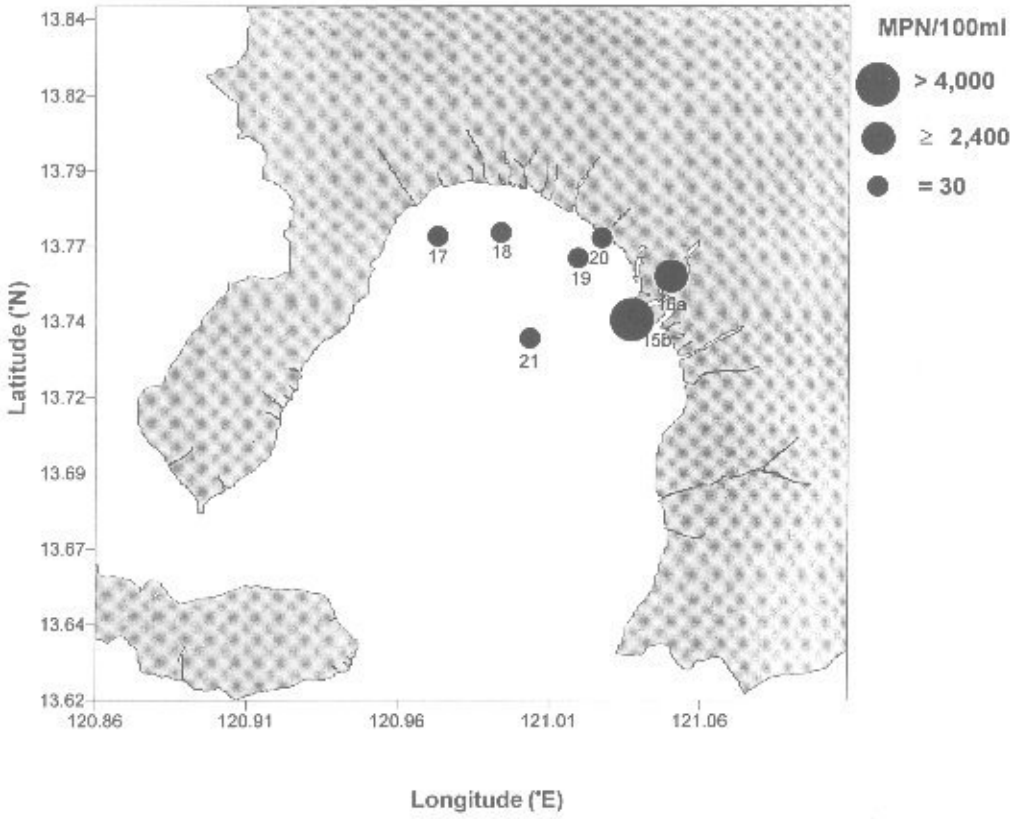
There is a growing demand in pleasure boating, sport fishing, surfing, water skiing and yachting. These recreational activities require less human contact with water and hence, can be accommodated in Batangas Bay. However, these recreational activities are normally associated with foreign and affluent tourists. Promoting these types of water-based recreation could create conflict with marginalized coastal residents, especially those who depend on the Bay waters for their livelihood. It is, therefore, necessary to have a job entry program for local residents should these activities be established.

LAND USE AND WATER USE LINKAGES

Coastal settlements issues

Of the different categories of families residing in the coastal zone, those who depend directly on the sea and on water-based activities for their livelihood, as well as those who use it as their traditional habitat, have the most compelling reason to live there regardless of their tenure status. The open access to fishing, availability of low-skilled jobs in the public port and the promise of high-skilled jobs in the private industrial firms are what attract these families to locate in the coastal zone. And yet, it is these families, especially marginal fisherfolk and dock workers, who are usually eased out, displaced and relocated to give way for industrial development/expansion, public works and other forms of urban development. On the other hand, many coastal communities are unable to have proper dwellings and sanitary facilities resulting in indiscriminate discharge of waste into the Bay contributing to the degradation of the Bay's waters.

Figure 12. Concentration of Coliform Measured from Several Sampling Stations in Batangas Bay.



Source: Jacinto (1997). Samples taken 4-6 June 1997

Urban waterfront and public easement

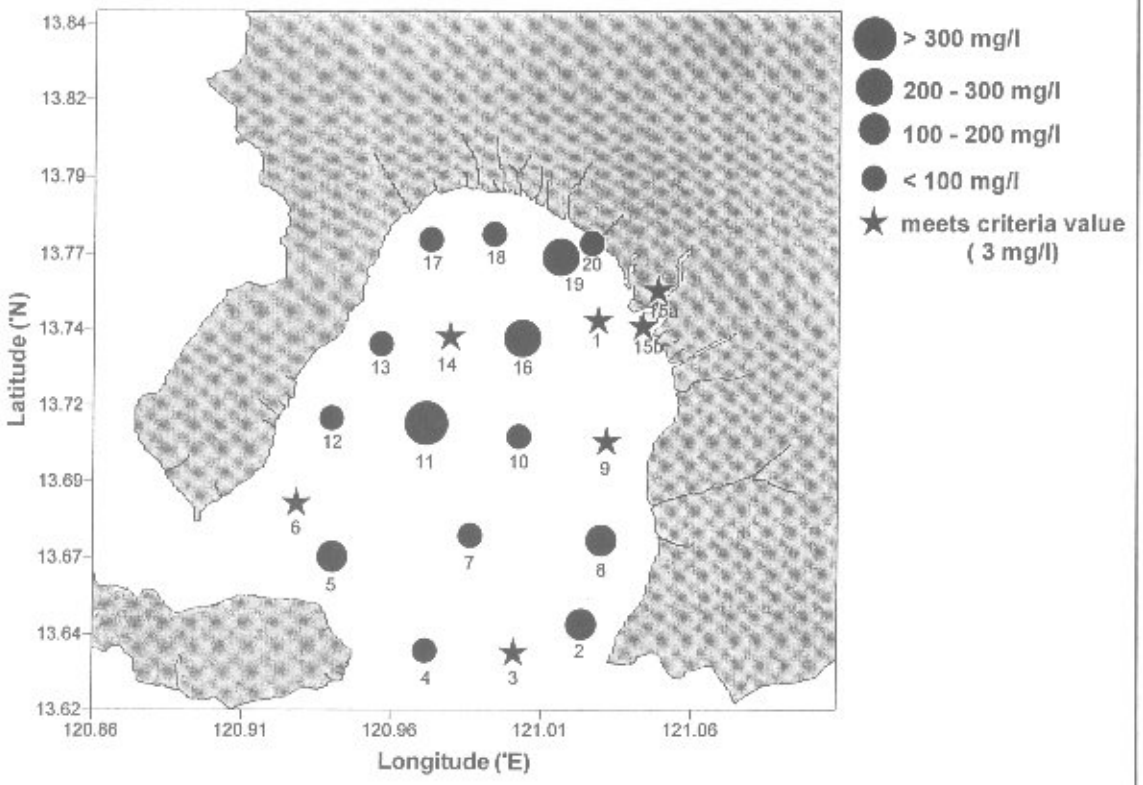
All the LGUs around Batangas Bay are oriented landward. By locating their town centers inland rather than on the waterfront, coastal municipalities deprive themselves of the visual amenities of the Bay. None of the LGUs has reserved or recovered certain portions of its shoreline for public easement. If the municipalities continue to allow their shorelines to be completely alienated to private owners, the rest of their townspeople will be deprived of access to the sea. This situation is now being experienced by San Pascual. The rest of the coastal municipalities may well be fast approaching the same predicament.

Coastal zone industries

The preponderance of heavy industries has had a number of significant effects on the environmental quality and water use pattern of Batangas Bay. Industries not only generate substantial revenues for the municipalities but also attract more and more people to reside along the coast due to real and perceived livelihood opportunities. Such agglomeration of people and disparate activities invariably results in the generation of domestic and industrial waste that contributes to the degradation of the Bay's waters. Although some industries regulate their own waste disposal through voluntary agreement with the Department of Environment and Natural Resources (DENR) and the municipal government, not all firms have joined the system.

Another related issue is the bias of local officials in favor of industrial development in their own territory as a means to increase their municipal revenues. Generally, they would welcome any prospective firms and assign them to any available area along the Batangas Bay shoreline following the *de facto* zonation in practice. In the competition for waterfront locations, industrial firms usually win over other prospective users. The land use effect of

Figure 13. Surface Concentration of Oil and Grease at Various Sampling Stations in Batangas Bay.



Source: Jacinto (1997). Samples taken 4-6 June 1997

continuous massing of industrial frontage is the closing off of the waterfronts from public access. In the land use plans of coastal LGUs, the industrial zone is generally located along the coast. Unless these plans will be revised to accommodate public easement and/or access to the shores of Batangas Bay, the coastline will become private property.

Potential concerns

Another technically challenging issue is how to delineate buffers and easements around a location or along linear features of the sea bed which might become focal points of activity in the future. An example is the proposed gas pipeline from Malampaya in Palawan which will make a landfall at the Tabangao Shell complex. Another is the possibility that Batangas Bay may be harboring archaeological artifacts which might justify refloating or salvage operations in the future. A third possibility is the presence of significant mineral reserves underneath the sea bed which could be extracted in the national interest. Finally, the bathymetry and configuration of the Bay may justify undersea disposal of urban sewage, similar to the present practice in Manila Bay. Should these possibilities become real, necessary or inevitable, there would be anticipatory policies that will address these issues.

Chapter 4
Policy Framework, Options and Approaches

POLICY FRAMEWORK

To deal with the issues discussed in Chapter 3, a policy framework is needed to rationalize present activities and guide the future actions of the different users of Batangas Bay. It should also consider the various levels of government and their respective regulatory powers and developmental responsibilities over certain aspects of the Bay as embodied in existing laws, administrative issuances, development plans and similar documents. Some policies can be inferred from the statements and views of responsible public officials and formulated at the national/regional and local levels.

National/regional level

Batangas Bay has traditionally served a regional function as an important seaport for the CALABARZON[1] and the islands of Mindoro, Romblon and northern Palawan. It is the second biggest port in Luzon next to Metro Manila. The presence of a deep harbor, capable of accommodating not only inter-island vessels but also deep-draft super tankers, has attracted oil refineries and heavy industries to locate in the Bay. To date, Batangas Bay has probably among the highest concentration of heavy industries in any water body in the country. Moreover, almost every major industrial firm has been able to build its own port or wharf. Aside from the Port of Batangas, there are 22 other ports ringing the Bay coastline from barangay Bulacan, Mabini on the western shore to barangay Simlong, Batangas City in the east (Table 8).

The natural advantage of a deep harbor has not been lost to national and regional planners. In fact, all regional development plans for Southern Tagalog prepared during the last 20 years have recognized the strategic importance of the Batangas Port as a catalyst to spur development of the region. The current upgrading of the port to international standards is probably the most significant public sector investment under the CALABARZON Master Plan. When completed, the Port of Batangas will serve as an alternate to the Port of Manila attracting more industrial investments in and around the Bay.

As far as national and regional planners and decision-makers are concerned, the industrialization of the Southern Tagalog Region will be largely mediated by Batangas Bay. The primacy of shipping and navigation in the Bay waters and of industrial development along the Bay coastline, therefore, should be taken into consideration when determining land and water use policies for the Bay.

Provincial/municipal level

At the provincial and municipal levels, there are no explicit policies regarding the role of Batangas Bay. From the standpoint of some provincial and municipal government officials, the two dominant uses of Batangas Bay are shipping and industrial activity as the Bay is being appropriated almost entirely by shipping and port-related activities with its shore dominated by industrial use.

Batangas province has numerous water bodies aside from Batangas Bay such as Balayan Bay, Nasugbu Bay, coves and embayments, especially along the western coast facing South China Sea. These water bodies have been receiving investments in tourism-related facilities and high-end residential developments. Unwittingly, the province practices *de facto* water zonation by directing industrial investments to Batangas Bay and diverting tourism-related investments to the other water bodies.

The idea of assigning specialized functions to the different water bodies according to their respective natural advantages makes sound economic sense. But it is hardly defensible in social and environmental terms. In social terms, the increasing population in the Batangas Bay area due to the opportunities provided by industrial and urban development proliferation require greater investments in providing better living conditions and social order. These include not only improved housing quality but also more efficient urban transport, opportunities for public recreation and the security net of direct access to the sea for fishing, recreation and the like. In environmental terms, the influx of industrial plants and migrant workers in the Bay area and the growing volume of vessel traffic resulting from the upgrading

[1] *CALABARZON is a subset of the Southern Tagalog Region covering five provinces fringing Metropolitan Manila, viz. Cavite, Laguna, Batangas, Rizal and Quezon.*

Table 8. Government and Private Ports, Batangas Bay.	
Name of Port	Location
I. GOVERNMENT PORTS	
1. Port of Batangas	Sta. Clara, Batangas City
2. Port of Bauan	Aplaya, Bauan
3. Port of Mainaga	Mainaga, Mabini
4. First Gas	Sta. Rita Aplaya, Batangas City
II. PRIVATE PORTS	
1. J.G. Summit	Simlong, Batangas City
2. Himmel Industries Inc.	Tabangao, Batangas City
3. LMG-Chemphil	Pinamucan, Batangas City
4. Pacific Flour Mills	Tabangao, Batangas City
5. General Milling Corp.	Tabangao, Batangas City
6. Pilipinas Shell	Tabangao, Batangas City
7. Caltex Philippines	Poblacion, San Pascual
8. PNOC Shipping Transport Corp.	Sta. Rita, Batangas City
9. Unichem/Cocochem	Aplaya, Bauan
10. A.G.& P. Marine Fabrication	San Roque, Bauan
11. A.G.& P. Cable and Wireless	San Roque, Bauan
12. KEPPHIL Shipyard	Bolo, Bauan
13. PNOC Coal Corp.	Bolo, Bauan
14. KEPPEL Shipyard	Bolo, Bauan
15. Batangas Bay Terminal Inc.	Aplaya, Bauan
16. Engineering Equipment Inc.	Sta. Maria, Bauan
17. A.G.& P. Creosote Treatment Plant	Sta. Maria, Bauan
18. PNOC Energy Base	Mainaga, Mabini
19. Purefoods Inc.	Bulacan, Mabini

Source: PPA PMO-Batangas.

of the port, potentially accelerate the deterioration of the bay's environmental quality, being the ultimate receiver of domestic, industrial and shipping wastes.

The challenge that provincial planners and decision-makers face in relation to the Batangas Bay is to maintain the multiple use of the Bay within the context of sustainable development. The key to resolving the problem is restoring and maintaining the quality of the Bay water based on use criteria to a level suitable for contact recreation as the base water quality standard, that is, Class SB [Recreational Water Class 1, DENR DAO 35 (Revised 1996)]. By considering the minimum criteria on seawater use at Class SB based on the most restricted user, other users have to comply with such criteria for their effluent discharges (in this case, ships and industries including residential areas). This would, however, entail additional cost for any technological intervention required. Nevertheless, policy- and decision-makers must take a decisive stand on the issue of further industrialization and urbanization of the Batangas Bay Region, re-evaluate the proposal in the current "Provincial Physical Framework Plan" to put the remaining underdeveloped areas on the eastern part of the Bay in Batangas City to industrial use. On the other hand, there is also the plan of the municipality of Mabini to extend its industrial zone through the coast facing Batangas Bay. Towards this end, the marine pollution abatement and management programs being put in place by the Batangas Bay Demonstration Project are a major contribution to the sustainable development of Batangas Bay.

Is there a need for more industries along the Bay? With the eventual modernization of the Port of Batangas, it may be both impractical and unnecessary for new industries to justify the need to build their own private ports. All but the most specialized types of cargo can be adequately handled by the Batangas Port. What is needed is to build a network of roads with adequate capacity to handle cargo traffic from the port to any production area in

the hinterlands. The social justification of providing more industrial jobs to the local population may no longer be valid as any new jobs created will probably go to prospective in-migrants rather than the local residents who are in all likelihood already gainfully employed or do not have the necessary skills for the new jobs. While significant revenues can be earned by local governments from establishing industries in their areas, these could be dampened by so many incentives offered by the national government under the increasingly fashionable program of "Special Economic Zones". Further, the prospect of higher pollution load with increasing industrial and population density within the Bay watershed is in itself sufficient justification for rethinking the province's industrial location policy.

The arguments for multiple use accommodation in Batangas Bay as against making it serve exclusively shipping and industrial functions are not hard to find. However, the prerequisite of multiple use is the maintenance of the quality of the Bay water that is able to sustain the various users' requirements. Therefore, the city/municipal level of policy-making plays a crucial role in that it is at this level where land use policies are formulated and enforced.

City/municipal level

Local government units act as partners of the national government in the management of natural resources and maintenance of ecological balance within their territorial jurisdiction [RA 7160, Sec. 3(i)]. They exercise this responsibility through a series of devolved functions such as those listed in Table 7. For the Batangas Bay, it is within the territorial jurisdiction of Bauan, Batangas City, Mabini, San Pascual and Tingloy (Figure 10). Hence, these LGUs can exercise their devolved functions such as the grant of privilege to engage in fisheries and related activities, enforce environmental laws and undertake developmental activities such as research and development, dispersal of fish fry for seeding to municipal fisherfolk and fishing cooperatives.

With respect to fisheries, the LGUs can exercise their territorial use rights for this resource in areas not designated by the PPA and PCG as sea lanes and ship port operating areas. Although fisheries is not a high revenue earner compared to industrial and shipping activities, the socioeconomic contribution, especially to the marginal constituencies of the five coastal LGUs is significant. It is thus important that the provincial and municipal governments through the Batangas Bay Council for Integrated Coastal Management (BBCICM)[1] provide the legal and institutional mechanisms to sustain and manage the fisheries sector that includes maintaining the water quality standard of Batangas Bay at Class SB. As well, the municipalities can play an important role in the long-term maintenance of the quality of the marine environment by carefully selecting industries that they will allow to locate in their territories. Above all, it is the unique responsibility of the coastal LGUs to plan human settlements and provide for adequate services to improve the quality of life of their respective constituents which in turn can have a positive effect on the water quality of Batangas Bay.

URBAN WATERFRONT PLANNING PRINCIPLES

The following principles of waterfront planning for urban areas, quoted from Wisconsin (1966) may find some use among the coastal LGUs in their future land use planning.

- Discourage urban uses of the waterfront which are not directly or indirectly dependent on the marine environment for their operations and their activities.
- As far as possible, public use should be given priority over private ones for the foreshore lands and even the private activities must be functionally related to the sea.
- Relieve the continuous mass of industrial frontage with visual breaks facing the sea.
- Achieve a proper balance between economic, recreational and visual requirements. Avoid closed subdivision patterns along waterfronts.
- Safeguard residential development from natural disasters by limiting construction of new buildings to safe distance above the high water mark.
- Safeguard permanent public access to waterfront and beach areas by preserving existing access points and creating new ones if necessary.
- Utilize good civic design principles to take advantage of the amenities of the waterfront.
- Provide adequate waterfront parks and beaches for public recreation including facilities for monitoring water quality and maintenance of cleanliness.

[1] *The BBCICM is originally named Batangas Bay Region Environmental Protection Council created under Provincial Ordinance No. 001, s. 1996.*

Specific policy options and strategies are further discussed below.

POLICY OPTIONS

Pursuant to and guided by the multi-level policy framework presented in the preceding part of this chapter, policy options and strategies dealing with the five major users of the Bay are explored in this section. These strategies will guide the formulation of the water use zonation scheme described in Chapter 5. Practical suggestions are likewise given for the benefit of coastal LGUs intending to improve the approaches to and content of land use planning especially in the coastal zone.

On shipping and navigation

Obviously, this is the most important use of the Bay, especially from the point of view of the national economy. As such, it should be given priority of use both in time and space. The shipping and navigation function, however, could come in conflict with locally based claims for water use. In this case, the local claims should give way to shipping and navigation. Agencies and private sectors that have to do with shipping, however, must ensure that water quality is maintained, particularly on oil and grease pollution of the Bay so that other users of the water can coexist with shipping. The imminent ratification of the International Convention for the Prevention of Pollution from Ships 1973 and its Protocol of 1978 (MARPOL 73/78) by the Philippines will have significant impact on the management and prevention of marine pollution from ships, particularly for Batangas Bay. Local legislation will have to be enacted and enforced to ensure compliance with the provisions of MARPOL 73/78, for example, the establishment of port reception facilities to manage ship waste.

On private ports

With the upgrading and modernization of the Batangas Port, other ports especially private ones become superfluous, except those that handle very specialized types of cargo. To prevent private ports from interfering with general shipping, appropriate vessel traffic management scheme must be observed and infrastructure support such as circumferential and radial roads need to be put in place to encourage maximum patronage of the Batangas Port including proper port control and management. At the same time, regulatory measures ought to be enforced to discourage further reclamation and private port construction.

On municipal fisheries

At present, small-scale municipal fishing is concentrated near the Batangas Port which is in direct conflict with shipping and navigation. This area is also found to have higher levels of coliform and has limited flushing potential compared to the south and southwest parts of the Bay. Fishing areas should, therefore, be designated away from Batangas Port such as in southern Mabini and in Tingloy. Other areas may be opened for fishing where the water quality is appropriate.

On water-based recreation

Apart from existing resorts and beaches, water-based recreation and tourism can be promoted in other parts of Batangas Bay that are not actively utilized for navigation and anchorage. For example, diving can be promoted along the southern part of Mabini (Pinamucan Peninsula) and around Maricaban Island. Recreation involving less human contact with water such as surfing and water skiing can also be allowed. Also, recreation involving the use of watercraft such as sport fishing, yachting and sailing can be encouraged, along with the development of boat launching, small-boat berthing and similar facilities. The feasibility of establishing a marina should also be looked into. The elitist connotation of these facilities should be minimized by allowing the municipalities or similar public bodies or cooperatives to operate them to ensure democratized access.

On coastal settlements

A detailed survey of the number of coastal residents according to the categories described in Table 6, needs to be conducted to gather reliable and adequate information with which to formulate appropriate interventions. Pending conduct of such survey, interim policies may be observed when dealing with existing coastal settlements, such as the following:

- Tenured residents, whatever their motivation for residing in the coastal zone, must continue to enjoy security of abode.
- Families directly dependent on the water for their primary livelihood regardless of tenure type must be allowed to stay, if no alternative sources of income are available elsewhere.

- Preference is to be given for compact or clustered design of housing in resettlement areas to ensure more efficient provision of services.
- Tribal groups who are non-tenured and adopt the marine environment as their natural habitat shall enjoy priority in resettlement programs provided that the new site does not differ drastically from the character of their original habitat.

On buffers and other easements

Before policy options could be formulated on buffers and easements, more information ought to be made available regarding the following proposed or anticipated future activities in the Bay:

The gas pipeline. The alignment in terms of geographical coordinates is already available. What is not known is how deep a clearance from the surface should be observed considering the maximum draft of large vessels such as those of oil super tankers. This information and other relevant technical details should be divulged by the project proponents. Open discussions at the Bay-wide level should be encouraged to assure the public about the safety measures being taken by the project proponents. Notwithstanding the safety features, an easement of about 300 meters wide from the surface and extending vertically downward to the bottom should be maintained. The project proponents shall be responsible for installing the proper safety signals and markers.

Archaeological objects and sites. A comprehensive survey of sea bottom must be undertaken to ascertain if there are sunken vessels with artifacts of historical/archaeological importance in Batangas Bay. Applicable national laws shall be followed in case the survey indicates positive results.

Mineral reserves. A thorough geological investigation of the rock structure beneath the sea floor should be conducted to determine whether there are significant quantities of mineral deposits that could be extracted if the national interest so demands. This is the responsibility of the national government.

On water use zonation and municipal land use zoning

The effectiveness of water use zonation will depend in part on the character of land uses along the coast that the coastal LGUs will allow or promote. Accordingly, there should be a set of policies to guide the coastal LGUs in land use planning and zoning, and their exercise of regulatory functions. Critical policy areas include, but are not limited, to the following:

Industrial location. Appropriate criteria should be formulated by the LGUs or through the Batangas Bay Council for Integrated Coastal Management (BBCICM) to use in granting locational clearance to new industries seeking waterfront locations. For example, industries that have nothing to do with water should be banned from waterfront locations. For future industries to be allowed along the coast, they must satisfy any or a combination of the following conditions:

- They must utilize water transportation for the receipt of raw materials provided that such cargoes cannot be handled by existing facilities of the Batangas Port and provided further, that, to the extent feasible, the transport of finished products shall be through the Batangas Port.
- They must utilize raw water for manufacturing or processing purposes such as desalination plants.
- They produce water-dependent products, for example, ship- or boat-building, dry-docking, and the like.

Residential areas. A decision has to be made regarding what type of communities and what categories of residents should be accommodated in seafront areas as discussed previously on coastal settlements.

Domestic waste disposal. Local residents regard the Bay as the ultimate receiver of solid and liquid domestic waste. Alternative disposal sites inland for solid waste must be developed. Regarding urban sewage, the feasibility of treatment as against seabed disposal should be determined. If the latter is chosen, proper location and design should be followed.

Sea bottom disposal of urban sewage. If this option is considered, information on bathymetry, submarine topography and flushing potential should be used to determine the proper location of the sewage outfall. Gunnerson (1988) provides comprehensive technical details including design standards and criteria which may be helpful when considering this system of sewage disposal. In any case, a thorough environmental impact assessment must be conducted.

Public recreation. Public recreation as a waterfront use is an important concern which the LGUs around the Bay should address consistent with the function of the town as an environment for living and not solely as a work place. Coastal zone recreational facilities such as waterfront promenades, amphitheaters and hilltop "overlook" parks are some of the possible types of outdoor recreation along the coast.

Municipal infrastructure. Coastal LGUs should plan their local infrastructure to allow public access to the Bay waters and linkage to the region-wide infrastructure facilities. For example, the important municipal infrastructures to link Tingloy with the mainland Batangas economy are the construction of a wharf in southern Mabini to shorten the Mabini-Tingloy ferry routes by eliminating the Tingloy-Talaga and the Tingloy-Anilao routes. The wharf is now feasible given the fact that the coastal road around Mabini is nearly complete. Of course, the Tingloy wharf must be upgraded as well. Eventually, when external access to Tingloy is improved, the town will become within one day's commuting distance from any part of the Bay Region. The influx of investments in tourism-related activities can be expected to follow. A circumferential road network for Tingloy will then become a necessity.

Another essential infrastructure is a fish port or fish landing. If small municipal fisheries should be diverted to Mabini and Tingloy due to the relatively clean waters in those municipalities, the new fish landing may be best located in Mabini. The fish port should be built to handle the regular ferry service as well.

On recovering the waterfronts for public use

There are many ways by which the local governments can reserve certain portions of their shoreline for public easement. Three approaches are presented in this section:

Urban renewal. Urban renewal seeks to improve the environmental quality and tenurial status of coastal settlements where there is overcrowding and proliferation of slums. Settlements near or around the public ports of Batangas City and Bauan are ideal sites for urban renewal due to their built-in access to the waterfront. Another ideal site is Barangay Wawa in Batangas City at the confluence of Calumpang River and the Bay coastline. Planning for urban renewal of these areas should be based on the objective of providing everyone decent shelter through medium-rise walk up apartments with proper setbacks so that more open space could be recovered on the waterfront for the recreational needs not only of the immediate residents, but also of the city residents in general. Planning intervention in the Badjao settlements should be done with careful sensitivity to the cultural preferences and practices of these migrant tribal people.

Network of access roads. Another way to ensure public access to the waterfront is to build roads that are evenly spaced (e.g., every half kilometer) running perpendicular to the shoreline and connecting them to existing or planned circumferential roads. These will enable the people access to the water and provide them opportunities to carry out activities in the Bay. These access roads can also be designed to serve as boat launching ramps so that residents and tourists who have their own boats can put out to the water at any point of their choice. Moreover, the access roads can be linked with fish landings and fish markets to be patronized by the general public. In places where there are shallow beaches, the perpendicular access roads can be used by the general public to reach the beaches for their recreation needs. Some theme parks may be put up along these access roads to widen the choice of recreation opportunities and to deter the formation of permanent settlements in areas where these are not to be encouraged.

Batangas Bay Rail Transit. The Batangas Bay Rail Transit (BBRT) is conceived as an elevated railway running parallel to the coastline. It will serve as a regular commuting system for the workers in factories along the Bay and for students enrolled in various schools in the region. It will also serve to convey tourists to the recreational areas on both sides of the Bay's mouth. If this project will be realized, it can provide an opportunity to acquire portions of the coastal zone for public easement through integration with the land acquisition process for the rail right of way. The alignment of the BBRT can be so chosen as to offer passengers a panoramic view of the Bay. At the same time, every station will be designed to incorporate provisions for urban waterfront parks and open spaces. In short, the BBRT can be a powerful viable strategy for proper coastal land management as it can provide a modern mode of urban transport, induce orderly economic development, rationalize settlement patterns and ensure public access to the waterfront.

Chapter 5
Functional Zonation of Batangas Bay

A functional water use zonation scheme is an important management mechanism to regulate land- and water-based activities in a given water body, reduce multiple use conflicts, maintain environmental quality and ensure the sustainable development of that water body. A workable zonation scheme should be anchored on a management framework such as ICM and made an integral component of land use planning. Unlike land zoning which regulates spatial structures in a given land use type, water use zoning has both elements of land use planning and zoning but focuses on a water body, in this context, the Batangas Bay. Generally, zonation addresses itself principally to the issues related to priority of certain uses over others, and to the need to reconcile and/or prevent incompatibilities between and among the different users of the Bay. Since there is no water use zoning in the Philippines, the definition for water use zoning in this study is at the broader context in which the water use zoning takes into account the impacts on and from land uses and their planing. Also, the water use zoning for Batangas Bay should be seen as forming part of the policy responses to the coastal issues facing the Bay Region as a whole.

In formulating the draft water use zonation scheme for Batangas Bay, two practical considerations were taken, viz., the existing conditions of the area and the nature and requirements of the water use activity. Analysis of the area was made to identify places that are still in their natural or near-pristine state, areas that have the potential for periodic flushing, and areas where pollution load is high and which are not regularly flushed out. Baseline information used came from the coastal environmental profile, fishery assessment, hydrographic modeling, marine pollution assessment and relevant thematic maps. On the other hand, water use activities were assessed on the basis of their water quality requirement and their tolerance to other activities. These activities were then matched with the conditions of the areas they actually occupy or where they will be located.

Establishing Priority of Water Uses

A prerequisite to functional zonation is the classification of all users of the Bay according to the degree to which they can tolerate other users. Those that can accommodate other users may be mediated according to the principle of priority in time. On the other hand, those that are not tolerant to other users are allocated their own exclusive zones on the basis of priority in space. Activities that have nothing to do with the Bay waters must be located elsewhere. To determine the tolerance of a particular activity to other activities, the following general principles are used:

1. Two activities that involve movement on the water surface can be accommodated in the same place at different times. Such activities are allowed in multiple use zones.

2. An activity that is stationary or stays in one place for a relatively long time and does not require the use of water in its pristine quality can accommodate another moving activity provided proper traffic control is observed and/or effective buffer is placed around, above or below the stationary activity. Such stationary activities are assigned to exclusive use zones.

3. Activities that utilize the Bay waters whose viability depends on a given physical condition or standard of water quality are located in restricted use zones with protective buffers when practicable.

Delineation and Description of Functional Zones

Pursuant to the above considerations, three water use zones were created:

1. Restricted use zone for activities that depend on the maintenance of a certain quality of the water.

2. Exclusive use zone for activities that require unhampered access to their area of operation.

3. Multiple use zone for activities that require movement and hence, can share the same place at different times.

Notwithstanding the overriding principle that guides the zonation scheme, the use of the terms "restricted" and "exclusive" is to promote the maximum sharing of a common resource by a multiplicity of interests. This is in recognition of the essential character of the resource, that is, the three-dimensional fluidity of water allows it to accommodate frequent changes and turnover in use. Unlike land uses, water uses are seldom fixed in time or space. Water use activities can occur in the same three-dimensional space at different layers, say, one at the bottom, another at the surface, and still another in-between. Moreover, there are certain land uses that affect, and are affected by, activities in the water. Hence, a fourth zone, waterfront land use zone is added for purposes of attaining rational and efficient utilization of that area where land and water meet. The strategic function of this fourth zone is to provide a venue for eventually integrating ICM concerns in conventional local land use planning and zoning. A composite map of the four zones is shown in Figure 14. Each of the zones is described in more detail in the following sections.

Restricted use zones

These areas accommodate activities that depend upon the continued maintenance and preservation of the environmental quality, particularly of coastal waters within the classification SB (Recreational Water Class I) for coastal and marine waters. Only uses that will not cause the deterioration of water quality and destruction or degradation of marine habitats such as coral reefs and seagrass beds may be allowed in these areas. Restricted use zones are subdivided into the following functional areas.

1. *Restricted fishing zone* - nearshore areas within 50 m depth. Many parts of this zone have fringing coral reefs upon which the continued viability of fishing depends. Therefore, only non-destructive and non-mobile fishing gear types as well as mariculture are allowed. Harvesting of corals and certain associated biota is strictly prohibited. Recreational diving may be allowed.

   This zone is located along the coast of Mabini from south of Pure Foods Milling in barangay Bulacan to Matoco Point in barangay Mainit, thence to barangay San Teodoro all the way to Balayan Bay. This zone also covers the entire coastline of the island of Maricaban. The seaward portion of the following barangays in Mabini is covered by this zone: Mainaga, Calamias, Bulacan, Pulong Balibaguhan, Talaga Proper, Talaga East, Saguing, Gasang, Malimatoc 1, Malimatoc 2 and Mainit, along the Batangas Bay coast; and San Teodoro and Bagalangit along Maricaban Strait. All barangays of Tingloy are within this zone.

2. *Diving area* - this refers to the waters located among the islets of Maricaban Island such as Sombrero and Caban in western Tingloy, and along its southern coast eastward to Papaya Point. Diving areas fringe on restricted fishing zones up to the 200 m contour. Sailboats and other non-motorized vessels may be allowed in the area. Spear fishing is prohibited. Because diving is also allowed in the restricted fishing zone, all barangays of Tingloy, being located along the coast, have a diving zone (Figure 15).

Exclusive use zones

These are areas dedicated to specific uses whose viability is dependent on unobstructed or unhampered access to their area of operation. Other uses that are temporary and of very short duration may be allowed within these zones, subject to permission by the PPA or as directed by the PCG. These zones include the following functional areas:

1. *Navigational lanes* - the areas covered by vessel traffic separation schemes (VTSS). These are of two types: The Verde Island Passage VTSS and the Batangas Bay VTSS. The Verde Island Passage VTSS is for vessels that do not make a call at Batangas Port. The Batangas Bay VTSS is intended for vessels calling at, departing from or destined for the Batangas Port. The Batangas Bay sea lanes have a width of 1.0 nautical mile.

   Absolute priority use is given to shipping in these areas. For enforcement purposes, suitable markers or buoys must be put in place.

2. *Ship operating areas* - areas adjoining the sea lanes and adjacent to the shoreline that are being utilized or reserved for anchorage, maneuvering of ships, cargo and passenger handling, and related operations within the operational areas of the Batangas Port,

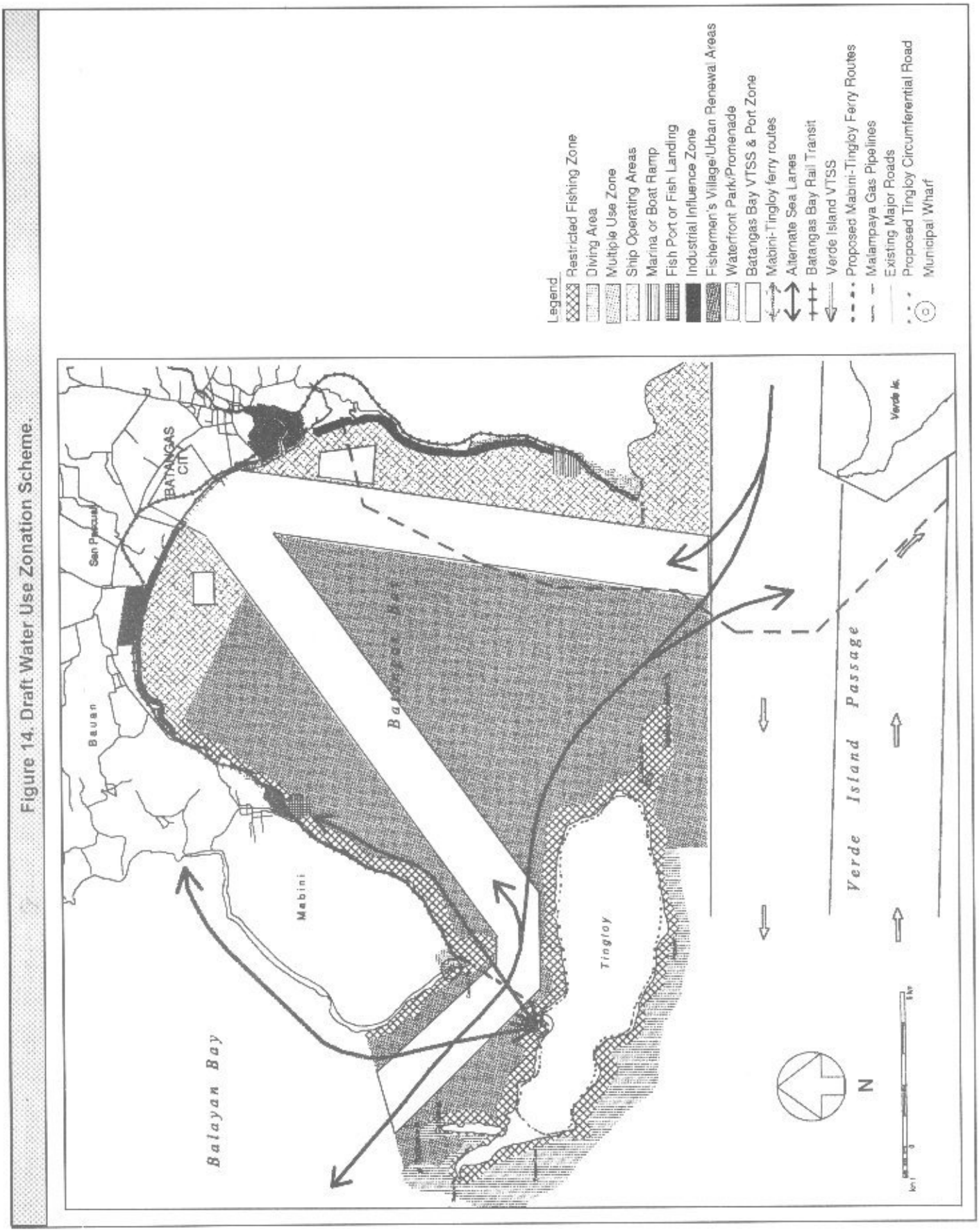
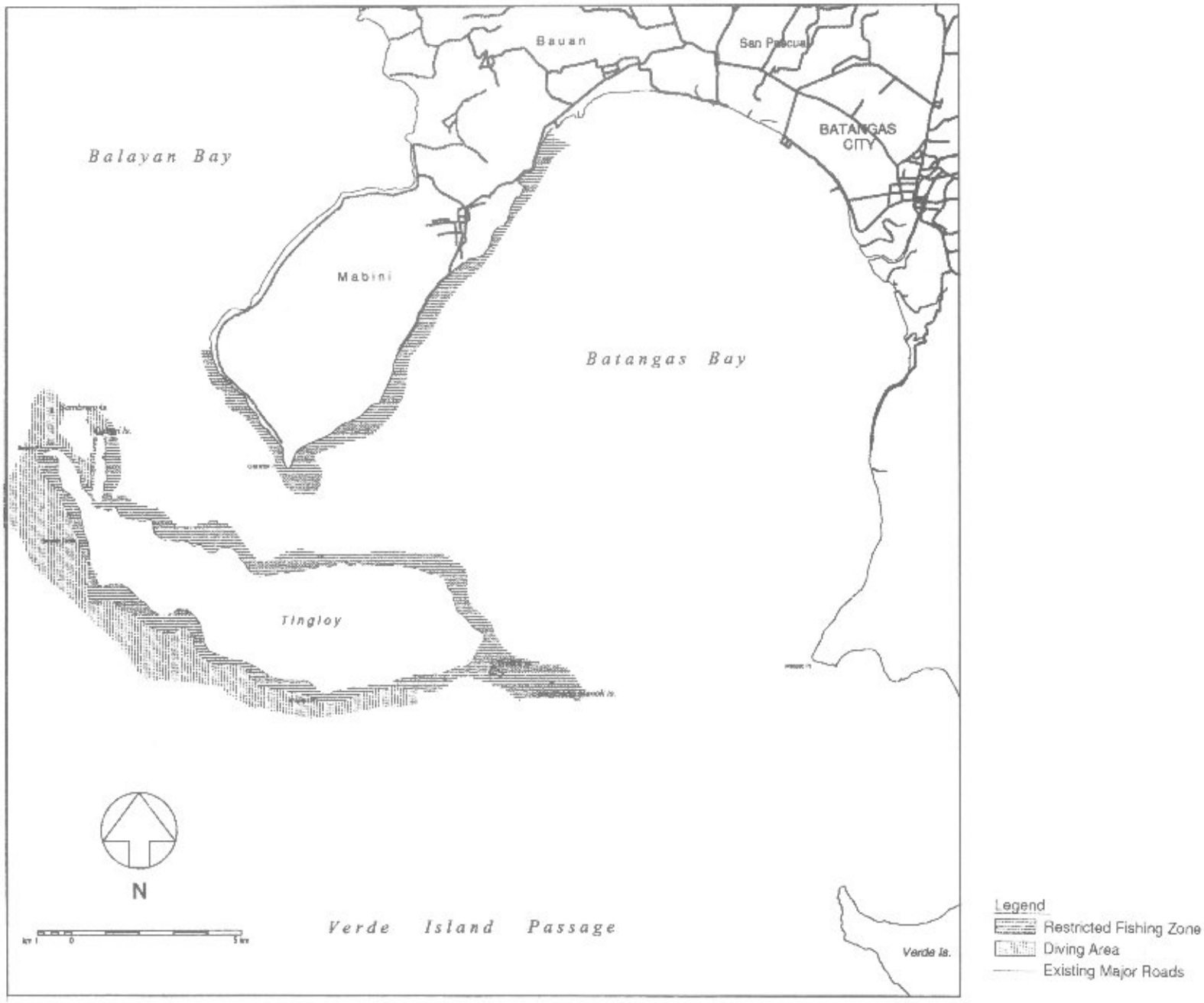


Figure 14. Draft Water Use Zonation Scheme.

Figure 15. Restricted Use Zones.



private ports, and municipal ports and wharves. These are located along the Batangas Bay coastline of Bauan, San Pascual and Batangas City.

3. *Alternate sea lanes* - the median line on Maricaban Strait between the municipalities of Mabini and Tingloy running eastward and turning around Balahibong Manok Island, and vice versa, through the mouth of Batangas Bay. This route is usually taken by coast-wise vessels en route to/from Manila as a shelter from the southwest monsoon. Other mobile uses shall be allowed along this corridor but shipping shall be given top priority.

4. *Malampaya gas pipeline easement* - a corridor of 300 meters wide through the mouth of the Bay crossing Verde Island Passage from Mindoro to Tabangao Shell Refinery in Batangas City. Within this easement, fishing, diving or any other activities that may get entangled with the pipeline shall not be allowed.

5. *Marina or boat ramp* - this is a necessary support facility to pleasure boating and other activities using recreational sea craft. Boat ramps serve as launching areas while marinas serve as mooring places for pleasure boats. The proposed location of these facilities is in barangay Simlong in Batangas City. An alternative site is in the vicinity of the proposed municipal wharf in San Teodoro, Mabini.

6. *Industrial influence zone* - the sea side extension of the land-based industrial areas. These areas are either used for essential operations of the industrial firms or are a necessary buffer to other activities that may be put at risk from the industrial operations. The industrial influence zone shall be off limits to other uses.

A strip of 200 m from the shore is automatically reserved where there are existing industrial installations or upon the establishment of a new industrial plant. It covers portions of the following coastal barangays: in Bauan - San Pedro, Sta. Maria, San Miguel, San Andres 1, San Andres 2, Aplaya, Sto. Domingo and New Danglayan; in San Pascual - Poblacion, San Antonio and New Danglayan; and in Batangas City - Ambulong, Tabangao Aplaya, Pinamucan Proper, Pinamucan Ibaba and Simlong (Figure 16).

Multiple use zones

These areas accommodate any number of activities through a system of time sharing. Time sharing may be enforced through regulation but some activities are highly seasonal in character and hence, observe natural time sharing. Multiple use areas include the following:

1. *Mobile fishing gear zone* - areas beyond 50 m depth from the shoreline not otherwise reserved for navigation or utility easements where all types of mobile fishing gear can be used. This zone occupies the central part of Batangas Bay and the deeper portions of Maricaban Strait.

2. *Pleasure boating zone* - areas generally utilized for recreational type of boating such as leisure cruises, water skiing, sport fishing and the like. Pleasure boating can also share time with general shipping and port-related uses and mobile gear fishing.

3. *Mabini-Tingloy ferry routes* - routes regularly taken by ferry boats plying the Mabini-Tingloy route. The Talaga-Tingloy route is used during the southwest monsoon; the Anilao-Tingloy route during the northeast monsoon. Other uses like fishing and pleasure boating can alternate with the ferry service but the latter shall be given priority over all other users along these routes (Figure 17).

Waterfront land use zones

These use zones are situated within a corridor 200 m in width starting from the seaward limit of foreshore lands (lowest low water) landward through and including the foreshore areas and the 20 m salvage zone. Within these zones, the following land uses or activities are proposed to be established:

1. *Fish port or landing* - a major support infrastructure for fishing. All existing fish landings along the Bay shall be phased out and consolidated in Talaga, Mabini. The fish port shall also serve as the landing facility for the Talaga-Tingloy ferry boats, to complement the existing wharf in Anilao. If the proposed wharf at San Teodoro will

Figure 16. Exclusive Use Zones.

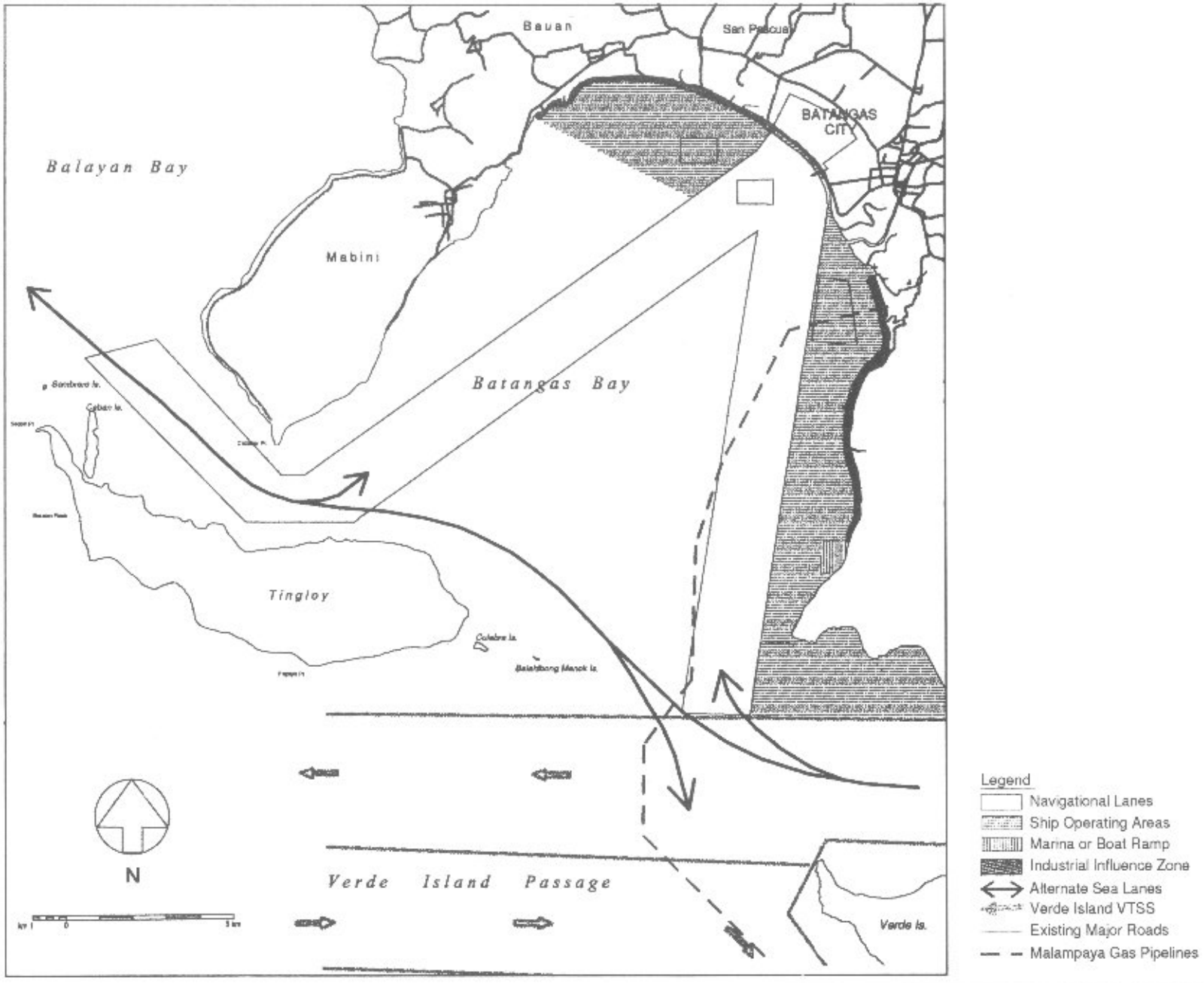
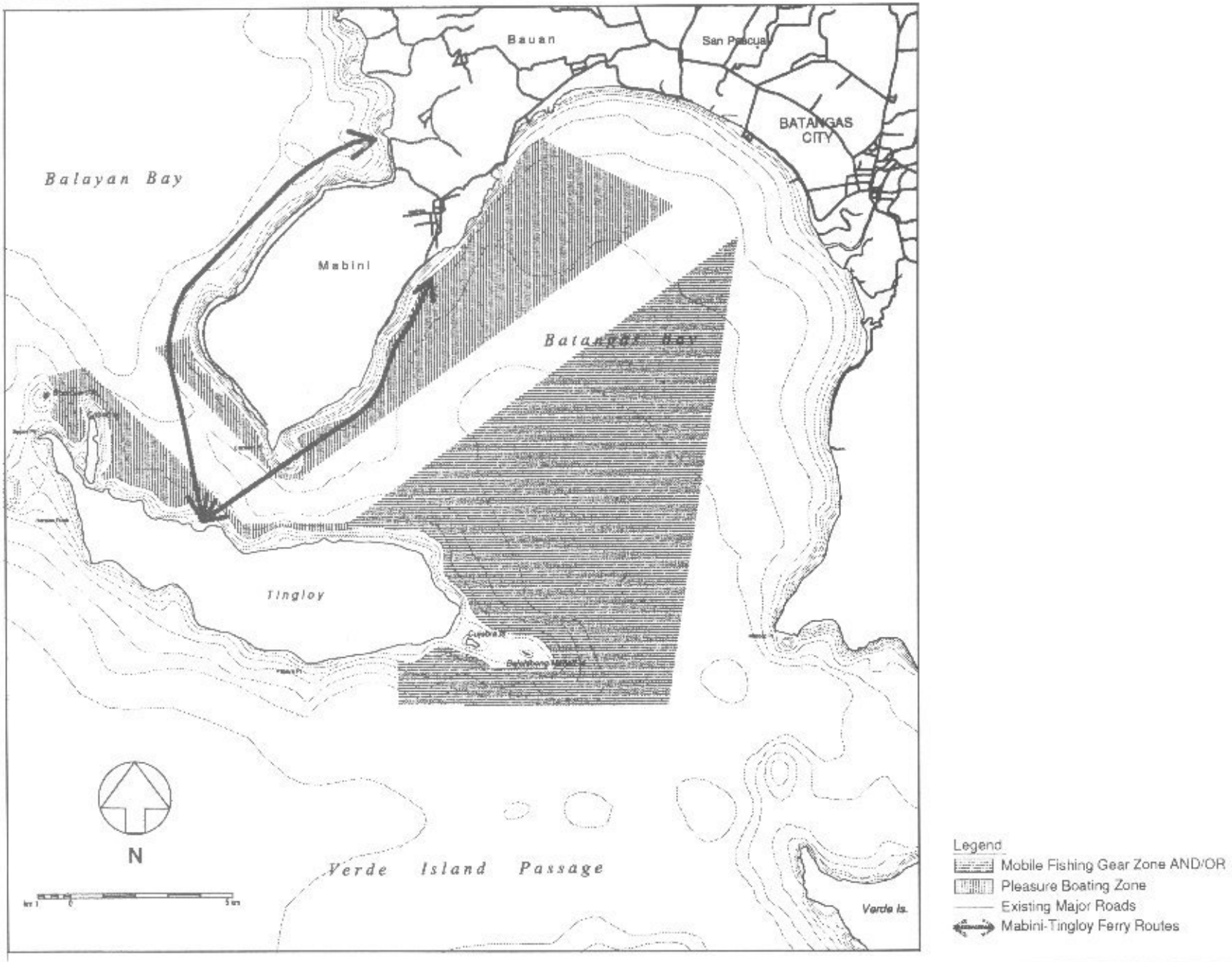


Figure 17. Multiple Use Zones.



be constructed, however, the Talaga Fish Port should be dropped.

2. *Fisherfolk's village* - an area close to the Fish Port in Talaga East or Talaga Proper in the municipality of Mabini. This will be a permanent home for subsistence fisherfolk who do not enjoy secure tenure in the areas they occupy at present, as well as for those who are likely to be displaced by on-going or proposed development projects. Again, if the fish port is transferred to another location, a suitable area close to the port should also be identified for the fisherfolk's village.

3. *Waterfront parks* - municipal or regional parks reserved to provide public access to the sea by the general population. These parks may be sited and developed in conjunction with the acquisition of right of way for the proposed Batangas Bay Rail Transit and as a design feature of urban renewal areas. Waterfront parks may take the form of hilltop "overlook parks" in the vicinity of Cazador Point in barangays Mainit and San Teodoro in Mabini and Matoco Point in barangays Mabacong and Pagkilatan, Batangas City. Waterfront amphitheaters may also be constructed in these same sites and in Calamias, Mabini. The steep slopes and cliffs in these sites are ideal for developing stepped banks or sloping steps where people can be seated watching the sunset or sunrise or observing the various activities on the Bay. Waterfront promenades or walkways may likewise be provided in conjunction with urban renewal areas in barangays Aplaya and Sto. Domingo in Bauan and in barangays Cuta, Wawa and Malitam in Batangas City. When properly lighted, seafront promenades provide the urban dweller with an opportunity to experience an environment quite different from the rest of the city.

4. *Batangas Bay Rail Transit* - an elevated rail facility generally parallel to the Bay coastline. As an alternative to, or to complement, the circumferential road, the BBRT serves as a rapid transit for the regional population. It will also become a major tourism-related infrastructure. Properly routed, it offers opportunities for improving the urban design of coastal communities, recovering public access to the sea, and restoring amenity value to certain waterfront areas.

5. *Industrial areas* - currently a major land use of the Bay coastline, industrial activities will be regulated in the future to ensure that only water-related or "water-dependent" industries will be allowed to locate along the shoreline.

6. *Urban renewal areas* - These are areas currently characterized by residential congestion and urban blight usually close to the port zones of Bauan and Batangas City. Urban renewal is an urban planning strategy that seeks to improve the physical quality of the urban environment by seeing to the rational allocation of living space and improving the tenure arrangements of residents. Through ingenious building design, height and density regulations, and observance of proper setbacks, the renewed area can recover open space for the public and restore the visual amenity to urban waterfront sites.

   The identified urban renewal sites are in barangays Aplaya and Sto. Domingo in Bauan, and in barangays Cuta, Malitam and Wawa in Batangas City.

7. *Municipal wharf* - located in barangay San Teodoro on the southern part of Mabini, near Cazador Point, to replace the present Talaga-Tingloy and Anilao-Tingloy ferry service routes. This much shorter route across Maricaban Strait can be used in all seasons because it is not affected by the monsoon winds. Its added benefit is that of making Tingloy much more accessible and thus linking it to the economy of the Bay region.

   If this facility is constructed, the present municipal wharf at Poblacion 3 in Tingloy must also be upgraded.

8. *Tingloy circumferential road* - to speed up developments and induce investments in Tingloy, its internal access must be improved along with the increased external accessibility provided by the San Teodoro wharf. The circumferential road is a necessary support facility to the touristic and recreational function of the island municipality (Figure 18).

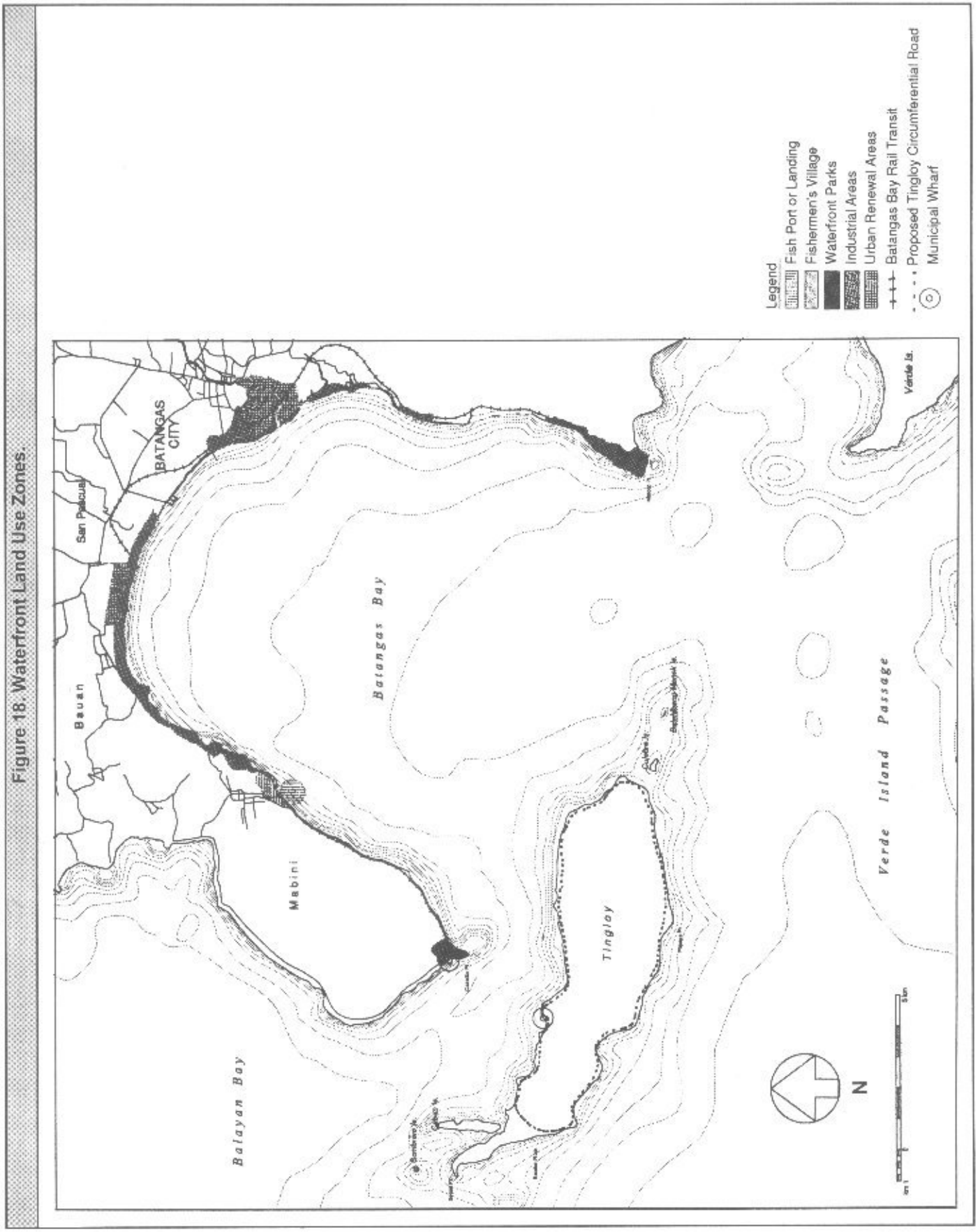


Figure 18. Waterfront Land Use Zones.

Chapter 6
Implementation of the Water Use Zonation Scheme

The implementation of the water use zonation scheme cuts across several municipal jurisdictions and is handicapped by at least two major problems, viz., the question of legitimization and the problem of appropriate institutional mechanism. This chapter focuses on the process of getting the scheme adopted and eventually implemented through the existing legal and institutional mandates of local governments and national government agencies. As there are no precedents to guide action in this case, the process towards implementation can be an opportunity to experiment on new forms of institutional arrangements for local governance and to explore the boundaries of local autonomy.

Adoption of the Water Use Zonation Scheme

To be implementable, the water use zonation scheme should first undergo the process of legislative legitimization. The process involves conduct of public hearing and endorsement by the Batangas Bay Council for Integrated Coastal Management (BBCICM), deliberation and review by the Provincial Land Use Committee (PLUC) and the Provincial Development Council (PDC), and adoption by the Sangguniang Panlalawigan (SP) for enactment into an ordinance.

Public Hearings

Although the process of preparing the water use zonation scheme included a number of public consultations, it should be subjected to a series of public hearings by the PG-ENRO under authority of the BBCICM. In preparing the water use zonation scheme for such hearings, PG-ENRO must ensure that it is validated and conforms to policies, standards and guidelines set by the BBCICM and in the Local Government Code and EO 72 of 1993. The public hearings should provide a venue for various individuals, groups, sectoral representatives and government agencies interested in the environmental management and sustainable use of the Bay to register their comments, reconcile their interests and enlist their commitments to the implementation of the scheme. The water use zonation scheme should be revised or amended based on the result of the public hearings.

Approval by the Provincial Development Council

The policy recommending body of the province is the Provincial Development Council (PDC) which is also the official planning body as mandated by the Local Government Code [Sec. 106 (a), Sec. 107 (c), Sec 109 (a)]. The PDC is empowered to formulate development plans for adoption by the legislative council (SP). The PDC is also the responsible body to initiate the formulation or to prepare the comprehensive provincial land use plan which is reviewed by the PLUC to ensure consistency with provincial and national policies, standards and guidelines. As provided for in EO 72 of 1993, the PLUC through the chairman, shall submit its findings and recommendations to the Sangguniang Panlalawigan for consideration in making its decision to enact a zoning ordinance. At the regional level, the Regional Land Use Committee (RLUC) will review the provincial land use plan to ensure its consistency with the Regional Physical Framework Plan (RPFP) and national policies set forth by the National Land Use Committee. It will then be reviewed and ratified by the Housing and Land Use Regulatory Board (HLRB).

In the case of the water use zonation scheme, which at this stage is not an integral part of conventional land use planning, it is within the ambit of the PDC's responsibility to deliberate on, approve and endorse the water use zonation scheme for review by the PLUC and submission to the SP for adoption. During the process of review, the BBCICM should be represented as the sponsor and advocate of the scheme and to provide the necessary details as required. The PG-ENRO shall make available all technical and relevant documents and materials to facilitate deliberation and decision-making.

Adoption by the Sangguniang Panlalawigan

After the review and approval by the PDC and PLUC, the PLUC will submit its findings and recommendations on the water use zonation scheme to the SP along with the endorsement of the PDC for final adoption. Again, the BBCICM should make the presentation and provide the advocacy before the SP. The SP, through a resolution shall adopt the scheme and spell out the details of implementation through an ordinance (Figure 19).

Integration of the Water Use Zonation

The adoption of the water use zonation scheme by the SP does not imply automatic implementation. The scheme has to be reviewed by the RLUC and ratified by the HLRB in accordance to EO 72 of 1993. As a crucial requirement to implementation, the water use zonation scheme has to be integrated fully into the land use plans at both provincial and municipal/city levels. Integration will require the revision or amendment of existing land use plans and planning guidelines and ordinances and/or enactment of new ones. Legal and institutional aspects of implementing the water use zonation scheme have to be defined including the roles and functions of the provincial and municipal/city governments as well as relevant bodies (e.g., BBCICM, RDC/RLUC, NGA, etc.). These include monitoring, enforcement, permitting system (e.g., new development, renovation, conversion, operation, waste disposal, fishing, exploitation of marine resources, etc.), establishing infrastructure (e.g., navigational safety, monitoring and enforcement), manpower requirements, arbitration of disputes and violations, disaster management (e.g., oil/chemical spills, maritime accidents), management and conservation of marine biodiversity, maintenance of environmental quality (e.g., effluent discharge, waste management), funding (sources, management, sustainability) and organizational structure of the body tasked to implement, enforce and monitor the zonation scheme, among others. If the body tasked to coordinate and/or implement the zonation scheme will be the office of the planning and development coordinator at the municipal/city level, it is necessary to legislate measures to expand its present roles and functions. Alternately, the Sangguniang Bayan or Sangguniang Panlungsod can exercise that function but designate a body to enforce the water use zonation scheme such as the office of the municipal environment and natural resources officer (MG-ENRO). Thus, the integration of the water use zonation scheme into the comprehensive land use plans (muncipal/city and provincial) must be addressed before subjecting it to public hearings and refined based on the outcome of such hearings. Further refinement will be required as the scheme is reviewed by the PLUC, RLUC and the HLRB.

IMPLEMENTATION OF THE WATER USE ZONATION SCHEME

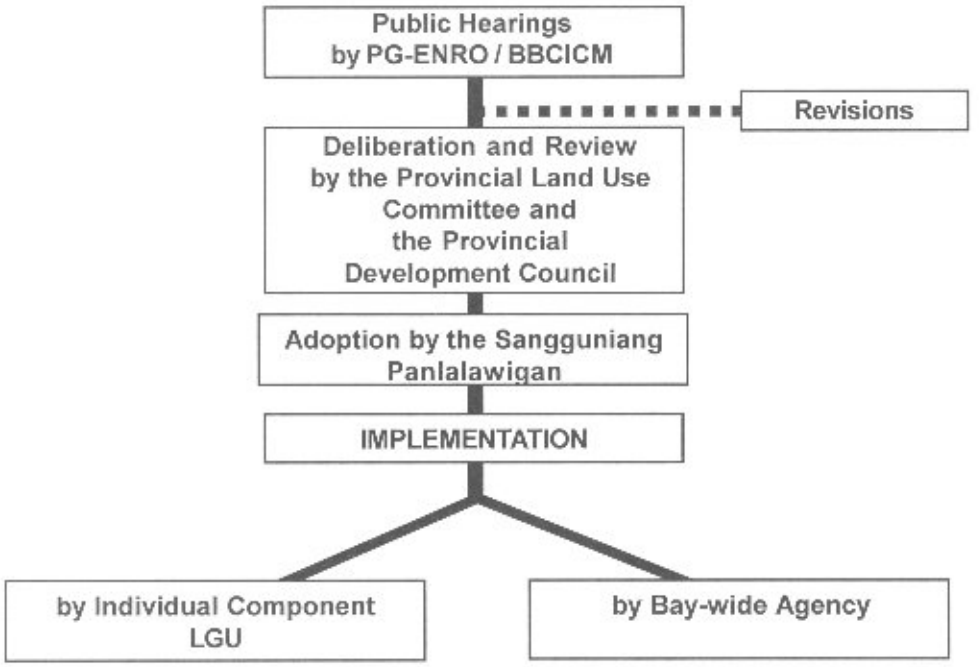
Among the important details that the provincial ordinance adopting the water use zonation scheme should spell out is the institutional mechanism for its implementation inasmuch as the provincial government has no zoning powers. The configuration of such a mechanism will hinge on whether the coastal LGUs will opt to exercise their authority over their territorial jurisdiction individually or apply the concept of a communal property. The ramifications of each scenario are discussed below.

The individual LGU scenario

If the coastal LGUs desire to exercise their own powers individually, the water use zonation scheme can be implemented through the planning and zoning authority of each component municipality. The necessary legislative measures should be enacted to pave the way for its implementation. Such measures will define the institutional arrangements needed and the procedures/guidelines to effect enforcement and monitoring including appropriations. Alternatively, the municipalities concerned may enact piecemeal ordinances or issue executive orders dealing with particular aspects of the water use zonation scheme that affect their territory.

Under this scenario, the municipality's action is put under review by the BBCICM and then the provincial government (LGC, Sec. 30). This is done through the PG-ENRO and the Office of the Provincial Planning and Development Coordinator (OPPDC). The provincial government, therefore, has the opportunity to enforce provincial and Bay-wide policies through its review and supervisory powers. Issues and conflicts between municipalities are

Figure 19. Zonation Scheme Legitimization Process.



PG-ENRO - Provincial Government Environment and Natural Resources Office
BBCICM - Batangas Bay Council for Integrated Coastal Management
LGU - Local Government Unit

arbitrated and resolved first by the BBCICM and, when necessary, by the Sangguniang Panlalawigan.

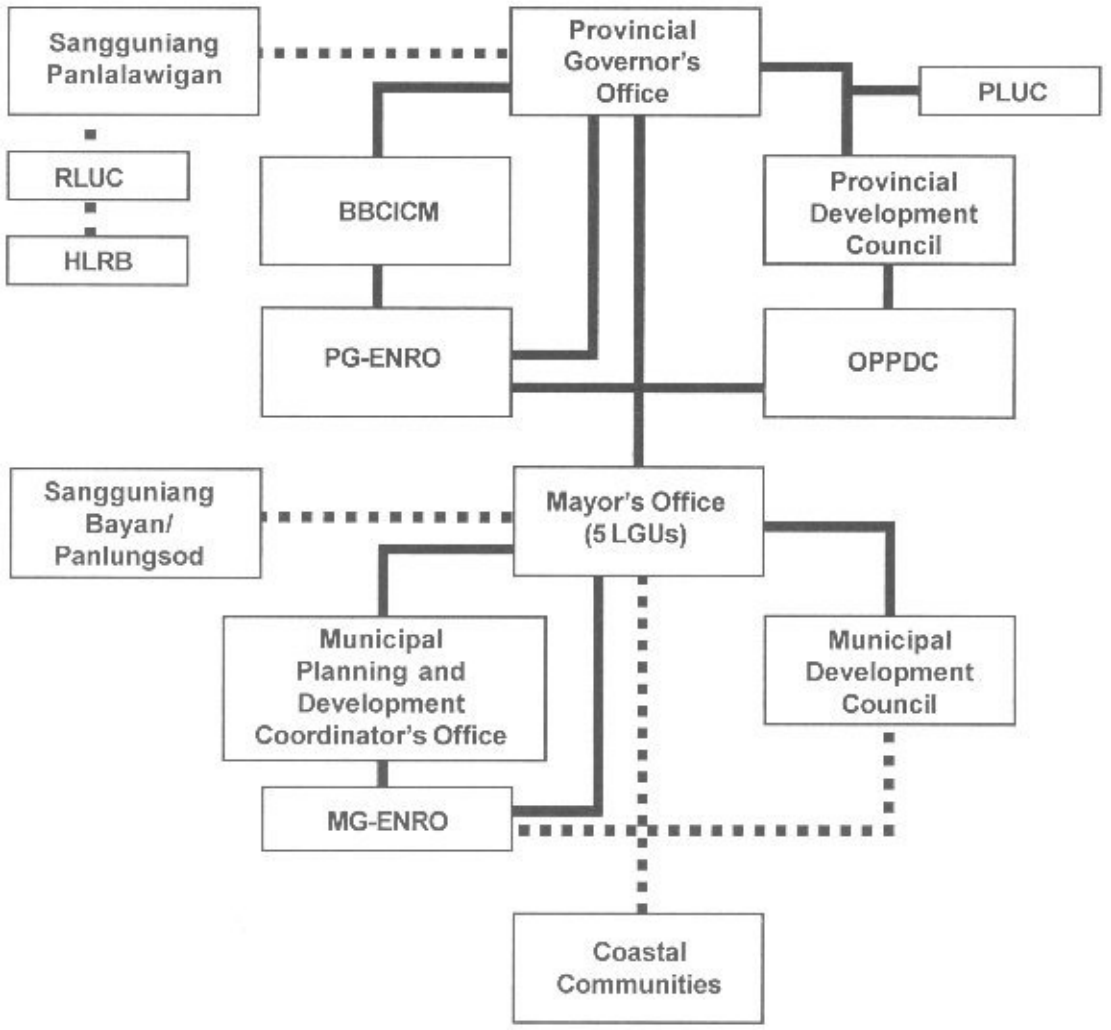
The communal property scenario

Given the complex jurisdictional issues and multiple claims over the use of the Bay, the coastal LGUs might choose to jointly manage it as a common resource and communal property. This implies that the concerned LGUs can exercise their powers independently from each other and collectively in any part of the Bay.

Philippine experience in zoning has been limited in coverage to the terrestrial side of the municipal territory. Moreover, the power to zone is an authority granted to individual municipalities. Although there is as yet no supra-municipal political unit granted zoning powers, such a body is possible through Sec. 33 of the Local Government Code. It states that local government units may enact appropriate ordinances and group themselves, consolidate or coordinate their efforts and services for purposes commonly beneficial to them through memoranda of agreement. Under the communal property scenario, the role of an area-focused Bay-wide body such as the BBCICM to coordinate and arbitrate the actions of the coastal LGUs is crucial.

The BBCICM as coordinating body. As a coordinating body, the BBCICM does not absorb or subsume the powers of the coastal LGUs. The component LGUs retain and exercise their full powers. The area-wide Council smoothes out the inter-LGU relations and injects region-wide perspectives and values into otherwise parochial interests of individual municipalities. The Council also sees to the complementarity and consistency among programs and actions of the component LGUs.

Figure 20. Organization for Implementation of the Water Use Zonation Scheme in the Batangas Bay Region.



BBCICM - Batangas Bay Council for Integrated Coastal Management
HLRB - Housing and Land Use Regulatory Board
LGUs - Local Government Units
MG-ENRO - Municipal Government Environment and Natural Resources Office
PG-ENRO - Provincial Government Environment and Natural Resources Office
PLUC - Provincial Land Use Committee
OPPDC - Office of the Provincial Planning and Development Coordinator
RLUC - Regional Land Use Committee

Combined scenarios

If the two scenarios are combined, that is, the individually mandated LGUs are coordinated by the BBCICM, the resulting structure may turn out to be the most feasible one. As depicted in Figure 20, the implementation of the zonation scheme can be placed within the structure that is anchored on the integrated coastal management of Batangas Bay. The structure consists of two levels of authority: provincial and municipal.

Provincial level. At the provincial level, the BBCICM will be the coordinating body in the Bay-wide implementation of the water use zonation scheme and arbitrate on any disputes arising from it. The Council also evaluates and endorses proposed programs and projects by the PDC that are foreseen to have impacts on the Bay region, particularly its environmental quality and the implementation of the water use zonation scheme. The PG-ENRO which serves as the secretariat of the BBCICM, has a direct line function deriving authority from the Office of the Governor. In this scenario, the PG-ENRO will exercise its regulatory functions to ensure that the water use zonation scheme is properly implemented. However, it should work closely with the OPPDC to thresh out problems regarding the integration of the water use zonation scheme into the comprehensive land use plan including the review process to pave the way for effective implementation. The Sangguniang Panlalawigan provides the legal authority to ensure the smooth implementation of the water use zonation scheme and the required institutional and legal arrangements including the appropriation of necessary funds.

Municipal level. A counterpart structure at the municipal level is the Office of the Municipal Planning and Development Coordinator (MPDC). For Batangas City, it is the City Planning and Development Coordinator (CPDC). The secretariat will be the MG-ENRO which is also the technical secretariat of the Office of the Mayor. The MPDC/CPDC will be responsible for the implementation of the water use zonation scheme at the municipal or city level. The MG-ENRO will exercise its functions to coordinate with government agencies and non-government organizations in the proper implementation of the water use zonation scheme and advises the MPDC on any operational and regulatory issues in its implementation including monitoring. Both the MPDC and the MG-ENRO are under the Office of the Mayor. It is important that the MPDC should work closely with the Municipal or City Development Council (MDC/CDC) to ensure the harmonization of the water use zonation scheme with the comprehensive land use plan and vice versa. It is at this level that the implementation of the water use zonation scheme is critical in terms of enforcement and monitoring for compliance. Thus, it is necessary to have an effective coordination with the legislative body. Like its provincial counterpart, the Sangguniang Bayan or Sangguniang Panlungsod enacts the necessary legislation that will implement and enforce the scheme at the municipal/city level including the appropriation of required funds.

The vertical linkage between the two levels is provided by the supervisory power of the Governor over the Mayor. No other vertical relationships exist among the other bodies.

Chapter 7
Conclusions and Recommendations

This study concludes with reflections on some of the important lessons learned and recommendations for future action or further study towards enhancing its replicability in other water bodies.

LESSONS LEARNED

Planning in the Philippines has been biased toward the terrestrial component of the territory. As a result of two decades of land-focused planning, the buildup of information base, the development of methodologies and approaches, and the establishment of institutional mechanisms for land use planning and zoning are more advanced than those for water. Water use zoning is a concept that is long overdue in the Philippines considering the archipelagic character of the country.

The rationale for water use zonation derives from the need to reduce or eliminate conflicts among several users of a given water body and to maintain its environmental quality at a level that allows multiple uses on a sustainable basis. Given the essentially open-access character of most water bodies, it is reasonable to expect multiple rather than specialized use patterns of these water bodies. Hence, the need for planning devices such as the water use zonation scheme to instill proper and rational utilization and the sense of responsibility among the stakeholders of that water body. In the case of Batangas Bay, a system of self-regulation among the stakeholders, particularly those who are involved in activities that have an adverse impact on the environmental quality of the Bay. The water use zonation scheme complements such voluntary initiatives.

Aside from adverse impacts of coastal activities and population, hinterland activities like agriculture, poultry and piggery raising including quarrying and urban development occurring within the Bay watershed also contribute to the degradation of the marine environment. It is hoped that in the preparation or revision of their land use plans, the coastal LGUs will be guided by the water use zonation scheme to formulate land use policies that are sensitive to the interrelationships and linkages between land use and the quality of the coastal and marine environments.

The draft water use zonation scheme for Batangas Bay is the first of its kind in the Philippines. Being a pioneering study, it was prepared with very limited knowledge and experience. Although a great deal of effort was spent in ensuring its internal consistency, the ultimate test of the validity of this document is whether it will work. There is as yet great uncertainty and little assurance in that respect but it is a step forward. Although the development of the water use zonation scheme is a pilot study, it is based on scientific and technical information. Such inputs will enable the scheme to be verified, improved and replicated in other water bodies. The methodologies in developing the Batangas Bay water use zonation scheme and in producing the inputs can also be used in developing similar schemes elsewhere with appropriate modifications relative to the conditions of the target water body.

There is a huge potential offered by the water use zonation scheme to demonstrate cross-sectoral and inter-jurisdictional cooperation in the management of a common resource (i.e., Batangas Bay). The Constitution and the Local Government Code encourage LGUs to group together and pursue common causes for their mutual benefit. Few LGUs, however, have taken advantage of this opportunity. In the case of Batangas Bay Region, there is BBCICM which is the mechanism for effecting such integration.

In Batangas Bay, the coastal LGUs are often overwhelmed by the scale and dominance of some users of the Bay such as shipping and port operations and the location of strategic industries like power plants and oil refineries. These Bay users are sanctioned by, and are responsible only to, the national government, and the host city or municipality is put in a quandary how to deal with them. Collectively, however, the concerned LGUs can deal with the situation more effectively.

RECOMMENDATIONS

To enhance the replicability of the water use zonation scheme, the following steps are suggested:

1. The pilot study should be extended into the implementation stage to complete the documentation of this pioneering effort.

2. The establishment of planning databases for ICM to be housed in mandated agencies such as PG-ENRO and the MG-ENRO. At present, scientific information and data-generation skills are scattered among educational institutions, private consultancy groups and international aid agencies. Often this information is not accessible to planners in the public sector, especially those from local governments.

3. Local planning guidelines, which are land-focused, should be revised to incorporate policies for the marine portion up to the limit of municipal waters. Technical assistance in the proper delineation and marking of boundaries on the water should be extended to all coastal LGUs.

4. Corollary to No. 3, the powers of LGUs over their municipal waters should be expanded to include the sharing of revenues, regulation, enforcement and developmental intervention other than municipal fisheries. Amendments to this effect should be made in the Local Government Code.

5. To be able to develop such an integrated guideline for local land and water use planning, a pilot study to actually relate the two types of zonation in one of the Batangas Bay municipalities should be undertaken. The municipality of Tingloy may be a good project site considering that it has no existing comprehensive use plan or zoning ordinance and that it is increasingly coming under pressure from both developers and conservationists.

6. All coastal LGUs should be encouraged to create organizational structures similar to the BBCICM at the provincial level and the Municipal Environment Protection Council as described in Chapter 6. These Councils will provide a mechanism for the deliberation of issues and concerns relative to the coastal zones and marine environment of coastal municipalities. Amendments can be introduced into the Implementing Rules and Regulations of the LGC further defining the scope of functions of the EPC and its relationship to the local development council.

7. An alternative to No. 6 is the expansion of the powers and functions of the Fisheries and Aquatic Resources Councils (FARCs) authorized to be created by the Revised Fisheries Code of 1998 (RA 8550). Although the mandate of the FARC is limited to fisheries matters, the possibility of "piggy-backing" a broader set of ICM concerns into its functions deserves further study.

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