

5. Case Study for El Nido North

5 Case Study for El Nido North

5.1 Profile of the Study Area

5.1.1 Location and Coverage of the Study Area

The study area is located at the northern end of the main island of Palawan. The area's geology is characterized by rocky limestone formation, especially in the Bacuit Bay area and pocket beaches along its irregular shoreline.

The El Nido North case study area covers mainly the coastal areas of Villa Libertad, Pasadeña, Bucana, Barotoan, Tiniguiban, and the poblacion. For the purpose of analyzing environmental conditions and land use, larger areas outside of the Study Area are covered; however, the major tourism development areas are limited to coastal areas (refer to Figure 5-1).

5.1.2 Socioeconomic Conditions

1) Population

The study area's population of 6,952 (1995 NSO Census) is assumed to live close to the coastal areas. The populations of all barangays are constantly increasing, with Barangay Pasadeña exhibiting the highest annual rate of increase at 8.2%.

Table 5-1 Population Trend

Barangay	Area (ha) ^{1/}	Population		Growth
		1990	1995	1990-95: % / yr
Bucana	2,130	2,696	3,094	2.8
Barotoan	3,045	1,309	1,495	2.7
Pasadeña	5,445	904	1,338	8.2
Villa Libertad	2,631	912	1,025	2.4
Study Area	13,251	5,821	6,952	3.6

Source: NSO

^{1/} Barangay areas are approximate

2) Employment, Industry and Income

According to the municipal socioeconomic profile and the Study Team's socioeconomic survey, the majority of people in El Nido are self-employed in the agriculture and fishing industries, although there are two international-quality resorts located in the islands of Miniloc and Pangulasian.

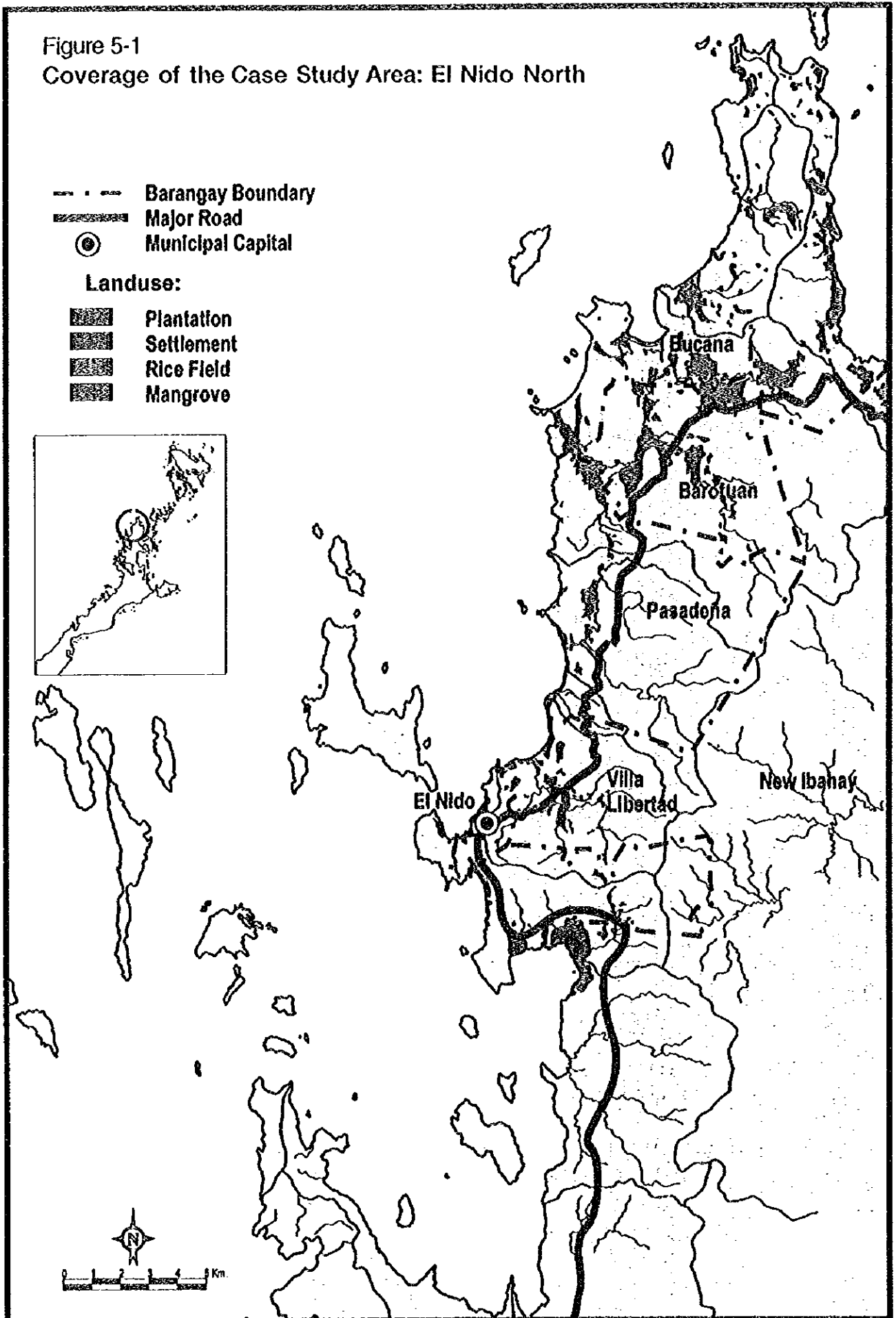
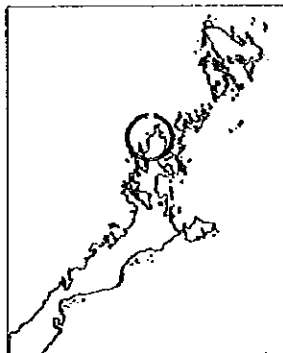
Average monthly household income in El Nido was found to be P 4,105, which is substantially low even when self-consumption factors are taken into account. Clearly, providing alternative livelihood is imperative in this area.

Figure 5-1
 Coverage of the Case Study Area: El Nido North

- - - - - Barangay Boundary
- ==== Major Road
- ⊙ Municipal Capital

Landuse:

- ▨ Plantation
- ▨ Settlement
- ▨ Rice Field
- ▨ Mangrove



3) Land Administration

The capability of the municipality of El Nido to manage its own jurisdiction is limited mainly due to shortages in manpower and financial resources.

Land Classification: Land is classified into Alienable and Disposable land, Timberland, Unclassified land and Public Forest. In the Timberland area, private ownership is not allowed. Timberland areas are located inland and in the islands (refer to Figure 5-2).

The total area classified as Alienable and Disposable is approximately 5,800 hectares, of which 3,400 hectares are within the study area (refer to Table 5-2). According to PCSD ECAN Division, all Alienable and Disposable land is or will be classified as multi-purpose zones in the ECAN zoning.

Table 5-2 Alienable and Disposable Area

Barangay		Area (ha)
Study Area	Base Bay North	253
	Base Bay South	147
	Yocoton Bay	213
	Nacpan Bay and Inland	1,253
	Pasadeña ^{1/}	693
	Villa Libertad	560
	Poblacion North	280
	Sub Total	3,399
Outside Study Area	Cadlao North	147
	Cadlao South	53
	Corong-corong South	586
	Manlag	533
	Aberawan	1,088
	Study Area	3,400
Sub Total	2,407	
Total		5,806

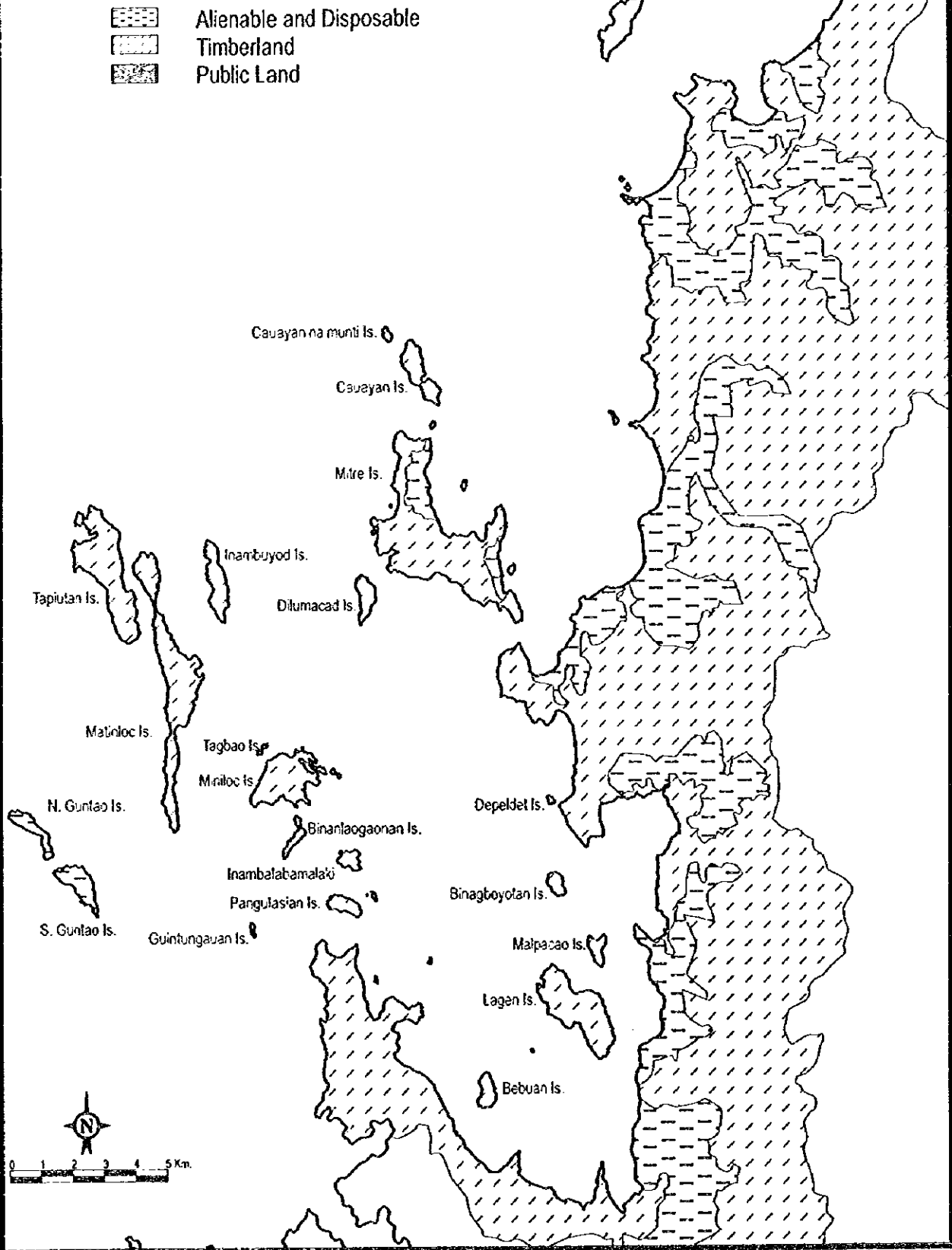
Source: Provincial Assessor's Office

^{1/}Bulalacao and Quinawanaan Rivers

Land Ownership: Tax declaration forms reveal that the overall rate of government land ownership exceeds 70% of the total area since there are Timberland areas within barangay boundaries as defined by the assessor's office. In the poblacion area, except in Barangay Corong-corong, lot sizes are found to be smaller than in other barangays (refer to Table 5-3).

Although the percentage of ownership by the government is high, most of the coastal area, where tourism development is possible, is privately owned land.

Figure 5-2
**Land Classification Map for
 El Nido North**



**Table 5-3 Land Ownership by Barangay:
Private vs Government by Barangay in El Nido North**

Barangay	Private		Government						Assessed Area Total (ha)
			National (ha)		Municipality/Barangay (ha)		Govt. Total (ha)	Govt % to the Total	
	No. ¹	(ha)	Forest	Others	Forest	Others			
Buena Suerte	84	77	136	0	0	0	136	64	213
Corong-corong	35	137	1,416	0	0	3	1,419	91	1,556
Masagana	115	58	331	0	0	0	331	85	389
Maligaya	73	17	33	0	0	1	34	67	51
Poblacion Total	307	289	1,916	0	0	5	1,921	87	2,209
Pasadeña	199	1,170	2,102	9	0	3	2,114	64	3,284
Villa Libertad	223	873	933	18	0	7	958	52	1,831
Bucana	95	306	567	35	0	0	601	66	907
Barotoan	290	1,170	3,593	24	0	0	3,618	76	4,788
Tiniguiban	351	1,531	2,824	0	0	5	2,830	65	4,361
Total	1,465	5,338	11,935	86	0	20	12,042	69	17,380

Source: Provincial Assessor's Office

^{1/} number of lots

Government ownership generally includes "salvage zone" area which is 40 meters inland from the coastline at high tide, and riverbanks with setback requirements of generally 20 meters.

Barangay Boundaries: Barangay boundaries are not yet clearly defined and discrepancies, in the data provided by DENR, the Assessor's Office, and the National Statistics Office on barangay land areas, exist. Disputes among barangays further delay the preparation of the municipality land use plan.

Settlement within Timberland: These are settlement areas outside of Alienable and Disposable Lands.

Guntao Islands: Land in this island is classified as Alienable and Disposable, and this conflicts with El Nido Marine Reserve's declaration of the island as part of the core zone.

5.1.3 Infrastructure

1) Transportation Infrastructure

Road: A SPIADP ring road project is being constructed. The circumferential road of the northern part was completed in September 1996 while by then, half of the southern portion had been completed. Its scheduled completion is October 1997.

Port: The municipal port, located in the town of El Nido, measures 130m x 6m, with a depth of 1m, allowing only small boats to approach it. Adjacent to the municipal port, the construction of another pier is being delayed because of problems in the transporting of construction materials.

Airport: A private airstrip owned by Ten Knots Development Corporation and operated by A. Soriano Aviation is primarily used to transport Ten Knots staff and guests to and from Manila. Residents of El Nido receive a 50% discount on airfare.

2) **Irrigation**

The Teberna Communal Irrigation Project (250 has.) of SPIADP in Barangay Tiniguiban is yet to be funded.

3) **Power**

National Power Corporation (NAPOCOR) serves while Palawan Electric Cooperative (PALECO) distributes electricity to about 150 consumers from 6:00 p.m. to 12:00 midnight.

4) **Water**

The Level III water supply facility is limited to Barangay Bebeladan. No other water supply facility is available in the study area. The surface water sources identified by the municipal government are, as follows:

Table 5-4 Water Source

Barangay	Untapped Spring	Elevation Above Barangay Proper	Distance from Barangay Proper (km)
Tiniguiban	Dakot	n.a.	4
	Alikik	10 ft.	2
Villa Libertad	Latak	10 ft.	0.5

Source: Municipal Profiles

A Level II water distribution facility is available only in the poblacion. The quality of water is poor and residents are advised to boil water for about 30 minutes before use. Others use shallow wells which may dry up during the dry season.

5) **Communication**

The only means of communication is via one telephone station and one post office in the poblacion. Mail going to Manila is sent by sea, and usually takes about one month. Radio is the major means of communication and VCRs (Betamax) are available in most barangays.

5.1.4 Environment

1) **Terrestrial Environment**

(1) **Vegetation**

To determine the present forest type, 1996 aerial photos were compared with 1992 JAFTA maps. Aerial photographs show that between 1992 and 1996, old growth and secondary forest changed by -5.35% and 3.7%, respectively. Incidentally, the population growth rate was 3.1% (refer Figure 5-2).

Palawan Mainland: Lowland evergreen rainforest (dipterocarp forest) characterizes El Nido North. The species of flora recorded are shown in Table 5-5. Old growth forests responsible for providing rich soil and essential water to agricultural areas in flatland have disappeared at a rate of around 5% per year due to ongoing logging and kaingin.

Islands of Cadlao, Matinloc, Tapiutan, Guntao, Miniloc, Lagen, Pangulasian: The life forms in the limestone forests of the study area (refer to Table 5-6) are tolerant to (i) extremely hot conditions, (ii) low water supply and (iii) poor nutrient supply. Limited accessibility has allowed the vegetation cover in the islands to remain intact while a variety of fruit-bearing trees, plants, and ruderal weeds, have changed the original state of vegetation in the flat coastal beach area.

Islands are located on the path of migratory birds and have an important role as resting sites. They also provide breeding sites for the swiftlet which provide livelihood to local communities. Relatively large islands such as Cadlao and Lagen, which are located relatively close to Palawan mainland, have many fruit-bearing trees.

(2) Present Distribution of Key Species

The results from interviews on the distribution of valuable and endangered species (refer to Table 5-7) suggest that the present state of the Philippine Cockatoo and Palawan Hornbill is indicative of human pressure on the ecosystem. The habitat of the Philippine Cockatoo has been limited to old growth forest. The Tabon bird, which particularly needs beach forest for breeding, used to be distributed widely in Palawan but is now found in smaller areas. Their habitats have been significantly narrowed and split into smaller areas (refer to Figure 5-6). The Palawan bear cat is the most rare mammal found in this area.



(3) Issues on Environmental Degradation

Mainland

- a) Destruction of large forest cover, makes imperative the regeneration of natural forest in order to supply nutrients and waters essential to agriculture in the flatland area.
- b) The use of agricultural chemicals which have adverse effects on the has started. Effective control of the use of these chemicals is called for.

Figure 5-3
Estimated Forest Type in El Nido North:
Old Growth and Secondary Growth as Judge by JAFTA map

Legend:

-  Old Growth Forest
-  Secondary Forest

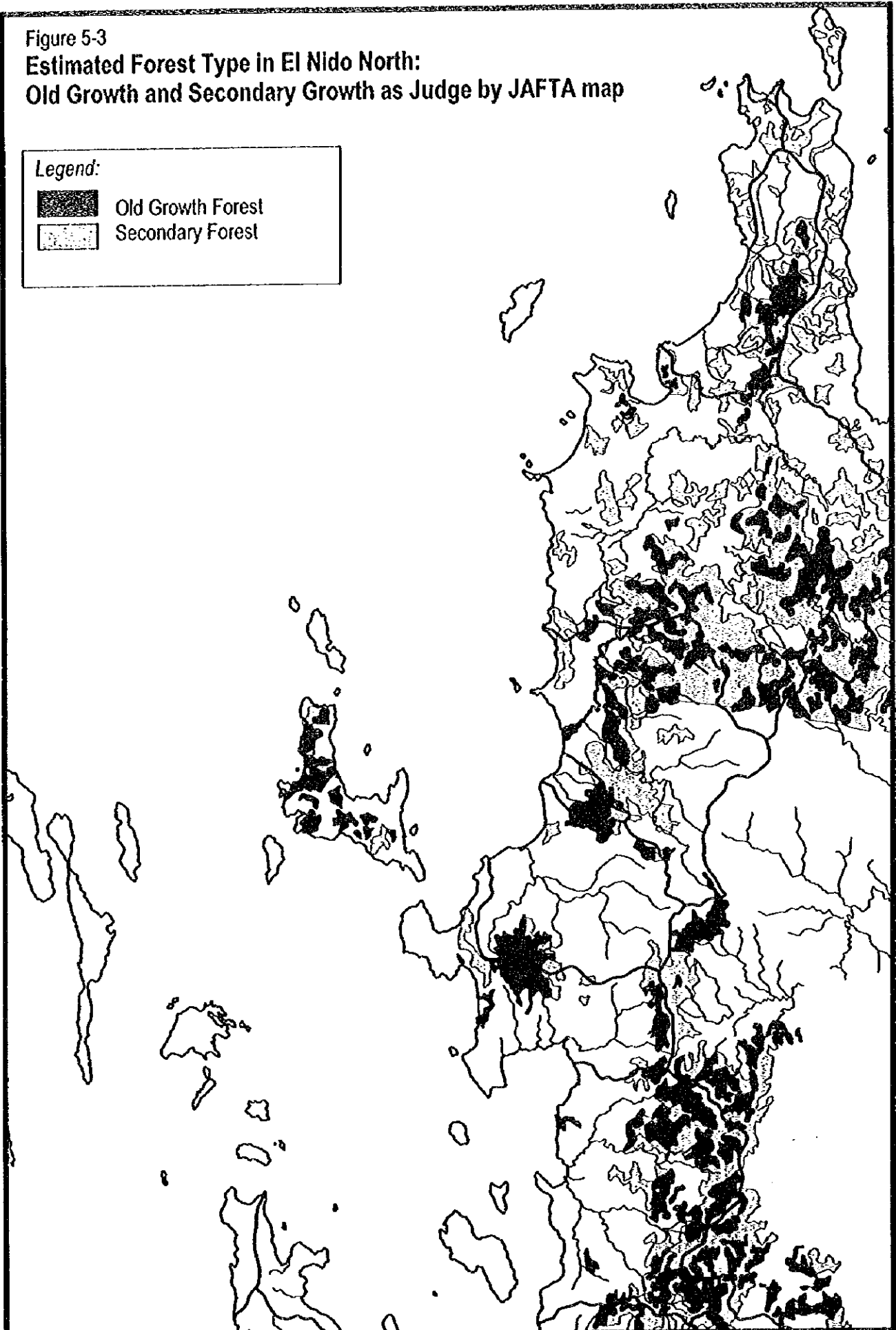


Table 5-5 Tree Species in the Old Lowland Evergreen Forest in El Nido Mainland

Botanical Name	Family Name	Local Name	Habit
<i>Adenanthera intermedia</i>	Loguminosae	Tanglin	l-t
<i>Azolla rhomboldea</i>	Loguminosae	Tindalo	m-t
<i>Alstonia scholaris</i>	Apocynaceae	Dita	l-t
<i>Artocarpus blancoi</i>	Moraceae	Antipolo	l-t
<i>Bischofia javanica</i>	Euphorbiaceae	Tual	l-t
<i>Calophyllum blancoi</i>	Guttiferae	Bitanghol	m-t
<i>Canarium</i> (several species)	Burseraceae	Pagsahingin	l-t
<i>Celtis philippinensis</i>	Ulmaceae	Malaikno	l-t
<i>Diospyros philosantha</i>	Ebenaceae	Bolong-eta	m-t
<i>Dipterocarpus grandiflorus</i>	Dipterocarpaceae	Apitong	l-t
<i>Draconomelon dao</i>	Anacardiaceae	Dao	l-t
<i>Draconomelon edule</i>	Anacardiaceae	Lamio	l-t
<i>Dysoxylum</i> (several species)	Meliaceae		l-t
<i>Endospermium peltatum</i>	Euphorbiaceae	Gubas	l-t
<i>Ficus variegata</i>	Moraceae	Tangisand bayauak	l-t
<i>Koordesiodendron pinnatum</i>	Anacardiaceae	Amugls	m-t
<i>Lagestroemia speciosa</i>	Lythraceae	Banaba	m-t
<i>Litchi chinensis</i> ssp <i>philippinensis</i>	Sapindaceae	Alupag-amo	m-t
<i>Macaranga</i> (several species)	Euphorbiaceae		m-t
<i>Mangifera altissima</i>	Anacardiaceae	Pahunan	m-t
<i>Myristica philippinensis</i>	Myristicaceae	Duguan	m-t
<i>Palaquium</i> (several species)	Sapotaceae	Taluto	l-t
<i>Pterocymbium tinctorium</i>	Sterculiaceae		l-t
<i>Serialbizia acio</i>	Loguminosae	Akle	l-t
<i>Strombosia philippinensis</i>	Oleaceae	Tamyuan	m-t
<i>Terminalia</i> (several species)	Combretaceae		l-t
<i>Ziziphus talanal</i>	Phanaceae	Balakat	l-t

Source: Terrestrial Survey, 1996

¹Symbols denote as follows: s-t = shrub or small tree (3-30cm diam. x 2-5m high)
m-t = medium sized tree (30-40cm diam. x 5-15m high)
l-t = large tree (over 40cm diam. X over 15m high)

- c) Edible bird nests, a product of the swiftlet, have been hunted and traded for many years yet data on its harvesting and trading have not been recorded making an assessment of the impact these activities difficult.
- d) Vector control programs (control of the malaria carrier) have been planned and implemented at certain levels to stop the high incidence of malaria. Spray insecticides can be expected to significantly impact the environment, especially the little-studied fresh water ecosystem.

Table 5-6 List of Plants in the Karst Formation of Islands in El Nido North

Botanical Names	Family Names	Local Names	Habit
<i>Afzelia rhomboidea</i>	Lemninosae	Tindalo	m-t
<i>Aglaia clarkii</i>	Meliaceae	Tukang - kalao	m-t
<i>Aglaia elliptifolia</i>	Meliaceae	Saibong	s-t
<i>Aglaia oligantha</i>	Meliaceae	Ansa	s-t
<i>Aglaia</i> (other species)	Meliaceae		s-t
<i>Alstonia scholaris</i>	Apocynaceae	Dita	l-t
<i>Ampelopsis</i>	Vitaceae		vine
<i>Antidesma</i>	Euphorbiaceae		s-t
<i>Ardisia</i>	Myrsinaceae		s-t
<i>Artocarpus blancoi</i>	Moraceae	Antipolo	l-t
<i>Barringtonia asiatica</i>	Lecythidaceae	Botong	l-t
<i>Bauhinia</i>	Leguminosae		s-t
<i>Begonia</i>	Begoniaceae	Begonia	herb
<i>Buchanania arborescens</i>	Ancardiaceae	Balinghasai	m-t
<i>Calamus merrillii</i>	Palmae	Rattan	vine
<i>Calophyllum inophyllum</i>	Cuttiferae	Bitagog	l-t
<i>Cayratia arborescens</i>	Vitaceae		vine
<i>Caryota cumingii</i>	Palmae	Fishtail palm	palm
<i>Canarium asperum</i>	Burseraceae	Pagsahingin	l-t
<i>Canarium hirsutum</i>	Burseraceae	Milipili	l-t
<i>Capparis</i>	Capparidaceae		s-t
<i>Cassia javanica</i>	Leguminosae	Kanafistula	s-t
<i>Celtis</i>	Ulmaceae		s-t
<i>Champereia manillana</i>	Opiliaceae	Malalukban	s-t
<i>Connarus culionensis</i>	Connaraceae		s-t
<i>Cordia dichotoma</i>	Boraginaceae	Anonang	m-t
<i>Crataeva religiosa</i>	Capparidaceae	Balai - lamok	s-t
<i>Cratogeomys celebicum</i>	Guttiferae	Paguringon	s-t
<i>Crinum asiaticum</i>	Amaryllidaceae	Bakong	herb
<i>Croton tiglium</i>	Euphorbiaceae	Tuba	s-t
<i>Cyathocalyx</i>	Annonaceae		s-t
<i>Cynometra ramiflora</i>	Leguminosae	Balitbitan	s-t
<i>Daemonorops margaritae</i> var <i>palwanicus</i>	Palmae	Rattan	vin
<i>Dinorchloa</i>	Gramoneae	Climbing Bamboo	vine
<i>Diospyros</i> (Maba) <i>buxifolia</i>	Ebenaceae	Gumunan	m-t
<i>Diospyros philippensis</i>	Ebenaceae	Kamagong	m-t
<i>Diospyros maritima</i>	Ebenaceae	Malatinta	m-t
<i>Drynaria quercifolia</i>	Polypodiaceae	Oak-leaf fern	herb
<i>Drypetes</i>	Euphorbiaceae		s-t
<i>Dysoxylum</i>	Meliaceae		s-t
<i>Elaeocarpus</i>	Elaeocarpaceae		s-t
<i>Epipremnum</i>	Araceae		herb
<i>Erythrina variegata</i>	Leguminosae	Dapdap	m-t
<i>Euphorbia</i>	Euphorbiaceae		herb
<i>Euphorbia didyma</i>	Sapindaceae	Alupag	m-t
<i>Garcinia</i>	Guttiferae		s-t
<i>Garuga floribunda</i>	Burseraceae	Bogo	l-t
<i>Gomphandra</i>	Icacinaceae		m-t
<i>Gnetum gnemon</i> var <i>gnemon</i>	Gnetaceae	Bago	s-t
<i>Heritiera littoralis</i>	Sterculiaceae	Dungon late	m-t
<i>Hernandia ovigera</i>	Hernandiaceae	Koron-koron	m-t
<i>Hibiscus tiliaceus</i>	Malvaceae	Malubago	s-t
<i>Hiptage pubescens</i>	Malpighiaceae	Dalumit	s-t

Table 5-6 Cont.

Botanical Names	Family Names	Local Names	Habit
Hoya	Asclepiadaceae		herb
Hydnophytum	Rubiaceae		herb
Impatiens	Balsaminaceae	Kamantigui	herb
Intsia bijuga	Leguminosae	Ipil	l-t
Jasminium	Oleaceae		herb
Kalanchoe integra	Crassulaceae		herb
Kingiodendron alternifolium	Leguminosae	Batete	l-t
Koordersiodendron pinnatum	Anacardiaceae	Amugis	m-t
Lagerstroemia piriformis	Lythraceae	Batitinam	l-t
Mallotus floribundus	Euphorbiaceae	Tulu-tulu	s-t
Mangifera altissima	Anacardiaceae	Pahunan	m-t
Merremia peltata	Convolvulaceae		vine
Mimusops parviflora	Sapotaceae	Bansalagin	m-t
Myristica quatteriaefolia	Myristicaceae	Duguan-mabolo	m-t
Myristica umbellata	Myristicaceae	Duguan-pinayong	m-t
Orchrosia glomerata	Apocynaceae	Dins	s-t
Oldenlandia	Rubiaceae		herb
Orania paraguayensis (endemic)	Palmae	Palawan banga	l-t
Orchids (several species)	Orchidaceae		herb
Pandanus	Pandanaceae		shrub
Parinari corymbosa	Amygdalaceae	Liusin	l-t
Philodendron	Araceae		vine
Pleomele angustifolia	Liliaceae	Malasambal	shrub
Poikilospermum	Moraceae		s-t
Pongamia pinnata	Leguminosae	Bani	m-t
Pseuderanthemum pulchellum	Acanthaceae		shrub
Pterocarpus indicus	Leguminosae	Narra	l-t
Pterocymbium tinctorium	Sterculiaceae	Taluto	l-t
Pterospermum diversifolium	Sterculiaceae	Bayok	m-t
Scheffiera ellipticifoliata	Araliaceae		shrub
Scheffiera palawanensis	Araliaceae		shrub
Sindora supa	Leguminosae	Supa	m-t
Spondias purpurea	Anacardiaceae	Sineguelas	s-t
Sterculia ceramica	Sterculiaceae	Malakalumpang	m-t
Syzygium	Myrtaceae		s-t
Tarrieta sylvatica	Sterculiaceae	Dungon	l-t
Taxotrophis macrophylla	Moraceae	Kuyos-kuyos	s-t
Veitchia merrillii (endemic)	Palmae	Bunga de Jolo	palm
Vitex parviflora	Verbenaceae	Molave	m-t
Wallaceodendron celebicum	Leguminosae	Bauyo	m-t
Wrightia lanete	Apocynaceae	Lanete	s-t
Ziziphus talanai	Rhamnaceae	Balakat	l-t

Source : Study Team ; Terrestrial Survey, 1996

Legend:

s-t = shrub or small tree (3-30 diam x 2-5 m high)

m-t = medium sized tree (30-40 cm diam x 5-15 m high)

l-t = large tree (over 40 cm diam x over 15 m high)

Table 5-7 List of Endangered and Valuable Species in El Nido North

1. Mainland Survey Sites

Species	Common Name	Zone 4		Happy Valley	Sitio Maranlao
		Bgy. Corong-corong	Bgy. Pasadena	Bgy. Borotuan	
a. Avian Species					
1. <i>Megapodius Freycinet</i>	Incubator Bird	Absent	common in coastal areas with dense growths	absent	common in beach forests
2. <i>Cacalua haematuropygia</i>	Philippine Cockatoo	uncommon and limited to forest areas	very rare	absent	common when rice fields mature
3. <i>Polyplectron emphanum</i>	Palawan Peacock	common in forested areas	uncommon and limited to forested areas	rare and limited to forested areas	common even near cultivated areas
4. <i>Gracula religiosa</i>	Talking Myna	common in forested areas	common even near cultivated areas	absent	common even near cultivated areas
5. <i>Ducula Pickeringii</i>	Gray Imperial Pigeon	common in forested areas	common in forested areas	uncommon and limited to forested areas	common even near cultivated areas
6. <i>Anthracosceros marchei</i>	Palawan Hornbill	uncommon and limited to forested areas	uncommon and limited to forested areas	absent	common but limited to forested areas
7. <i>Tanygnathus lucionensis</i>	Blue-naped Parrot	uncommon but not limited to forested areas	uncommon	uncommon	common especially when rice is mature
8. <i>Prioniturus platanae</i>	Palawan Racket - Tailed Parrot	uncommon	uncommon	uncommon	common
9. <i>Caloenas nicobarica</i>	Nicobar Pigeon	uncommon	common in forested areas	absent	common in forested areas
10. <i>Ardea Sumatrana</i>	Philippine Hawk Owl	absent	absent	absent	absent
11. <i>Ninox scutulata</i>		not known by respondents	common in forested areas	not known by respondent	common even near cultivated areas
b. Mammals					
1. <i>Manis Javanica</i>	Palawan Scaly Anteater	common	common	common but limited to areas with dense growths	common
2. <i>Arctictis binturong</i>	Palawan Bear Cat	uncommon	uncommon	uncommon and limited to areas with dense growths	uncommon
3. <i>Sundasciurus spp</i>	Sand Squirrel	common	common	common	common
4. <i>Hystrix pumila</i>	Porcupine	common	common	common	common
5. <i>Felis bengalensis</i>	Little Leopard Cat	uncommon	common even near cultivated areas	uncommon and limited to areas with dense growths	common even near cultivated areas
6. <i>Aonyx cinerea</i>	Clawless Otter	uncommon and limited to riparian areas	common	rare	common
7. <i>Paradoxurus hermaphroditus</i>	Palm Civet	common	common	uncommon	common
8. <i>Viverra tangalunga</i>	Malay Civet	uncommon	uncommon	rare	uncommon
9. <i>Macaca fascicularis</i>	Philippine Long Tail Monkey	very common	common	common but limited to areas with dense growths	common
10. <i>Acerodon spp</i>	Pabay Flying Fox	common but seasonal	common but seasonal	rare	common but seasonal
11. <i>Sus Barbalus</i>	Wild Boar	uncommon	common	common but limited to areas with dense growths	common
12. <i>Mydaus marchei</i>		common	common	common	very common

Source: Study Team



Table 5-7 Cont.

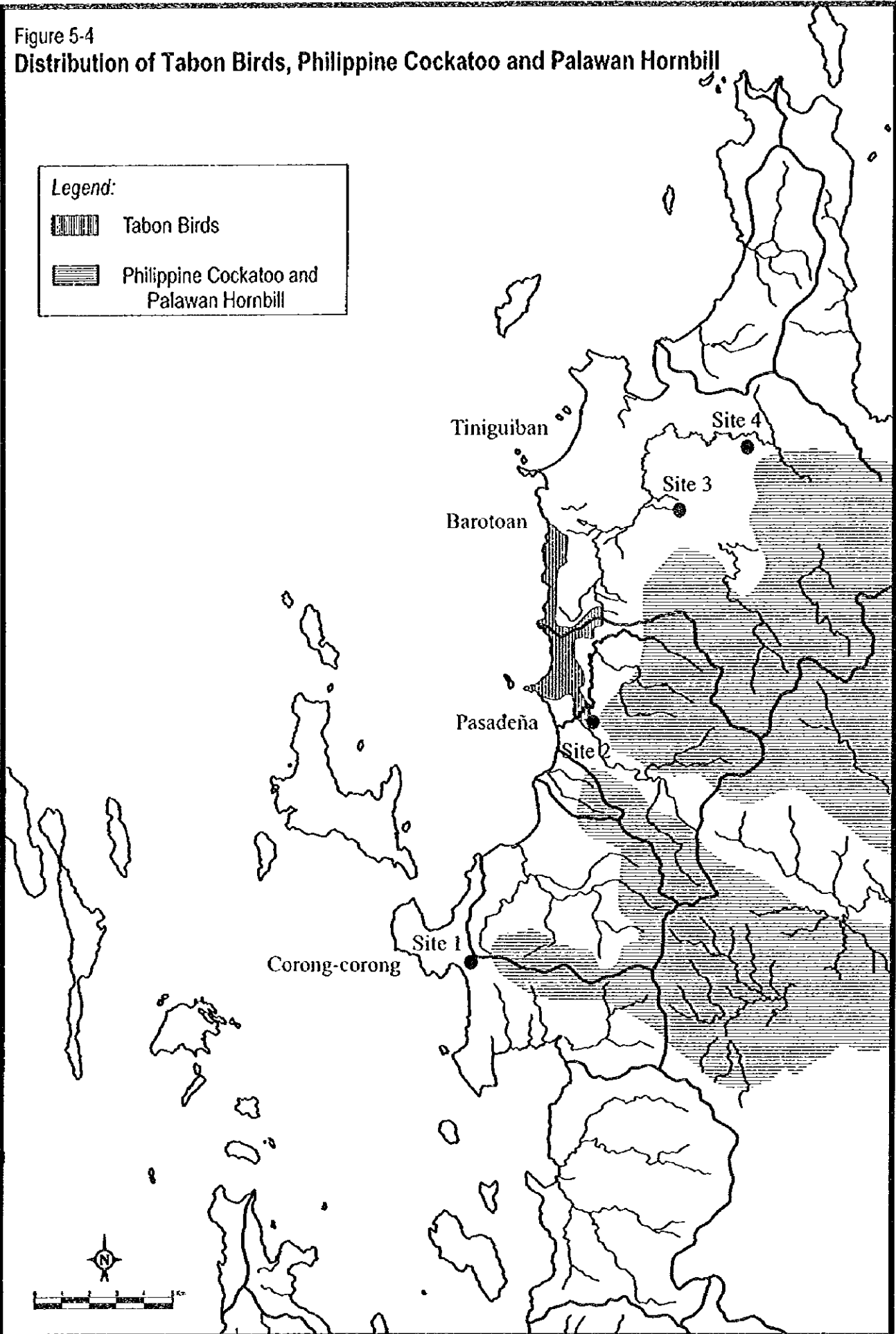
2. Islands In Bacuit Bay				
Species	Common Name	Cadiao Island	Miniloc Island	Pangulasian Island
a. Avian Species				
1. <i>Megapodius Freycinet</i>	Incubator Bird	common except near built up areas	uncommon and limited to forested hills and isolated beach forests	common intact in beach areas
2. <i>Cacatua haematuropygia</i>	Philippine Cockatoo	uncommon-rare	absent	rare (possibly migratory)
3. <i>Polyplectron emphanum</i>	Palawan Peacock	uncommon and limited to forested areas	absent	common even near built-up areas
4. <i>Gracula religiosa</i>	Talking Myna	common even near cultivated areas	absent	rare
5. <i>Ducula Pickeringii</i>	Gray Imperial Pigeon	common even near cultivated areas	common but seasonal	common
6. <i>Anthracoceros marchei</i>	Palawan Hornbill	common in forested area	common in forested area	common in forested area
7. <i>Tanygnathus lucionensis</i>	Blue-naped Parrot	common	absent	rare (possibly migratory)
8. <i>Prioniturus palanae</i>	Palawan Racket - Tailed Parrot	common	absent	absent
9. <i>Caloenas nicobarica</i>	Nicobar Pigeon	common in forested area	absent	absent
10. <i>Ardea Sumatrana</i>		rare	rare (but observed to be nesting in one lagoon)	absent
11. <i>Collocalia sp.</i>	Palawan Racket - Tailed Parrot	common	common	absent
b. Mammals				
1. <i>Manis Javanica</i>	Palawan Scaly Anteater	common	introduced	common in area with dense growths
2. <i>Arctictis binturong</i>	Palawan Bear Cat	not known by respondents	introduced	absent
3. <i>Sundasciurus spp.</i>	Sand Squirrel	common	common even in built up area	uncommon
4. <i>Hystrix pumila</i>	Porcupine	uncommon and limited to forested areas	introduced	absent
5. <i>Felis bengalensis</i>	Palawan Scaly Anteater	absent	absent	absent
6. <i>Aonyx cinerea</i>	Anteater	absent	introduced/but did not survive	absent
7. <i>Paradoxurus hermaphroditus</i>	Palm Civet	common	uncommon/introduced	absent
8. <i>Viverra zangalunga</i>	Malay Civet	common even in cultivated areas	uncommon/introduced	absent
9. <i>Macaca fascicularis</i>	Philippine Long Tail Monkey	common even in cultivated areas	very common even in built-up areas	common but limited to forested areas
10. <i>Acerodon spp.</i>	Panay Flying Fox			common but seasonal
11. <i>Sus Barbatas</i>	Wild Boar	uncommon and limited	absent	absent
12. <i>Mydaus marchei</i>		to riparian areas		absent

Source: Study Team

Figure 5-4
Distribution of Tabon Birds, Philippine Cockatoo and Palawan Hornbill

Legend:

-  Tabon Birds
-  Philippine Cockatoo and Palawan Hornbill



Source: Study Team, based on interviews
 Note: Site 1, 2, 3 and 4 denote the locations of interview surveys on endangered species.

- e) Old growth forest and well-developed secondary forests have to be protected for soil conservation and water retention.
- f) Resting and/or breeding sites for migrating birds should be made available in wetland areas including those areas which have been converted to rice fields.

Islands

- a) Exotic species of flora and fauna, such as bear cats and palm civets, and other animals like monkeys and dogs have been introduced into the fragile island ecosystem with detrimental effects to the existing environment.
- b) Breeding sites of endangered species including Hawksbill sea turtle and wild birds, especially the Tabon birds, are very valuable in order to ensure their survival. These sites need to be studied and assessed properly from the viewpoint of bio-diversity conservation.

2) Marine Environment

(1) Coral Reef

While excellent coral reef was found along the coast of off-shore islands most of the coral along the coast of the main island was rated "poor" (refer to Figure 5-5).

(2) Seagrass Bed

Seagrass is very scarcely distributed throughout the case study area (refer to Figure 5-6).

(3) Mangrove Forest

There are no extensive and dense mangrove forests in the area (refer to Figure 5-7).

(4) Marine Wildlife

Dugongs have often been observed in El Nido. Sea turtles have also been known to nest on Gointongoan Island (Turtle Island) and on other small off-shore islands. Members of the Study Team sighted some dugongs and sea turtles during their field survey in September 1996.

Figure 5-5
Distribution of Coral Reef in
El Nido North

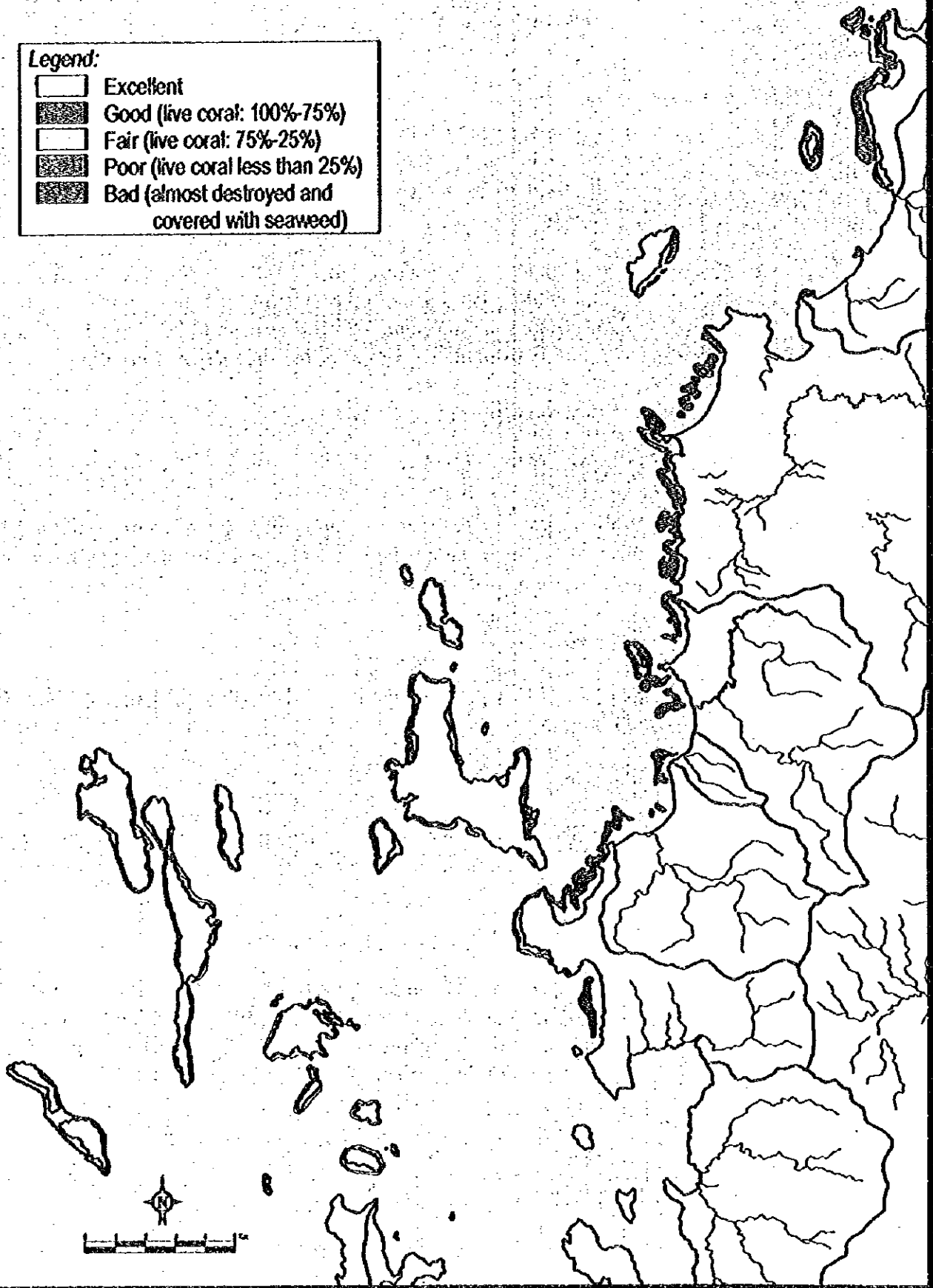
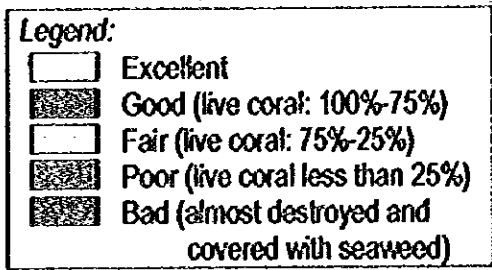


Figure 5-6
**Seagrass Bed Distribution
in El Nido North**

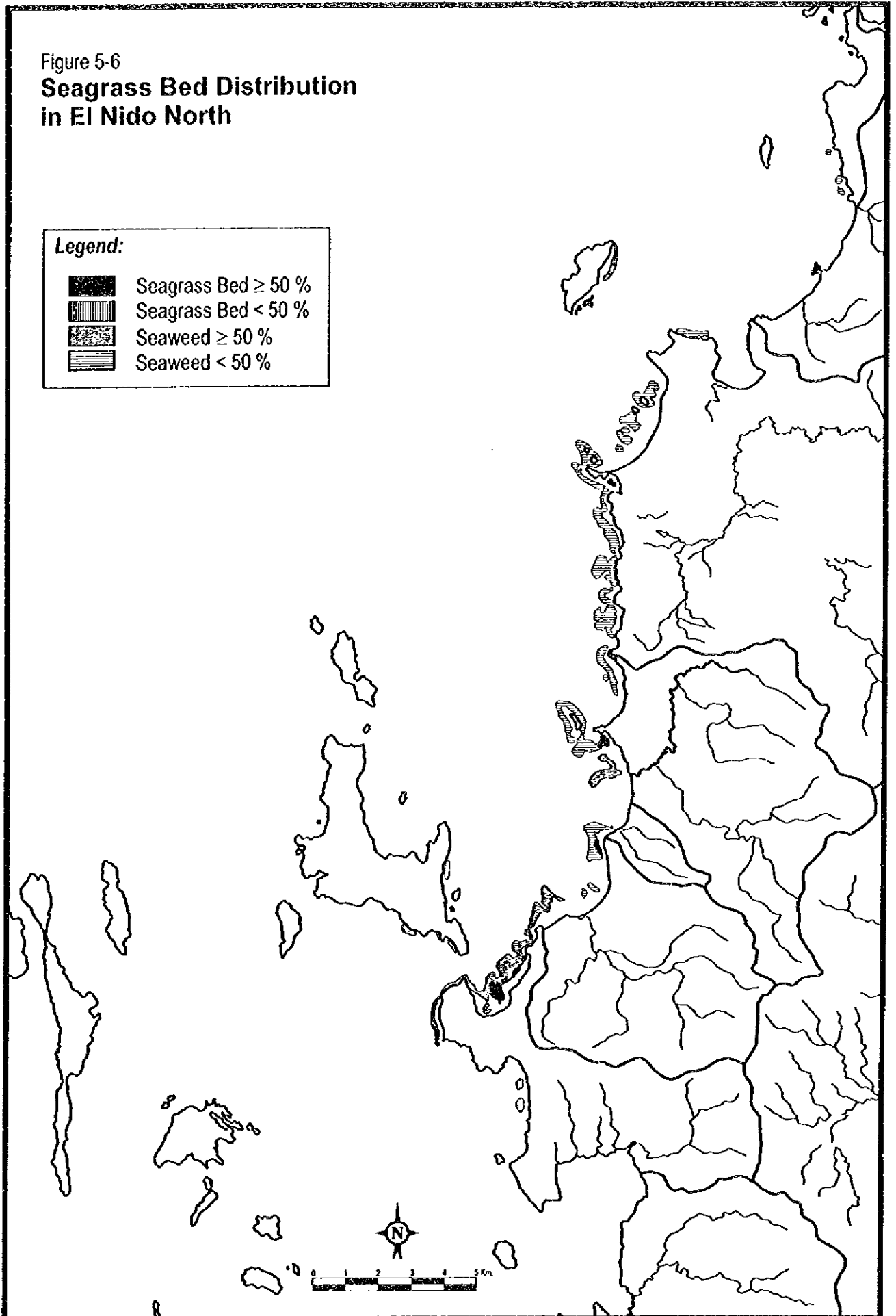
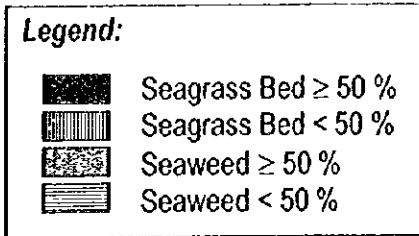
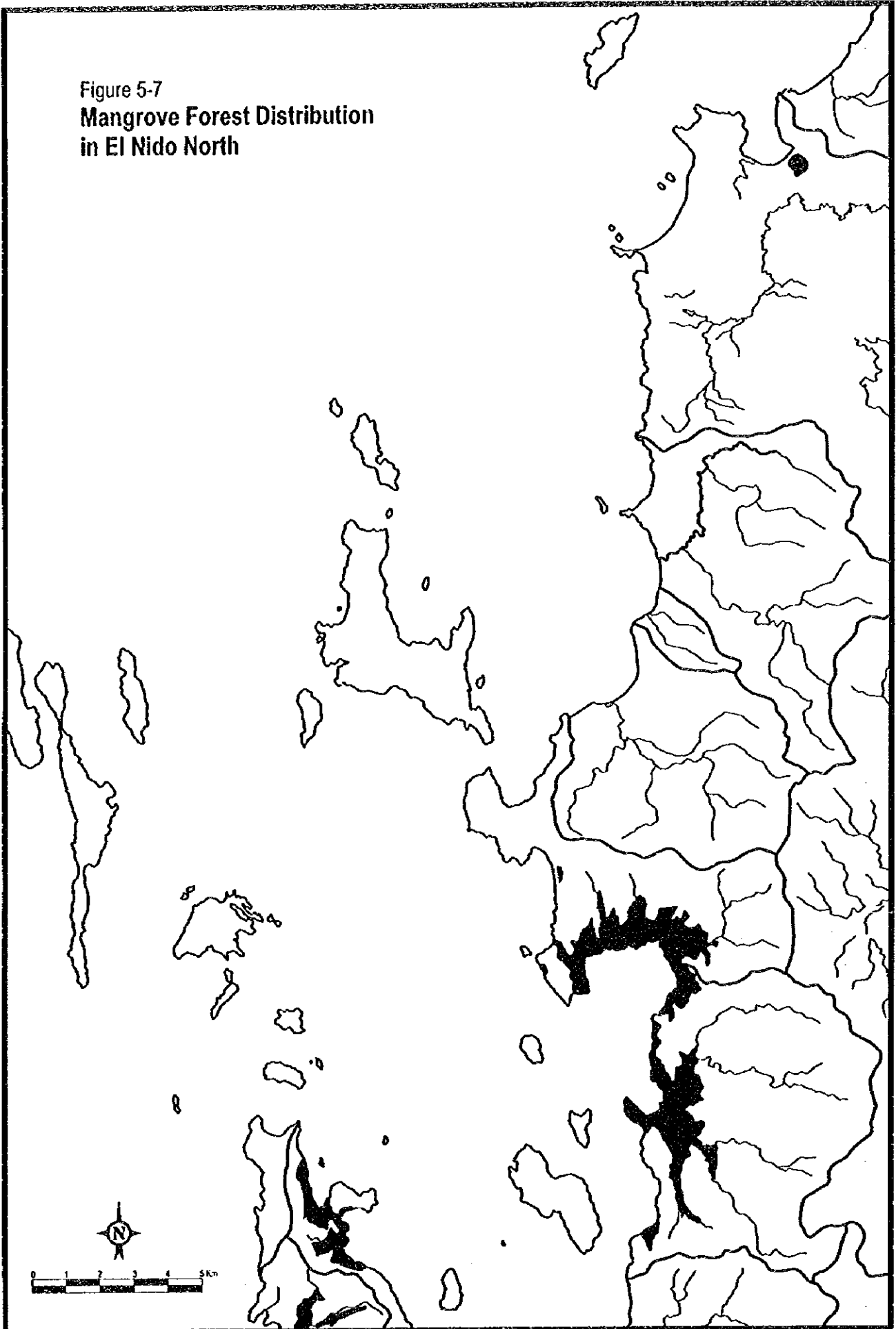


Figure 5-7
Mangrove Forest Distribution
in El Nido North



(5) Others

There were indications of destructive activities, such as dynamite fishing and anchoring of boats in high-quality coral reef areas. Also, driftwood which can obstruct the nesting of sea turtles, was found scattered on the beach after rough weather conditions.

(6) Issues and Recommended Actions

- Technical measures and simple remedies like planting in upstream areas should be undertaken to prevent soil discharge.
- Illegal fishing practices should be banned through strict law enforcement.
- Attention should be given to the anchoring of boats in coral reef areas.
- Driftwood should be removed from sand beaches to make way for sea turtle nests.
- Incidental and intentional catching of dugongs and sea turtles should be prevented through control of fishing activities and promotion of awareness for the need to conserve endangered species.

3) Social Environment

The indigenous peoples, all belonging to the Tagbanua group, are distributed in the of the north to northwestern coasts of the municipality as shown in Table 5-8, and are engaged in agriculture and fishery. Presently, they are preparing to claim "Ancestral Domain" with the assistance of PANLIPI. Information on the location and scale of the "Ancestral Domain" is not available at present as reaching a consensus among the members of the group is proving difficult.

Table 5-8 Location and Number of Indigenous Peoples by Barangay

Barangay	Sitio	Household	No. of Members
1. Barangay Masagana (Poblacion)		1	2
2. Barangay Buena Suerte (Poblacion)		1	5
3. Barangay Tiniguiban,	Catoldan	3	8
	Cagbuli	2	4
	Diapila	1	3
	Dagmay	5	19
	Sabang	1	5
	Dagoyon	2	4
	Maranlao	3	more than 10
4. Bucana	Yocoton	7	6
	Patuyo	3	6
	(Poblacion)	3	11
5. New Ibajay		4	7
6. Villa Paz		1	159
Total		40	159

Source: Social Survey 1996

Another problem of social environment in the case study area is the decreasing number of indigenous people. Currently, 40 households with 159 members are scattered throughout the area. Also, some Tagbanuas have already become urban dwellers, while others are beginning to adopt the ways of their Christian neighbors, thus making it difficult to preserve their indigenous culture. Even if “ancestral domain” is awarded, this tendency to enter mainstream society may not change and in due time, sustainable management of natural resources may become more difficult with the loss of traditional ecologically-sound practices.

5.2 Environmental Management Plan

5.2.1 Environmental Management Area Classification

1) Criteria and Area Classification

In order to provide a basis for environmental management plan formulation, the study area has been classified based on the assessment of existing environmental conditions and levels of needed actions. Conservation and Preservation Areas have been delineated based on the criteria shown in Table 5-9.

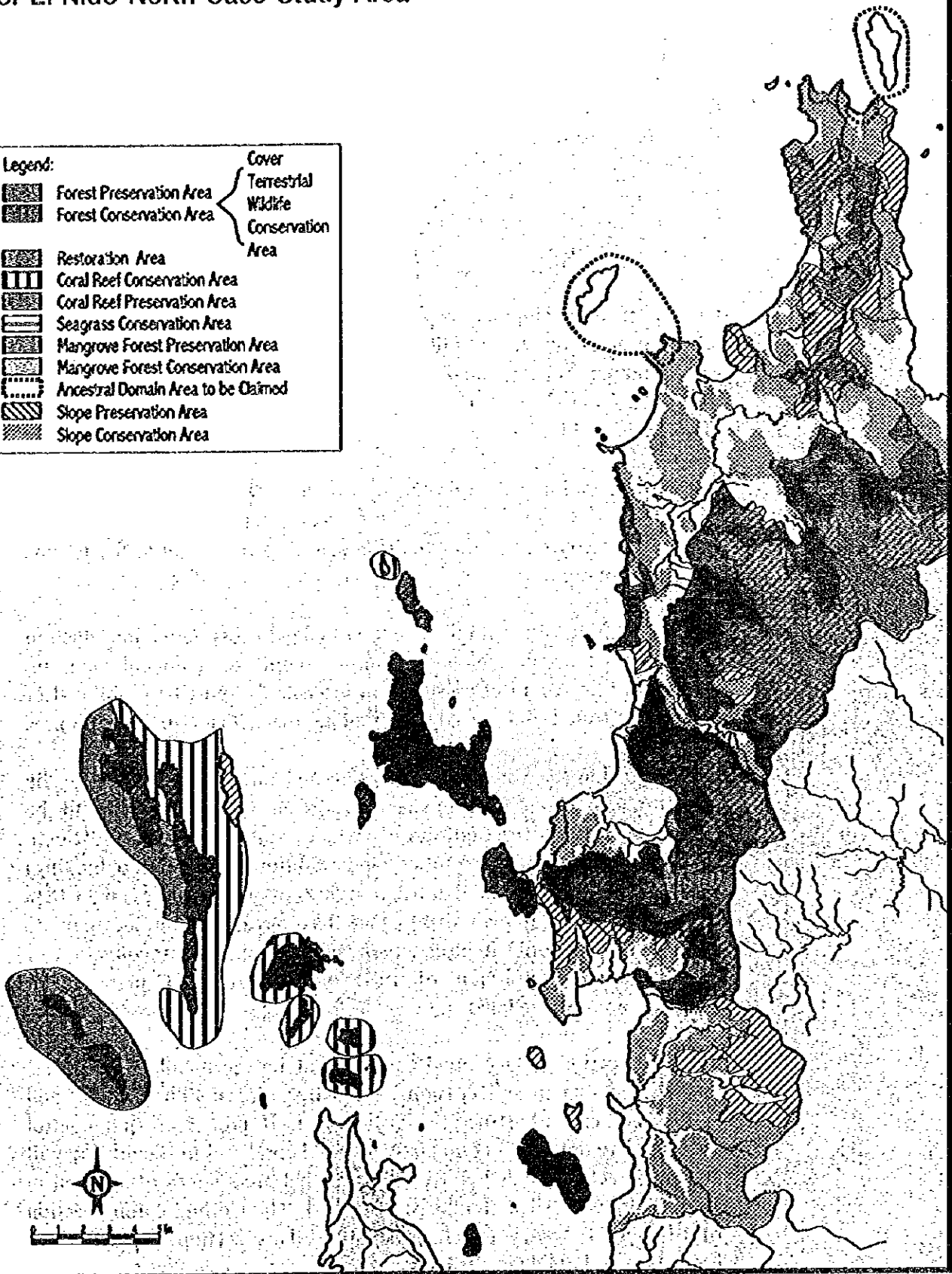
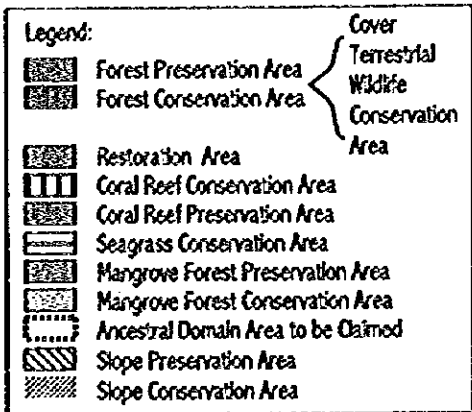
Table 5-9 Criteria for Environmental management Area Classification

Environment		Criteria for	
		Preservation Area	Conservation Area
T e r r e s t r i a l	Forest	<ul style="list-style-type: none"> - intact, unique, and biologically significant ecosystem - mossy forest and old growth forest 	<ul style="list-style-type: none"> - large-scale secondary forest. Forest Quasi - Conservation Area - residual forest
	Slope	<ul style="list-style-type: none"> - area with slope of above 50% <p>Slope Conservation Area</p>	<ul style="list-style-type: none"> - area with slope range of 18% - 50%
	Terrestrial Wildlife		<ul style="list-style-type: none"> - habitat of endangered and endemic species
M a r i n e	Coral Reef	<ul style="list-style-type: none"> - more than 75% live coral cover 	<ul style="list-style-type: none"> - 50% to 70% live coral cover - conservation areas surround preservation areas
	Seagrass		<ul style="list-style-type: none"> - seagrass beds with at least 50% cover of macrophytes
	Mangrove Forest	<ul style="list-style-type: none"> - slightly disturbed mangrove forest with an area of more than 500 ha. - moderately disturbed mangrove forest with an area of more than 1000 ha. 	<ul style="list-style-type: none"> - slightly disturbed mangrove forest with area of less than 500 ha. - moderately disturbed mangrove forest with an area of 500-1000 ha. - severely disturbed mangrove forest with an area of more than 1000 ha.
	Dugong		<ul style="list-style-type: none"> - frequent dugong sighting
	Sea turtle		<ul style="list-style-type: none"> - dominant nesting beach of sea turtles

Source: Study Team

The results of the work are shown in Figure 5-8 and explained in the following sections.

Figure 5-8
 Environmental Management Area Classification
 for El Nido North Case Study Area



2) Terrestrial Environment

- (a) **Forest Management:** Zoning for Forest Management Areas in the El Nido case study area should be divided into mainland and islands from the viewpoint of environmental conditions.

Mainland: In the preservation areas of mainland Palawan, clusters of old growth forest surrounded by well-developed secondary forest and karst forest are to be Forest Preservation Areas. The patches surrounded by these areas are to be designated natural recovery zones. The guidelines set for each zone shall be the same for the Busuanga area with only slight modification. Beach forest, shall be strictly protected from any type of human impacts. Adjacent secondary forest and brush land are to be conservation areas.

Islands: The development capacity of the small island in Bacuit Bay is relatively small due to its limited flat areas. With their limited capacity to sustain human impacts, small islands can be considered environmentally-sensitive. Therefore, construction of accommodation and camping facilities is prohibited.

In the preservation areas of Guntao, Tapiutan, Matinloc and Inambogol islands, where very unique stunted limestone forests grow, only scientific research and environmental education activities beneficial to the islands will be encouraged.

In consideration of the fragility of small island ecosystems, introduction of any exotic species, including ones endemic to mainland Palawan, which have no record of existence in the islands, must be prohibited or strictly controlled (through caging or gating mechanism, for example).

In Cadlao, Lagen, Minitoc, Pangulasian and other islands close to the mainland, limestone and lowland evergreen forest areas are to be assigned as conservation areas where only scientific research, environment education activities, and traditional uses (Nido hunting) will be allowed. Development of up to 50% of areas with less than 18% slope and where human disturbance has already occurred, may be permitted if and only if proper permission is obtained (acquisition of ECC through submission of EIS) and environment management measures are implemented.

- (b) **Slope Protection:** Once good coral reef along the mainland coast has deteriorated due to soil erosion caused by deforestation, kaingin, and agriculture and infrastructure development. If proper erosion control measures are not taken, comparatively good coral reef in Bacuit Bay will also be affected. Eroded cultivated areas that are sources of siltation in Bacuit Bay watershed should be measured. The Corong-corong section of El Nido - Taytay generates siltation. This section requires slope protection and drainage channels.

(c) **Terrestrial Wildlife Conservation:** The sensitive Philippine Cockatoo, Palawan Hornbill and Palawan Bear Cat ecosystem within the lowland evergreen and beach forests indicate levels of human pressure. Therefore, remaining old growth and well-developed secondary forests in the mainland, including continuing brush lands, will be Terrestrial Environment Management Areas. All islands will be designated similarly. For the protection of the endangered Hawksbill sea turtle and Tabon bird, only strictly monitored short-term activities will be allowed in beach forest areas.

3) Marine Environment

Sewage discharge, waste water, and garbage all contribute to the deterioration of small island environments. Therefore, construction of accommodation facilities and camping will be prohibited on small islands. El Nido Marine Reserve, will also be damaged by household and resort sewage and garbage disposal unless proper counter-measures are provided.

(a) **Coral Reef:** Damaged coral reefs caused by anchoring are seen in Bacuit Bay. Anchorage should be prohibited in Preservation Areas, while mooring buoys at sand bottoms may be allowed. Matinfoc Island is classified as Core Zone according to ECAN Zoning due to its well-conserved coral reef. In the west of island, however, a pier, dormitory and a shrine, all made of concrete materials, were constructed by a private group in 1996. These structures and their operation may destroy valuable coral reef and contribute to the deterioration of the marine ecosystem and landscape. Proper actions should be taken to stop illegal construction and the environment should be restored to its original form.

(b) **Seagrass:** Seagrass beds should be conserved for fishery resources and Dugong. Therefore, construction of any structures should not be allowed except pile-type structures which are subject to permits.

Small-scale undisturbed beds of seagrass have which may help restore components of the mainland ecosystem have been identified. Therefore, control of activities in these areas is imperative.

(c) **Mangrove forest:** The capability of the mangrove forests in Bacuit Bay to restrain siltation is limited. To avoid siltation, other direct measures, such as slope protection, should be employed.

(d) **Wildlife:** Although Guintogaoan Island is considered a sea turtle conservation area, more information on the sea turtle nesting sites and Dugong habitat must be gathered. Water Monitor Lizards, and other scavengers have been found on the island. So as not to attract these species, and thus protect the sea turtles, food should be prohibited in the habitat areas. Monitoring and control of the scavenger population are

necessary. Debris, such as driftwood, should also be removed from the beaches so as not to hinder the landing of sea turtles.

4) **Social Environment**

Management plans for each Indigenous cultural community area should be prepared in cooperation with PCSDS, municipal governments, and NGOs. Management plans should include a plan for sustainable use of natural resources. DENR has yet to recognize ancestral domains and lands, of which boundaries were delineated based on the location of existing indigenous communities and interview surveys.

5) **Landscape**

Preservation Landscape Area should be established in lime stone forests especially those of higher elevation except where other sub-zoning areas have already been established. Observation trails may be permitted here.

5.2.2 Required Environmental Management Activities

1) **Identified Management Measures**

In order to protect and conserve the environment in the study area on the basis of the proposed Environmental Management Area Classification, a number of management measures need to be undertaken. They are:

- (a) restoration of degraded areas
- (b) constant monitoring of terrestrial and marine environments
- (c) water pollution control
- (d) solid waste management

2) **Restoration of Environmentally Degraded Areas**

This work involves reforestation and rehabilitation of eroded areas. Natural recovery aims to rehabilitate forest gaps and corridors for wildlife. Reforestation, including that of mangrove forest consists of nursery operation, plantation establishment, maintenance and protection, administration and supervision. In the case study area there are 700 ha that require natural recovery. There are approximately 300 ha of eroded areas in Bucana which require reforestation.

3) **Monitoring of Terrestrial and marine Environment**

Terrestrial environmental monitoring covers flora and fauna, especially in forests. Periodic monitoring (twice a year) will be conducted and Landsat images will be analyzed every year by PNRCC.

- (a) **Terrestrial Environment**: The impact of tourism development and activities on the terrestrial environment, especially on small islands, must be monitored by beneficiaries who shall submit reports to the proper authority.

The impact of species already introduced into the islands must be assessed and monitored periodically. If necessary, programming and implementation of the transfer or extermination of species in the islands must be required of developers who introduce them.

Nido hunting has provided livelihood in communities for generations. However, data on the harvest and trade of Nido has not been recorded. To assess the impacts of harvest, data should be recorded and monitored as part of cave management.

Monitoring the reproduction of Hawksbill sea turtles, Tabon birds, and other endangered species in beach forests is to be conducted for biodiversity conservation.

- (b) **Marine Environment**: Monitoring the live coral and species composition of the coral community, through diving surveys, will be needed to assess the modification of the ecosystem. The seagrass community should be monitored similarly. Monitoring of Dugongs and sea turtles should also be done through periodic observation and interviews with local people. All surveys should be conducted twice a year taking into account the seasonal change of turbid water discharge.

The case study area covers El Nido Marine Reserve where there is relatively intact coral reef, especially in Matinloc, Tapiutan, Inambuyod and Guntao islands. At present, constant patrols are an effective measure against illegal fishing and inappropriate coastal use.

4) Water Pollution Control

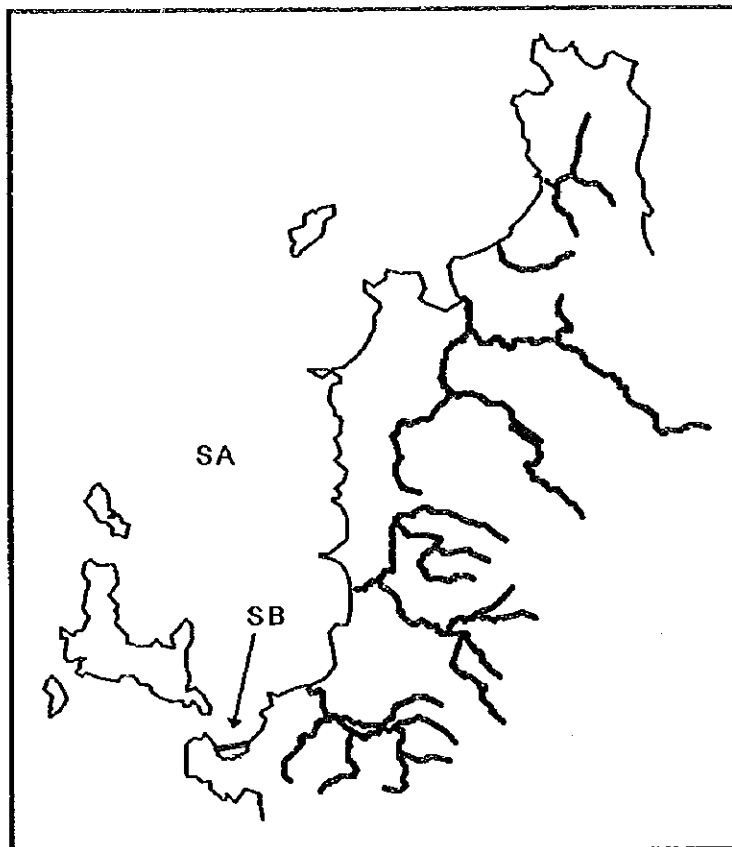
Since the study area is mostly covered by El Nido Marine Reserve, water pollution control is critical. According to DENR Administrative Order No. 34, s. of 1990, national marine park, coral reef park, and reserves are categorized as Class-SA, under which El Nido Marine Reserve and other areas fall, except the area fronting Poblacion El Nido, which will be covered by Class-SB (refer to Table 5-10 and Figure 5-9). Waste water from resorts and other facilities should be below the effluent standards shown in Table 5-11.

Table 5-10 Criteria for Surface Water Quality Classification

Classification	Beneficial Use
Class SA	<ol style="list-style-type: none"> 1) Water suitable for the propagation, survival and harvesting of shellfish for commercial purposes; 2) Tourist zones and national marine parks and reserves established under Presidential Proclamation No. 1801; existing laws and/or declared as such by appropriate government agency. 3) Coral reef parks and reserves designated by law and concerned authorities.
Class SB	<ol style="list-style-type: none"> 1) Recreational Water Class I - (public areas for bathing, swimming, skin diving, etc.); 2) Fishery Water Class I (Spawning areas for <i>Chanos chanos</i> or "Bangus" and similar species).
Class SC	<ol style="list-style-type: none"> 1) Recreational Water Class II (e.g. boating, etc.); 2) Fishery Water Class II (Commercial and sustenance fishing); 3) Marshy and/or mangrove areas declared as fish and wildlife sanctuaries;
Class SD	<ol style="list-style-type: none"> 1) Industrial Water Supply Class II (e.g. cooling, etc.); 2) Other coastal and marine waters, by their quality, belong to this classification

Source: DENR Administrative Order No. 34, s. of 1990

Figure 5-9 Proposed Classification for Required Water Quality Standards



Source: Study Team

Table 5-11 Effluent Standards

Parameter	Unit	Class SA		Class SB		Class SC		Class SD Water not classified	
		OEI	NPI	OEI	NPI	OEI	NPI	OEI	NPI
Color	PCU	(a)	(a)	150 100		(b)	(b)	(b)	(b)
Temperature (max. rise in degree C in RBW)	C rise	(a)	(a)	3	3	3	3	3	3
pH (Range)		(a)	(a)	6.0-9.0	6.0-9.0	6.0-9.0	6.0-9.0	5.0-9.0	5.0-9.0
COD	mg/l	(a)	(a)	100	60	250	200	300	200
Settleable Solids (1 hr.)	ml/L	(a)	(a)	0.3	0.3	-	-	-	-
5-Day 20 C BOD	mg/L	(a)	(a)	50	30	120(c)	100	150(c)	120
Total Suspended Solids	mg/L	(a)	(a)	70	50	200	150	(d)	(e)
Total Dissolved Solids	mg/L	(a)	(a)	1,200	1,000	-	-	-	-
Surfactants (MBAS)	mg/L	(a)	(a)	5.0	2.0	15	10	-	-
Oil/Grease (Petroleum Ether Extract)	mg/L	(a)	(a)	5.0	5.0	15	10	15	15
Phenolic Substances as Phenols	mg/L	(a)	(a)	0.1	0.05	1.0(f)	0.5(f)	5.0	1.0
Total Coliforms	MPN/ml	(a)	(a)	5,000	3,000	-	-	-	-

Source: DENR Administrative Order No. 35, 1990

OEI: Old or Existing Industry

NPI: New/Proposed Industry or wastewater treatment plants to be constructed

PCU: Plutonium Cobalt Unit

(a): Discharging of sewage and/or trade effluents is prohibited or not allowed

(b): Discharge will not cause abnormal discoloration in receiving waters outside of mixing zone

(c): For wastewater with initial BOD concentration over 1,000 mg/L but less than 3,000 mg/L, the limit may be exceed up to a maximum of 200 mg/L or a treatment reduction of 90%, whichever is more strict

(d): Not more than 60 mg/L increase (dry season)

(e): Not more than 30 mg/L increase (dry season)

(f): Not present in concentration to affect fish flavor or taste or tainting

6) Solid Waste Management

Household waste is collected by local governments but, garbage from the tourism sector should be managed by that sector, which may use municipal disposal sites for a fee. Solid waste management for the study area can be explained as follows:

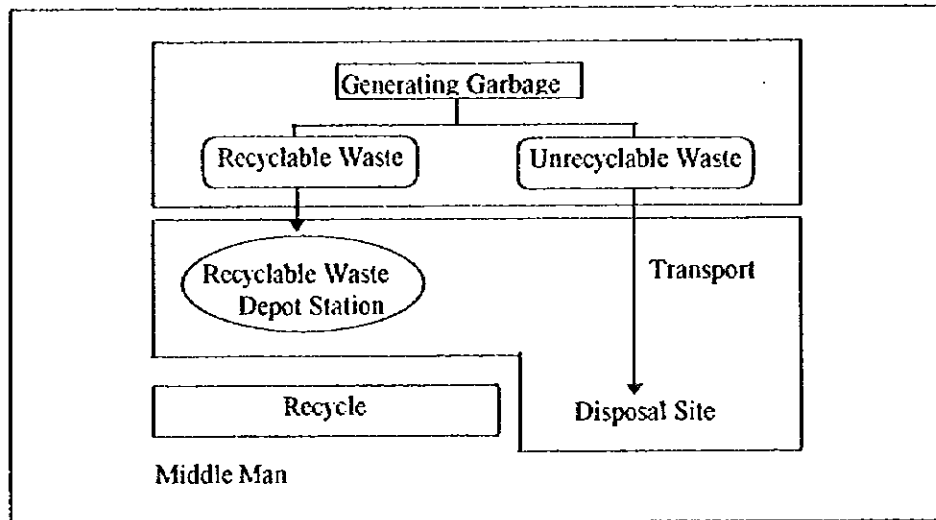
(a) Collection/Transport: Resort and other facilities operators should separate garbage into recyclable waste and non-recyclable waste before it is collected and conveyed by compactor cars or trucks.

(b) Treatment: Once deposited in appropriate areas, recyclable wastes may be sold to entrusted middle men.

(c) Disposal: Although sanitary landfill is considered the most effective method, the site location should not be along the coast, as that area is mostly a part of the El Nido Marine Reserve. Future land use plans for closed disposal sites should be prepared wherein due consideration should be given to the following:

- Disposal is prohibited in Preservation and Conservation Areas.
- Watersheds used for water supply should not be selected.
- Area with unstable slope should not be selected
- Leachate should be treated according to DENR standards.

Figure 5-10 Solid Waste Management Concept for El Nido Case Study Area



Source: Study Area

7) Estimated Costs for Environmental Restoration and Conservation Measures

Major restoration and conservation measures discussed in the previous sections require inputs of finance, qualified manpower, and adequate equipment. Initial and recurrent costs have been roughly estimated (refer to Table 5-12).

Table 5-12 Estimated Costs for Major Environmental Restoration and Conservation Measures

Measures	Initial Cost: P 000	O & M Cost: P 000/yr	Total (1997 - 2010): P million
1. Restoration			
1) Reforestation (360 ha) ^{1/}	13,790	-	13.8
2) Rehabilitation of eroded area ^{1/}	5,910	-	5.9
2. Monitoring of Key Environment ^{2/}	-	1,390	19.5
4. Overall Environmental Area Management and Administration ^{4/}	1,000	500	8.0
Total	20,700	1,890	47.2

Source: Study Team

1/ including nursery operation, plantation establishment, maintenance, administration etc., estimated unitcost is P19,700/ha

2/ including personnel, equipment, satellite data analysis

3/ including vehicles, boats, communication equipment, computers, diving equipment, etc.

4/ including establishment of a main office, 2 inland and marine stations, operation and management.

5.2.3 Environmental Administration Framework

1) Needs for Establishing an Effective Environmental Management Framework

At present, there is hardly an effective environmental management framework to ensure the implementation of proposed measures or protection of the environment in the case study area. Weak organization and absolute lack of funds, qualified personnel and proper equipment for monitoring, patrolling, law enforcement, education/campaigns, restoration and conservation work, etc., are serious constraints. Mechanisms for involving local communities including NGOs for environmental management of specific areas is also lacking. Delays in completing ECAN Zoning also weakens the basis of environmental management.

2) Organizational Structure

A central body for environmental management for the case study area should be the municipal government because of a number of reasons. The environment is a serious concern of local communities and effective conservation necessitates direct involvement of communities in terms of awareness, and monitoring, etc. Preparation and enforcement of ECAN Zoning is the responsibility of the municipal government which also stands in the best position for coordinating higher agencies such as PCSD, DENR, the provincial government etc., with the tourism development body, local communities and any other agencies with interests in the area. Organizational structure for environmental administration for the area is shown in Figure 5-11 and outlined as follows:

DENR and PCSD: DENR and PCSD formulate environmental policy and planning at the national and provincial levels. However, the main responsibility for the establishment of environmental policy and planning based on the national environment policies by DENR, is given to PCSD. This agency provides technical assistance to Busuanga Municipal Government.

El Nido Municipal Government: According to the Manual of Operation for Devolved General Management Functions, DENR and local government units endeavor to appoint Environment and Natural Resources Offices, named Municipal ENROs. As of November 1996, however, such offices had not been appointed. Since, Municipal ENROs are very important to environmental management, it is proposed to organize the following offices:

Table 5-13 MENRO and Environmental Management Stations in El Nido North

1. Municipal ENRO	entire area
2. Pasadeña Station	Inland
3. Sibaltan Station	Inland
4. Corong-corong Station	Inland / Marine
5. Ibajay Station	Marine

Source: Study Team

Area management stations mainly patrol illegal activities, monitor conservation and restoration projects and programs, and provide information

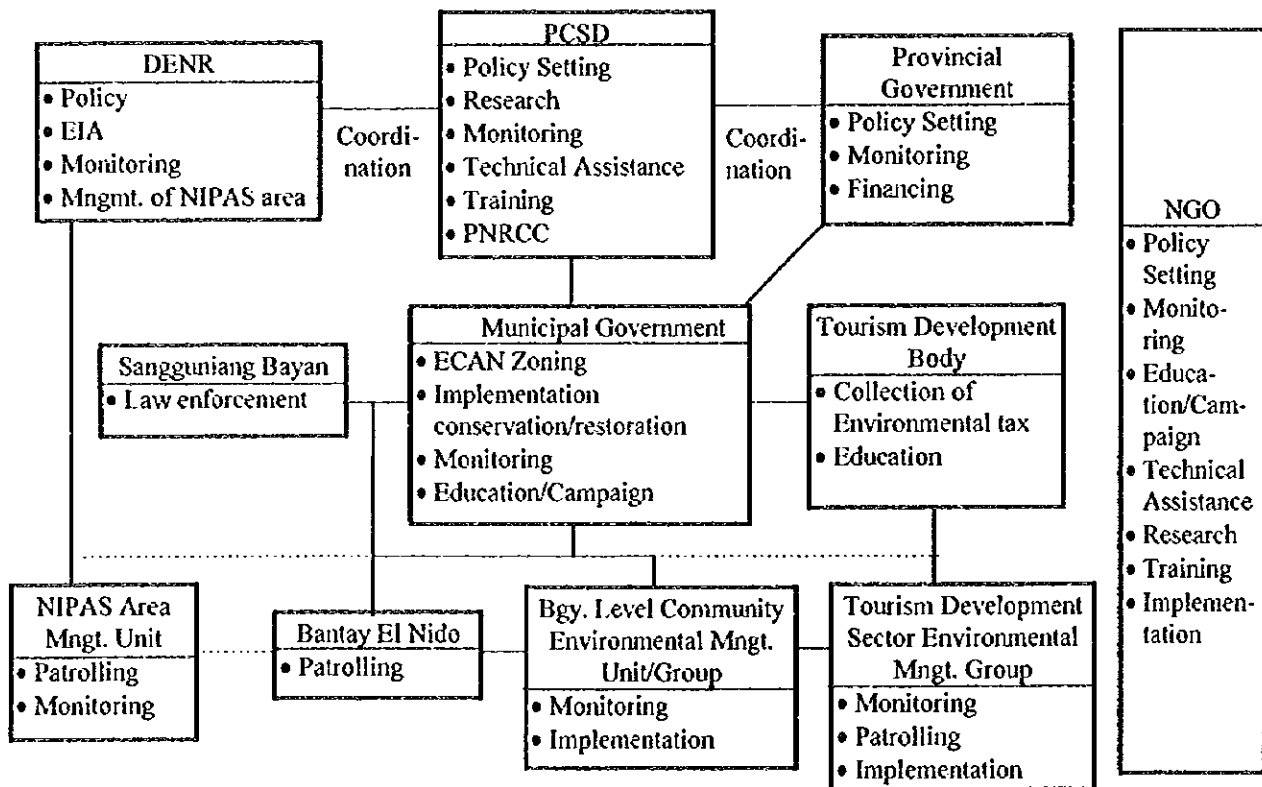
on areas, including the terrestrial and marine environments of those areas, to the Municipal ENROs. (See Table 5-14.)

Table 5-14 Staff Members Needed for Environmental Management in El Nido

Office/Station	Type of Staff	No.	Role
A. Main Office	Municipal ENRO	1	- representative of municipal environmental administration
	Environmental Planner	2	- environmental management planing, ECAN Zoning, environmental resources management, institutional and organization arrangement
	Terrestrial Environmental Officer	5	- terrestrial ecosystem conservation, forest management, wildlife conservation, terrestrial environmental restoration
	Marine Environmental Officer	8	- marine ecosystem conservation, fishery resources assessment and management, marine wildlife conservation
	Water pollution Officer	2	- pollution control
	Sanitary Engineer	2	- waste management
	Data analysis officer	2	- update and maintenance of data base
	Administrator	1	- Administrative service for staff
B. Terrestrial Management Station	Station Head	1x2	- overall management
	Ranger	4x2	- patrol for illegal activities, information of environmental conservation and restoration projects
C. Marine Environment Mngt. Station	Station Head	1x2	- overall management station
	Ranger	4x2	- patrol for illegal activities, information of environmental conservation and restoration projects

Source: Study Team

Figure 5-11 Organizational Structure for Environmental Administration: El Nido North



Source: Study Team

Bantay El Nido: Bantay Palawan patrols for illegal activities throughout the entire province of Palawan, excluding Puerto Princesa. Each municipality is currently making efforts to establish their own Bantay programs. El Nido is encouraged to coordinated with neighboring municipalities of Linapacan, Taytay, and San Vicente to ensure an effective patrol system.

Sangguniang Bayan: Sangguniang Bayan implements regulations of illegal activities. According to the Manual of Operations for Devolved General Management Functions of the DENR, Sangguniang Bayan can impose appropriate penalties for acts which endanger the environment.

El Nido North Tourism Development Authority: The municipal governments may entrust, to tourism development bodies, certain aspects of environmental management such as, patrolling of municipal waters, and the education of tourists, as conservation of quality environment is a major concern of the tourism sector. Collection of environmental tax may be an important role, if it is institutionalized. Adequate environmental management groups or units can be organized to cover specific areas.

Mobile Environmental Information: The use of visual aids is one of the most effective tools for information dissemination. Therefore, video education programs will be taken to barangays. Possible video programs and necessary equipment, to be provided by PNRCC (refer to section 3.2.8) are listed in Table 5-15.

Table 5-15 Possible Video Programs and Necessary Equipment for Video Car

Video Programs	<ol style="list-style-type: none"> 1. Current Environmental Conditions in Palawan (flora and fauna, endemic species in Palawan, protection of endangered species) 2. Caring for the Environment at Community Levels (marine/coastal resources, watershed, forest, etc.) 3. Waste minimization and management at community level (waste segregation and sorting, recycling and alternative utilization - <i>Pera sa Basura</i>-, collection and disposal) 4. The indigenous people of Palawan (Material Culture, Belief System) 5. Palawan Culture (music, dance forms, visual art, literature, functional art, rites and rituals, drama, myths and legends) 6. The Strategic Environmental Plan (SEP) 7. Team-Building for the Environment 8. Environmental Laws and Regulations
Necessary Equipment	- video set, generator, OHP and screen, microphone and speaker, four-wheel drive vehicle

Source: Study Team

Environmental Management at Barangay/Community Level: For effective management of the environment, involvement of local administration and communities becomes very critical. Therefore, it is proposed that effective units at the barangay or specific community/area level should be established for which proper facilities, equipment, training and financial support be

provided. Voluntary participation of residents also needs to be effectively tapped.

NGOs: In environmental management, the roles of NGOs are widely expected at different levels of activities, including policy setting, monitoring, education/campaigns, research, training, implementation of preservation/conservation work, etc. Depending upon the function and capabilities of the NGOs, they should be an integral part of the management system.

3) Financing Environmental Management

Preliminary estimates of the financial requirements for environmental management of the case study area indicates that approximately P 19.7 million of initial cost and about P 1.5 million of recurrent cost would be needed for specified activities.

It is expected that in this Study that the tourism sector may be able to contribute to shouldering these costs. One possible way is to directly or indirectly charge environmental costs to tourists who are the main consumers of the rich environment (a willingness-to-pay for environmental conservation interview survey of tourists found that a foreign tourist is willing to pay an average of about US\$ 50 per trip). Assuming that a total of 95,000 tourists expected in 2010 pays US\$ 30 per head, the amount would reach as much as P 74 million (US\$ 2.85 million) which is large enough to cover the needed costs for environmental management. Other beneficiaries such as fishery and agricultural industries may contribute to the costs.

5.3 Socioeconomic Framework and Preliminary Land Use Plan

5.3.1 Socioeconomic Framework

1) Population

Population of the case study area and the whole municipality has been projected based on the past trend and the regional medium-term development plan (refer to Table 5-16).

The existing El Nido poblacion does not have enough land area for future urbanization. The population of the priority area, which consists of four (4) barangays, shall constitute 34.4% of the total municipal population in 2010. The growth area in the municipality should be moved outside the existing poblacion. In the future, as transport modes change from the current sea transport to land transport as a result of road improvement and new construction, settlements will be formulated along these roads and within the vicinity of tourism development areas in El Nido North.

Table 5-16 Population Projection for El Nido by Barangay

Name of Barangay	Population			Growth Rate (%/yr.)		
	1995	2000	2010	1990-1995	1995-2000	2000-2010
Barotoan	1,495	1800	2,400	2.6	3.8	2.9
Bucana	3094	3,600	4,600	2.8	3.1	2.5
Pasadeña	1,338	2,000	3,100	8.2	8.4	4.5
Villa Libertad	1025	1300	2000	2.4	4.9	4.4
Total	21,940	26,700	35,200	3.1	4	2.8

Source: Study Team

2) Transportation Network

Although there is no overall regional development structure plan for the case study area, developments of infrastructure should be accelerated. The national road between Taytay and El Nido poblacions shall be paved with concrete. Furthermore, the road section from El Nido to Pasadeña shall be paved with concrete as a future national road. An arterial road network will be formulated with circumferential roads, Villa Libertad - Bucana - Sibaltan-New Ibajay - Villa Libertad road, together with the national road. The new El Nido airport will be connected to Pasadeña via a new road.

Major settlement areas and transshipment points of El Nido, municipal port, and other piers shall be linked by paved roads in order to accelerate local socioeconomic activities, which will in turn promote tourism development. In order to meet expected tourism demands, it is necessary to construct a new public airport.

3) Socioeconomic Development

While population is expected to increase further and basic infrastructure and services will be expanded, there are no concrete industry and economic development plans. In addition to the expansion of agriculture production and productivity, tourism development potentials should be effectively actualized.

5.3.2 Preliminary Land Use Plan

1) Needs for Effective Land Use Plan

At present, there is no officially recognized land use plan which would provide a physical development framework in an integral manner between conflicting elements related to settlement, industrial development, environmental conservation, tourism development, etc. Although it is not a direct objective of this Study, a preliminary land use plan has been prepared in order to verify that the proposed tourism development can be adequately integrated as a part of the area's entire physical and socioeconomic system.

2) Current Land Use

Land use of the study area is composed of forest, brushland, grassland, agricultural land, mangrove areas, and settlement areas (refer to Figure 5-12). The most dominant use is agriculture which consumes 72% of the area followed by residential/commerce (15%) and forest (10%), (refer to Table 5-17).

Agricultural use is limited to paddy fields and plantation. Settlements are distributed along the coastal areas or along the national roads. Coconut plantation areas are seen along the coastline and small-scale plantations found inland. Rice fields are along major rivers.

Table 5-17 El Nido Existing Land Use (1990)

Barangay	Area	Area by Land Use (km ²)								
		Residen- tial	Commer- cial	Indus- trial	Coco Farm	Rice/Cor- n Farm	Other Agriculture	Pasture Land	Fish pond/ Mangrove	Forest
Barotoan	35.6	1.8	0.7	0.7	8.9	16.0	1.8	0.7	-	5.0
Bucana	16.2	1.6	0.8	0.3	1.3	5.7	1.6	0.5	-	4.4
Pasadeña	44.9	4.5	2.2	-	17.9	15.7	2.2	-	-	2.2
Villa Libertad	51.1	5.0	5.0	-	15.0	17.5	2.5	3.6	-	2.5
Total	147.8	12.8	8.7	1.0	43.1	54.9	8.1	4.8	0	14.1

Source: National Statistics Office, Provincial Office of Palawan, Puerto Princesa

3) Estimate of Land Requirement and Development Suitability Analysis

In order to accommodate future demands on lands, land requirements by major land use type have been estimated and development suitability analyzed.

(a) Estimate of Land Requirements: Future land requirements have been estimated on the basis of projected population and number of farmers in 2010. A total required area is approximately 2,199 ha to accommodate 12,100 population in four barangays including Barotoan, Bucana, Pasadeña, and Villa Libertad which will be mainly engaged in agricultural activities (refer to Table 5-18).

Table 5-18 Estimated land Requirements and Land Availability, 2010

Barangay	2010 Est. Popula- tion	Required Land Area in 2010 (ha)				Estimated Suitable Area for Development (ha)
		Residen- tial:	Farm Lot	Others	Total	
Barotoan	2,400	30	540	22	592	1,482
Bucana	4,600	58	759	34	850	1,300
Pasadeña	3,100	39	437	26	502	785
Villa Libertad	2,000	25	210	20	255	1,000
Total	12,100	151	1,946	102	2,199	4,567

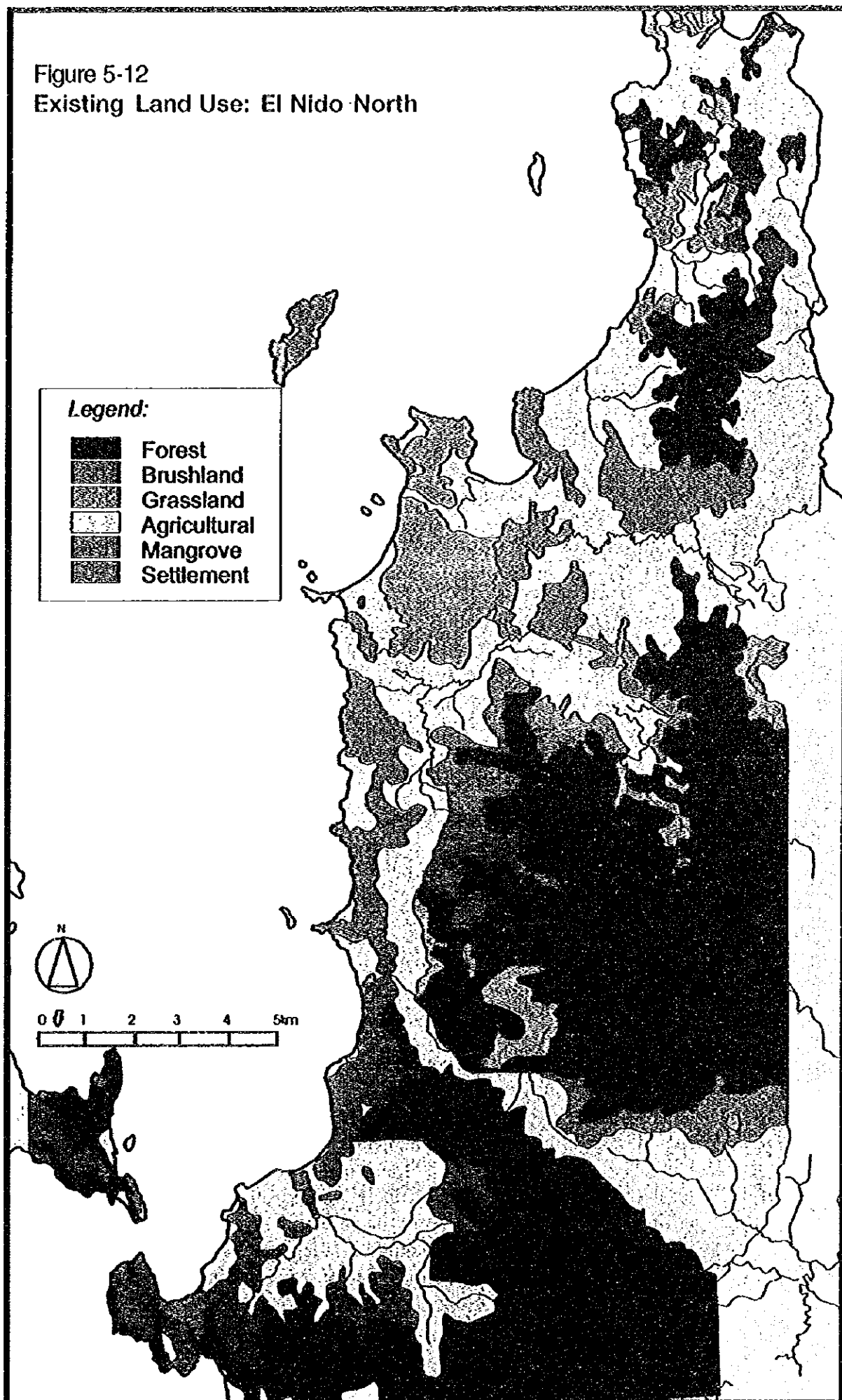
Source: Study Team

^{1/} assumed density is 80 persons/ha or 625 m²/family including building sites, infrastructure space, etc.

^{2/} assumed size of farm lot is 3 ha/farmer

^{3/} including commercial, institutional, industrial, and open space

Figure 5-12
Existing Land Use: El Nido North



(b) Estimate of Development Suitability of Lands: Development suitability of the area has been analyzed on the basis of soil condition and slope, and classified into the following four categories:

- land suitable for paddy and residence
- land suitable for tree crop
- land unsuitable for agriculture
- land unsuitable for agriculture and residences

The estimated suitable area for development is approximately 4,600 ha in the four barangays (refer to Table5-18 and Figure5-13).

4) Formulation of Preliminary Land use Plan

A land use plan for the case study area has been preliminarily formulated for the four barangays of Barotoan, Bucana, Pasadena and Villa Libertad (refer to Figure 5-14). Characteristics of the plans are briefly as follows:

- future land use can totally comply with development suitability of lands, thus no conflict between environment is foreseen;
- future land use expansion basically takes place along the existing roads and settlements;
- tourism development areas will be fully integrated with regional infrastructure and the socioeconomic system of the area.





5.4 Tourism Development Structure Plan

5.4.1 Development Concept and Framework

1) Development Concept

The case study area is one of the best parts of Northern Palawan to test the viability of sustainable tourism development concepts not only within the case study area, but also for the rest of Northern Palawan. As Environment is the sole basis for livelihood and tourism in the area, tourism development should be undertaken in compliance with environmental area classification with maximum involvement of local communities to manage the development in a sustainable manner. Physically, the proposed tourism developments should be of low density or within carrying capacity and should be equipped with adequate standards of environmental facilities. Socially, participation of local communities, in terms of operation and management, in tourism and environmental activities is very much necessary. From the management viewpoint, tourism products should be of high-quality, high-value, and high-return in order for the tourism sector to contribute economically and financially to the local economy and environmental conservation/restoration in Northern Palawan.

Figure 5-13
Land Suitability Map for
El Nido North

-  Suitable for Paddy and Residence
-  Suitable for Tree Crop Land
-  Unsuitable for Agriculture
-  Unsuitable for Residential and Agriculture

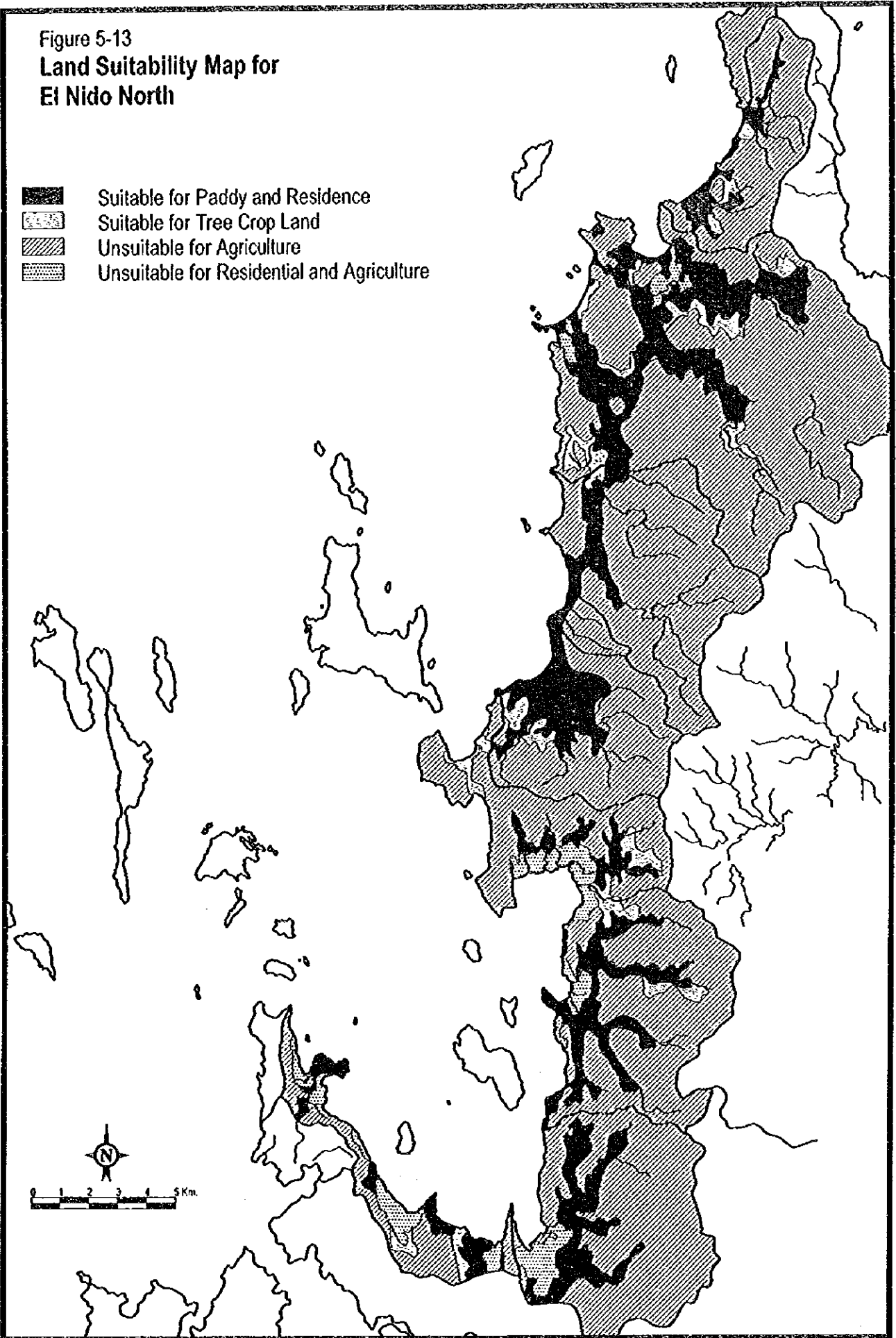
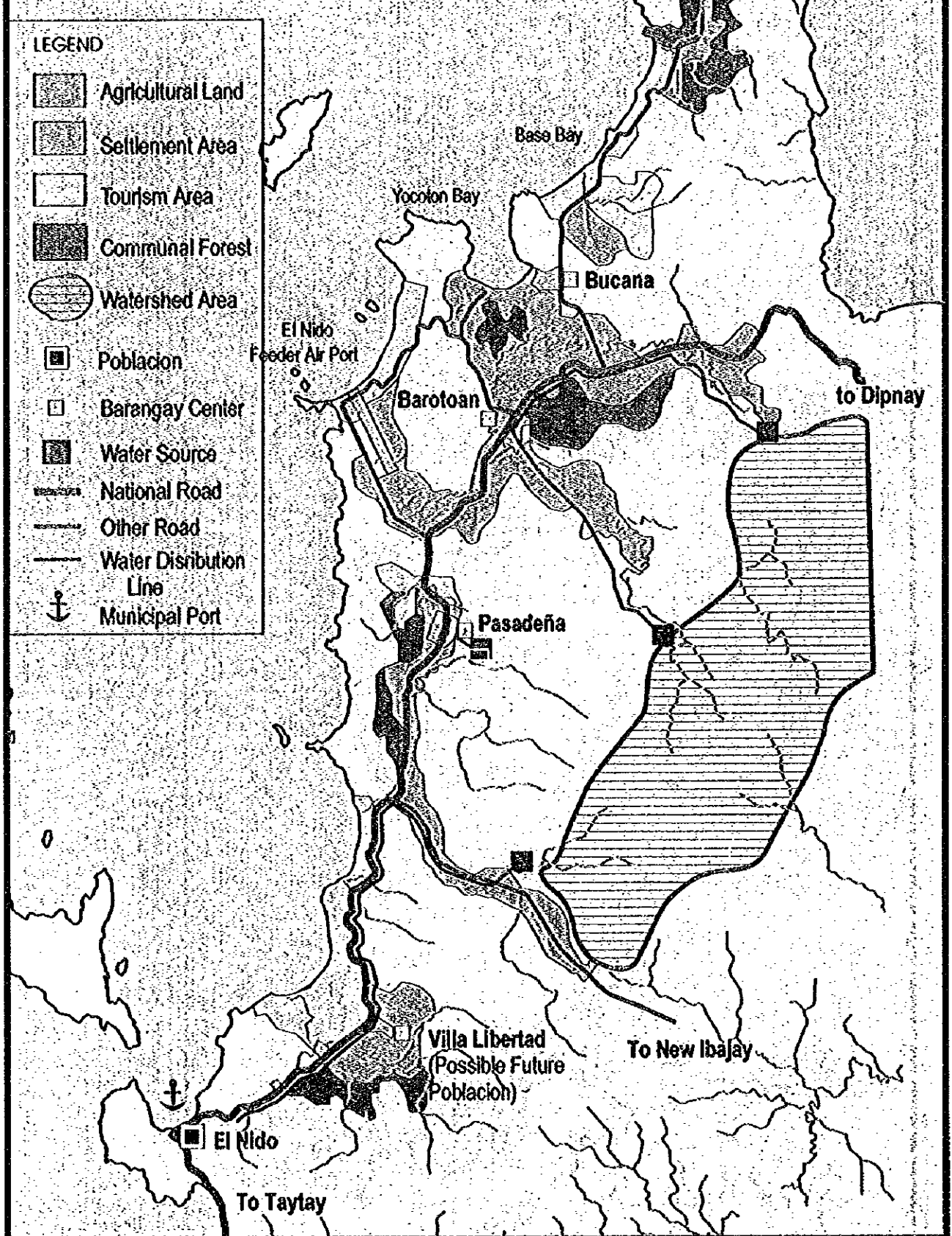


Figure 5-14
Land Use Plan for El Nido North



To tap the main target markets of international tourists from East Asia and other ASEAN countries with high economic growth rates as well as tourists from European and North American countries, development of the proposed feeder airport is essential to provide more direct and improved access to the area.

Because of geographical limitations, the existing poblacion of El Nido will not meet the administrative and commercial requirements of tourism as well as socioeconomic development. Therefore, it will be moved to new areas such as Villa Libertad where land is available for further development. It will be the location of a tourism office, facilities for related tourism industry development and human resource development, and medical facilities. Employee housing shall also be provided.

Infrastructure development such as road construction and community development shall be prioritized. To diversify tourism activities and to increase accessibility to tourism attractions in Bacuit Bay and Linapacan Islands, the areas will be developed as the core of sea transportation

2) Tourism Development Framework

Tourism development framework in terms of tourist-nights and number of hotel rooms to be met by proposed development was worked out. About 75% of 80,000 foreign tourists visiting El Nido stay about 5 nights in one location, and 25% visit the Puerto Princesa Tourism Cluster for about four-nights. The average length of stay of 15,000 domestic tourists is 4 nights. In order to accommodate these tourists, a variety of tourism programs, which utilize natural, scenic, and human resources, are prepared for inland, marine, beach and island areas (refer to Table 5-19 and Table 5-20, respectively).

Table 5-19 Estimated Tourist-nights for El Nido North, 2010

		Foreign	Domestic	Total
No. of Tourists	5 nights	60,000	0	60,000
	4 nights	20,000	15,000	35,000
	Total	80,000	15,000	95,000
No. of Tourist-nights		380,000	60,000	440,000

Source: Study Team

Table 5-20 Estimated Number of Rooms

Class	1995 (existing)	2000	2005	2010
De luxe	30	70	230	650
Standard	34	110	300	500
Economy	81	90	110	135
Total	145	270	640	1285

Source: Study Team

The demand for tourism activities in this case study area is not only generated by the tourists staying in the 1,070 rooms of the lodging facilities found in the area but also by tourists who engage in various activities during the day and stay outside the municipal boundary. The average number of tourists staying in the area is estimated to be about 2,250 and 4,350 at a peak day in 2010.

**Table 5-21 Physical Development Framework
for Daytime Tourism Activity Facilities**

	2000	2005	2010
Average Daily Tourist Inflow	250	900	2,350
•Stay in El Nido North Area	140	790	2,200
•from Outside	110	110	150
Peak Day Tourist Inflow	800	3,100	4,550
•Stay in El Nido North Area	550	2,850	4,220
•from Outside	250	250	330

Source: Study Team

5.4.2 Tourism Development Potentials

1) Tourism Resources

(1) Natural Marine Resources

The natural resources important to marine tourism are as follows: 1) well-distributed and diversified coral reef communities, and colorful coral fish for scuba diving and glass-bottom boat tours; 2) existence of rare species of animals, such as Dugongs and sea turtles, which increase opportunities to call attention to the importance of protecting the natural inheritance and; 3) big migrating fish resources, such as tuna and sword fish, for sport and game fishing. El Nido North is resplendent with the following resources:

- Distribution and diversification of good and large-scale coral reef communities located on the offshore islands, such as Matinloc Island, Tapiutan Island and Guntao Islands, that face the South China Sea.
- Diverse and fish resources 20 to 40 km off the coast of El Nido Towns and other resources present in bays, the surrounding coral reef, and along the coast and islands, which can be utilized as diving spots and fishing grounds.
- Dugong breeding areas, and turtle nesting sites located in seagrass beds and on sand beaches.
- The western-coastal areas north of El Nido Town have coral sandy beaches in a variety of sizes. The beach in Lio/Lamarao extends 7

km. Nacpan Beach and a beach in Base Bay are 3.5 and 4.5 km in length, respectively

(2) Inland Natural Resources

Inland natural resources in the mountainous areas of the main island include forest and other species such as the endangered Philippine Cockatoo, Palawan Eagle, etc. The forests over limestone create a unique and peculiar geographic feature and scenery which are considered attractive tourism resources.

- a) Geographic Features: The range of mountains stretching north to south and 300-600 meters in height are covered with forest. Along the coast from Lio to Nacpan, hills (about 100 meter in height) travel north to south. The valleys, near the shoreline and mountain ranges in the middle of the main island, are lowland areas.
- b) Remaining Natural Forests and Rare Indigenous/Endangered Species and Ecosystem of Flora and Fauna: The presence of these natural resources make the inland area suitable for environmental education, observation and exploration-type tourism activities. Mangrove forests which function not only as breeding areas for marine species but also as buffer are observed at the mouths of rivers, and around small bays,. They are to be preserved, and at the same time, utilized for mangrove cruises and board walks.

However, illegal activities such as logging and kaingin or socioeconomic development including agricultural development, have reduced the such natural habitats of endangered species. In order to protect these habitats against destruction, it is essential to institute appropriate. Tour guides/forest rangers should accompany tourists and entry to ecologically fragile areas should be limited.

- c) Rivers and Lagoons: The Barotoan river, flowing into the north of Yocoton Bay, has the largest catchment area in the study area. Water flow does not stop even during the dry season. Along the river is a relatively large rice field area. The Guintungauan and Bulucacao rivers are in the central part of the main island, flowing into the Lamarao beach area. The Nagkalit Kalit and Bulucacao falls are located in the upper part of these rivers. During the rainy season, the falls become tourism attractions due to their increased water flow. These areas are expected to become nature exploration spots.
- d) Hot Springs: Natural hot springs are located in the northern part of Pasadeña and the southern part of Bucana. The acidic and carbonated hot springs are of ample quantity, and have potential as health spas.

(3) Scenic Resources

Scenic resources create picturesque images and spectacular scenery that are important factors in promoting international tourism.

- (a) Composition of scenery: The attractive and amazing scenery is made up of small, white beaches surrounded by strong vertical lines and planes of the dark marble cliffs; blue sky and water; and uniquely shaped vegetation over limestone.

From the water, the hills close to the western coast of the main island visually become a stunning background for resorts. However, the scars of kaingin need to be restored.

The northern part of the arterial road will function as a tourism road. Storm drainage and slope protection requirements, must be satisfied. In addition to these engineering requirements, street and sidewalk furniture should be developed in some portions of the road.

- (b) Panoramic View Point: At the ridges from Barotoan to Sibaltan along the arterial roads, there are locations where tourists can see both the South China Sea and Sulu Sea. At these locations, "observation spots" with resting facilities shall be developed.
- (c) Sunset on the Horizon/with Island: A perfect spot for sunset viewing and is available in the west coast of the main as well as the northwest of the study area. The unobstructed view from the Nacpan to Base Bay area, is considered to be a good location for viewing the sunset.

(4) Cultural Resources

- (a) Historic Tourism Resources: Conclusive evidence of historic resources were not found.
- (b) Traditional, Cultural Tourism Resources: It was reported that isolated indigenous peoples can be found in Patuyo Cove and Labutaya Island in Barangay Bucana, Diapila Bay, Libro Point, Vabuli Bay, Cabli Island and in other areas. The participation of these people in the tourism industry can provide them additional livelihood opportunities: They can sell native handicrafts or participate in cultural exchanges. Their participation in tourism can be initiated by the people assisted by NGOs and the municipal government.

(5) Other Resources

Agro-tourism and the promotion of local agricultural produce such as fruits, vegetables, and flowers, and fishery products, shall be pursued. Cashew production and orchard farms, shall be promoted to meet the expected increase in demand from tourism development. Such promotion will facilitate financing for tourism resource development and management.

2) Tourism Development Opportunities

The existing tourism developments are divided into the following three categories: 1) development by joint capital from both domestic and overseas sources; 2) development by foreigners living in the Philippines; and 3) development by local capital.

Development patterns, in the El Nido North area, belong either to the first or second categories. The Pangulasian Island Resort, with 34 de luxe rooms, and Miniloc Island Resort, with 30 standard rooms fall within the first category. Development by local capital is seen mostly in the El Nido Town area where 81 rooms of economy-class accommodation are available. Compared with other areas in Northern Palawan, this area is well-developed as far as tourism is concerned, and has significant capital investments in accommodation facilities.

In resort development using joint capital from both domestic and overseas sources, private developer(s) shoulder infrastructure costs. These include costs for private airstrips, water resource development, and power generator installations. Operation and maintenance costs on water treatment facilities and other environmental protection measures shall also be paid for by the resorts.

The investment in island resorts created a positive impact on the local cottage industry. Tourism-related industries such as restaurant and transportation business have also grown.

The area's abundant marine and scenic resources provide opportunities for diverse tourism activities. Domestic and foreign investments in tourism are likely to increase once the necessary infrastructures are built or improved.

5.4.3 Tourism Development Constraints

The existing constraints of tourism development in Northern Palawan are, due to inaccessibility, the lack of infrastructure and of public incentives for private capital investment, as well as the rapid rise of land prices. While infrastructure development has been delayed, and specific measures for investment promotion have not been realized by the private sector, a private developer has been taking action to purchase lands in Lio and Lamarao beach areas.

1) Accessibility to the Gateway of Calamian Tourism Cluster and International Tourist Flow

In order to attract affluent tourists from East Asian countries, and to establish stronger socioeconomic relationships with their countries, feeder airports need to be built immediately. Based on the air transportation network concept of enhancing linkages among Puerto Princesa International Airport, Busuanga Alternative International Airport and other airstrips in the area, tourists from Europe and North America shall be transported by way of the Ninoy Aquino International Airport.

At the same time, the enhancement of road networks is essential, particularly the access roads from the new feeder airport to new tourism facilities in the development areas. The appropriate drainage and slope protection measures must also be incorporated in road construction methods.

2) Regional and Tourism Infrastructure Development

Generally, not only tourism but also infrastructure development such as water/electricity, telecommunication, sewage disposal and waste disposal facilities have been delayed. Such circumstances discourage the private sector from investing in the tourism industry because the initial cost of development becomes too high when infrastructure is included.

3) Institutional Measures to Promote Private Tourism Investment

The dire need for intensive infrastructure development and the induction of investments on environmentally responsible tourism was discussed in the Comprehensive Tourism Master Plan

However, specific measures to encourage private investment have not been taken at any level of government. Such measures might include financial and institutional tax incentives, creation of an office to answer inquiries from potential investors, etc.

4) Land Speculation

Information leaks about possible tourism projects have caused land speculation, particularly along the coastlines of San Vicente and Taytay. The

speculation, which caused increases in land prices, may pose a constraint to tourism development.

It is almost impossible to carry out appropriate land development under current land speculation conditions because additional constraints from other land use requirements, such as those of the agriculture and industrial sectors, may arise. This type of land investment boom can sometimes be the main cause of destruction of the natural environment in these areas. Therefore, it is necessary to draw up policies and measures to restrain land speculation and guide the appropriate use of lands.

5) Areas Covered by the Comprehensive Agrarian Reform Program

All privately-owned agricultural land larger than five hectares and all public agricultural land are subject to the Comprehensive Agrarian Reform Program (CARP). Therefore, idle land and large lots that are suitable for tourism development conflict with CARP. In order to avoid such conflict, land use conversion measures have been prepared. Table 5-26 shows the CARP lots in barangays which include the study area. So far, four lots have been identified to overlap with the tourism development area.

Table 5-22 Lots Covered by CARP: El Nido North

Barangay	Type	Name	Title No.	Titled Area (Tax Declaration): ha	Disposable Area (ha)	Status
Barotoan	VLT/DPS	Development Bank of the Philippines	T-8225	10.1687	10.1687	for registration
	VLT/DPS	Primo Relucio	T-9137	6.6204	6.6204	for doc.
	VLT/DPS	Primo Relucio	T-9136	7.6201	7.6201	for doc.
	CA	Miriam Cu	T-7683	6.3796	1.3796	for doc.
	CA	Eufracia Rodrigues	T-7705	9.9361	4.9361	for doc.
Tiniguiban	CA	Victoriano Abeque	T-4293	10.0000	5.0000	for doc.
	CA	Abdon Abrina	T-3549	11.1486	6.1486	for doc.
	CA	Valentin Abriqueno	T-3793	9.0000	4.0000	for doc.
	CA	Ernesto Albog	T-5087	7.2506	2.2506	for doc.
	CA	Norberto Arzaga	T-3515	8.7968	3.7968	for doc.
	CA	Luciano Balmonte	T-3521	11.1529	6.1529	for doc.
	CA	Melchor Gadiano	T-5242	9.0000	4.0000	for doc.
	CA	Primo Garcia	T-8044	15.0911	10.0911	for doc.
	VLT/DPS	Gideon Amurao	T-7015	11.7408	11.7408	for doc.
	VLT/DPS	Teresita Severino	T-7503	22.1699	22.1699	for doc.
Pasadeña	VLT/DPS	Gloria M. Fernandes	T-7846	8.6069	8.6069	Distributed (5/31/96)
	VLT/DPS	Gloria M. Fernandes	T-7847	11.9942	11.9942	Distributed (5/31/96)
	CA	Nieves Fernandes	T-5222 ^U	11.9943	11.9943	for doc.
	CA	Manuel Cacal	"	4.0000	n.a.	n.a.
	CA	Manuel Cacal	"	5.0000	n.a.	n.a.
	CA	Manuel Cacal	G-586(part) ^U	10.8676	n.a.	for doc.

Source: DAR

^Ulots overlap with the tourism development areas.

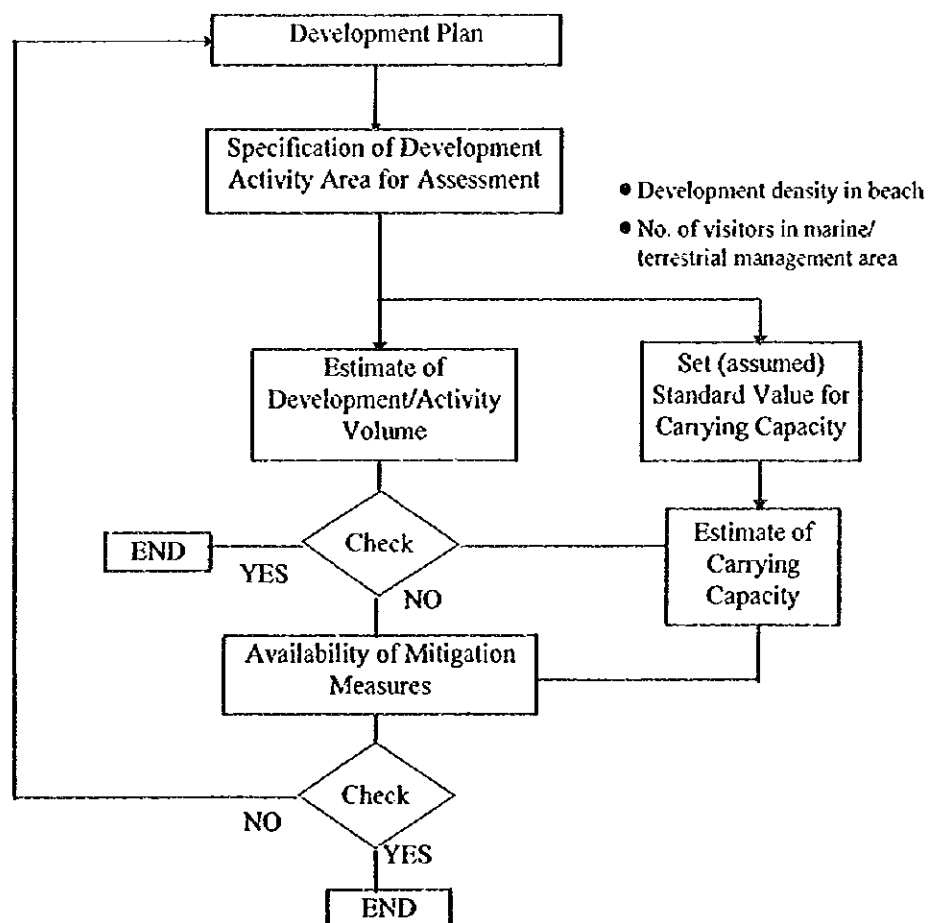
5.4.4 Assessment of Carrying Capacity

The carrying capacity of the area is estimated, as the structural plans are developed. The feedback process of defining carrying capacity is shown in Figure 5-16.

1) Critical Aspects and Criteria for Carrying Capacity

Criteria for carrying capacity are examined and defined in accordance with the environmental management plan. Three major accommodation developments are proposed in three locations: South Coast Resort (Lio/Lamarao Beach); Nacpan Resort; and North Coast Resort (Base Bay). As for activity areas, there are two water falls and their surrounding areas in terrestrial conservation areas in the central part of the main island, and diving areas in the marine conservation areas in Bacuit Bay. For each area, the following criteria are set:

Figure 5-16 Flow Chart for Carrying Capacity Assessment



- (a) Hotel and Resort Development within the Landscape Conservation Area: Strict enforcement is needed on the level of sewerage discharge from hotel and resort facilities along the coast to the South China Sea. There are still good quality corals and habitats of dugong. At the same time, in landscape conservation areas along the coast and in the hinterland,

density of development shall be as low as 5 rooms/ha to ensure adequate buffer areas (greenery) which will enhance visual and physical continuity of forest and beaches. Within the tourism development areas, the net-density is set at 15 rooms/ha to provide high quality resort environments.

(b) Activities in the Forest Preservation and Conservation Area: The activities in the forest preservation and conservation areas shall be limited to environmental education and research. The number of persons staying in these areas shall not exceed more than one party (8 persons) per hour. Since the central portion of the island still has old growth forests where local vegetation such as orchids and rattan and endangered species such as Philippine Eagle and Philippine Cockatoo exist, hunting pressure to birds and mammals is high. Therefore, entrance to the areas shall be minimized.

(c) Diving Activities in the Coral Reef Conservation Area: Diving in one spot shall not exceed two groups (one party shall be less than 10 persons) in the morning and three groups in the afternoon in the Coral Reef Conservation Areas.

2) Estimated Carrying Capacity and Proposed Control Method

(1) Carrying Capacity and Control Method for Hotel and Resort Development

Three major accommodation development areas are proposed. A high class resort development with a 520 room accommodation facility was planned in the North Coast Resort Area (gross-150 ha, net-60 ha) in Base Bay; 50-room resort was allocated to Nacpan Resort Area (gross-80 ha, net-40 ha); high to middle class resort with about 500 rooms for development was proposed in the South Coast Resort Area.

The estimated carrying capacity indicates that the proposed allocation of accommodation facilities are half of or less than the maximum. The development index for the total falls within the range of 27 to 36.

The controlling development under the carrying capacity is to employ an area development method to guide private investment on the appropriate density requirement. Also, development guidelines shall effectively be used to control development appropriate to location and density.

In the South Coast Resort Area, close coordination with El Nido Marine Reserve is necessary for environmental protection measures. Such measures may include a water recycling system which makes it possible to reuse water to water plants and trees and an inland sports field.

Table 5-23 Assessment of Carrying Capacity

Identified Area For Assessment	Critical Aspect	Estimated Carrying Capacity		Total	Control Method for Dev'ts/ Activities
		Planned Dev't/Activity Volume/Pattern	Unit Quantity		
South Coast Resort	Landscape Cnsv. A Dugeng Cnsv. A Env. of high quality tourism/resort area	Resort dev't (gross-370ha/net-160ha) (up-to-2010: resort-500roomsand others)	<ul style="list-style-type: none"> gross density: 5 rooms/ha net density: 15 rooms/ha 	<ul style="list-style-type: none"> gross: 1850 rooms net: 2400 rooms 	<ul style="list-style-type: none"> Dev't guidelines for density/water quality/design
Nacpan Resort	Landscape Cnsv. A Env. of high-quality tourism/resort area	Resort Dev't (gross-80ha/net-40ha) (up-to-2010: resort-50 rooms and others)	<ul style="list-style-type: none"> gross density: 5 rooms/ha net density: 15 rooms/ha 	<ul style="list-style-type: none"> gross-400 rooms net-600 rooms 	<ul style="list-style-type: none"> Areas dev't by Public Dev't guideline Sewage treatment
North Coast Resort	Landscape Cnsv. A Env. of high-quality tourism/resort area	Resort Dev't (gross-150ha/net-60ha) (up-to-2010: resort-520 rooms and others)	<ul style="list-style-type: none"> gross density: 5 rooms/ha net density: 15 rooms/ha 	<ul style="list-style-type: none"> gross-750 rooms net-900 rooms 	<ul style="list-style-type: none"> Areas dev't by Public Dev't guideline Sewage treatment
Inland Nature Trail	Forest Prsv./ Cnsv. A (disturb the ecosystem of endangered/indigenous species)	One trail for environmental/ecological research/education	<ul style="list-style-type: none"> 1 or less party/h/trail less than 8 pax/party 	80 pax/day	<ul style="list-style-type: none"> Guided by ranger or licensed Guide (application/admission fee w/ guide map/certification)
Diving Spot in West Coast of Peninsula	Coral reef Cnsv. A Seagrass Cnsv. A	Mooring buoy for 7 diving spots	<ul style="list-style-type: none"> less than 5 parties/day/spot less than 10pax/party 	350 pax/day	<ul style="list-style-type: none"> Organized by certified diver/boat operator (certified by PCSD)

Source: Study Team

(2) Carrying Capacity and Control Method for Tourism Activities

A centralized environmental management body of El Nido North shall issue permits to limit entry to the inland nature trail to 80 persons per day. In the inland nature trail, not only the environmental management body in El Nido North shall control entrance to environmentally sensitive areas by issuing entrance permits, but also qualified and licensed rangers and/or nature tour guides shall accompany tourists to offer educational opportunities and to prevent adverse impacts to the natural environment.

The environmental management body of El Nido North shall also install mooring buoys at appropriate locations to control boats. Diving operations shall only be managed by divers and boat operators certified by PCSD to prevent negative environmental impacts to the marine ecosystems.

5.4.5 Tourism Development Structure Plan

1) Outline of Structure Plan

The tourism development structure plan for the E Nido North case study area has been prepared (refer to Figure 5-17) and outlined as follows:

The proposed airport will cooperate with NAIA, Puerto Princesa and Busuanga Airports to enhance linkages with the international air network and to facilitate more direct access to the area.

Pasadeña will be developed as the center of tourism development.

The existing road which extends from El Nido Town to Villa Libertad, Pasadeña, Barotoan, and Sibaltan, shall be improved as the arterial road for tourism development. Also, access to/from barangay centers and major tourism facilities shall be improved by upgrading existing roads or constructing new roads to form an appropriate road network.

About 500 rooms of accommodation facilities are planned in the South Coast Resort Area - Lio and Lamarao beach areas in Villa Libertad. Pasadeña Agro-hill Park and Spa Resort are planned in the north part of Pasadeña, taking advantage of its agricultural and geological resources. In the coastal area of Nacpan, a new feeder airport, a research institute for environmental protection, a human resource facility, and accommodation facilities are planned. The north part of Base Bay is planned to be the core of tourism development in the coastal areas of the South China Sea side by developing 500 rooms of de luxe class accommodations.

In Corong-corong and Dipnay, a port facility to function as the core of sea transportation, is planned to enhance the linkages of tourist attractions in and around the islands in Bacuit Bay, Linapacan and in other tourism clusters.

2) Selection of Development and Utilization Areas for Major Tourism Facilities and Activities

The development areas for major tourism facilities and activities were selected based on the land suitability analysis, preliminary land use plan preparation and environmental management plan. The activity areas were also selected in accordance with the tourism resources assessment results and environmental management plan.

Table 5-24 Evaluation Criteria of Tourism Development Suitability

Area/ Aspect	Conditions
1. Beaches	White/Wide/Gentle Slope Sandy Beach
2. Hinterland	Geomorphology: Flat or slope with less than 18% incline.
	Existing land use: Existing community, irrigated rice paddies, and mangrove forests are excluded.
	Land Ownership and DAR-covered area: Most of the coastal areas are privately-owned and an agricultural lot over 5 hectares is subject to the Comprehensive Agrarian Reform Program; therefore, they are not an inhibiting factors to site selection.
	Visual Components: The area needs to have good visual quality such as good view of small islands and mountains.
3. Environmental Management	Outside of terrestrial environmental management areas
	The sites does not face the coral preservation areas. Turtle nesting sites (narrow beaches with vegetation) are avoided as much as possible.

Source: Study Team

Figure 5-17. Tourism Development Structure Plan

