Chapter 3
PHYSICAL FEATURES

This chapter provides background information on the land characteristics, hydrology, water quality, and climate of the profile area, which are esential in providing strategies and interventions for the proper management of the area.

LAND CHARACTERISTICS

Negros Oriental is located in the Central Visayas region of the Philippines and is in the eastern part of the 2-province Negros Island. It lies approximately 620 km from the capital city of Manila, at roughly 122^0 30′ E, 9^0 00′ N and 123^0 30′ E, 10^0 30′ N (Montebon 1995). The province of Negros Oriental occupies a total land area of 5,402.3 km^2 (540,230 ha) and is the largest of the 4 provinces in the Central Visayas Region. The 3 cities and 6 municipalities covered in this profile have a total land area of 1,927.9 km^2 (Table 3.1). It covers 162 km of coastline, stretching from the municipality of Manjuyod in the north to the municipality of Siaton, the southernmost municipality.

About 30 percent of the land area of the province is flat, mainly along the coastline, and the rest of land contains mountains, valleys, and plateaus. Of the total land area of Negros Oriental, only 16.39 percent (88,543.7 ha) is considered prime agricultural land (PPDO 1999), although approximately 65 percent of the land in the province is used for agriculture and pasture or range land, according to the Provincial Development and Investment Plan (PDIP). The agricultural land is mainly comprised of 4 types of soil: Isabela Clay, La Castellana Clay, Loam Special, and Faraon Clay. Almost 50 percent of the land in the province is classified as certified alienable and disposable and 37 percent of the land is classified forestland. The remaining land is unclassified forestland (PPDO 1999). Upland

Table 3.1. The land area and length of shoreline of the profile area.

Municipality/City	Land area (in km^2)	Length of shoreline (km)	Total number of *barangays*	Total number of coastal *barangays*
Manjuyod	264.60	16	27	10
Bais	316.90	30	35	112
Tanjay	539.30	19	24	9
Amlan	59.40	7	8	5
San Jose	54.40	6	14	5
Sibulan	163.00	9	15	6
Dumaguete	34.26	7	30	9
Bacong	42.07	7	22	7
Dauin	114.10	10	23	9
Siaton	335.40	51	26	14
Profile area	**1,923.43**	**162**	**224**	**86**
Entire province	**5,402.30**	**348**	**556**	**169**

(hills and mountain ranges) and lowland (plains) are mainly utilized for agriculture and beach fronts are developed for the tourism industry.

Low serrated mountain ranges separate Negros Oriental from Negros Occidental, the western province of Negros Island. The highest peak is Canlaon Volcano (2,465 m above sea level) in Canlaon City. The next highest peak is Cuernos de Negros, locally known as Mt. Talinis, overlooking Dumaguete City with an elevation of 2,000 m above sea level.

HYDROLOGY

There are a number of river systems and a few lakes within the profile area. Many of the river systems discharge into the Tañon Strait, though some dry up before reaching the coast (IEMP 1997). Some of these river systems are principal (critical) watersheds and drainage systems, while others are used for irrigation (Table 3.2). The watershed areas are protected and reforestation is now going on.

There are 3 lakes within the profile area: the twin lakes Balinsasayao and Danao in the mountains of Sibulan and Lake Balanan in Siaton. All 3 lakes are tourist attractions for camping and outdoor recreation, although Lake Balanan was originally proposed as a site for a hydro-electric plant. Other water bodies are used to provide cheap electricity, such as the National Power Corporation (NPC) hydro-electric plant in Pasalan Falls, Amlan which supplies electricity from Bais to Dumaguete.

WATER QUALITY

Dinoflagellates are common among harmful algae reported in the Southeast Asian waters. *Pyrodinium bahamense* is the most common species causing toxic red tides in the Philippines. Although most of the dinoflagellates identified were non-toxic, any bloom may lower water quality and cause anoxia or de-oxygenation of the water (Calumpong *et al*. 1997). The distribution of plankton in the different learning sites covered by the SUML survey is presented in Figures 3.1, 3.2, and 3.3.

Table 3.2. Negros Oriental critical watersheds.

Watershed/drainage way	Area (km^2)	Total agricultural area (ha)
Guihulngan River	89.87	4,937.00
La Libertad River	213.00	5,816.00
Tibiauan River	33.28	998.00
Pangalaycayan River	160.88	4,438.00
Manjuyod River	53.26	3,329.00
Lutao River	147.57	4,327.00
Tanjay River	215.00	9,419.00
Pagatban River	108.73	889.00
Bayawan River	434.00	12,727.00
Sebastian River	349.50	7,877.00
Tolong River	90.43	4,660.00
Cauitan River	85.00	1,189.00
Siaton River	228.00	3,428.00
Canaod River	107.07	3,861.00
Total	**2,315.59**	**67,895.00**

Source: PPDO (1999)

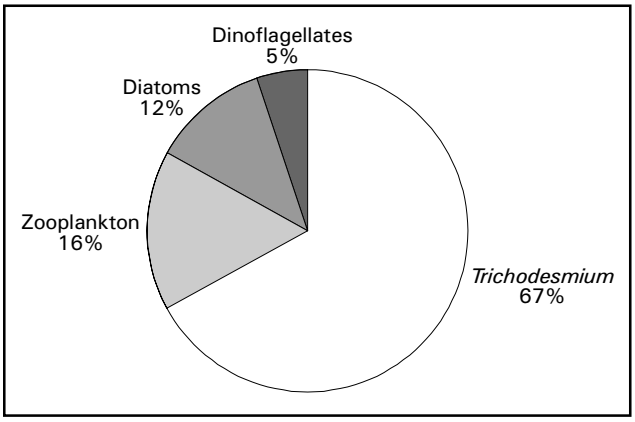

Figure 3.1. Distribution of plankton in Apo Island using horizontal and vertical tows (day and night).

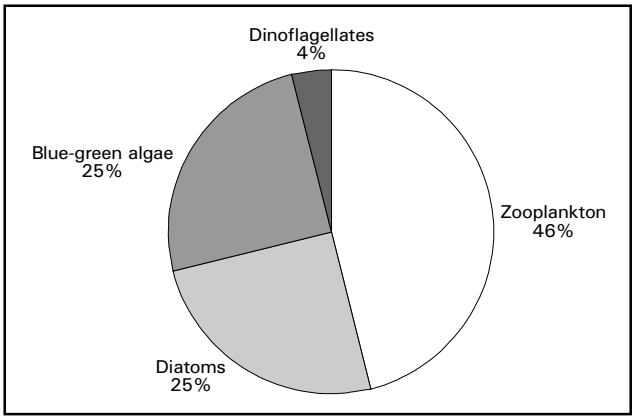

Figure 3.2. Distribution of plankton in Bais Bay using horizontal and vertical tows (day and night).

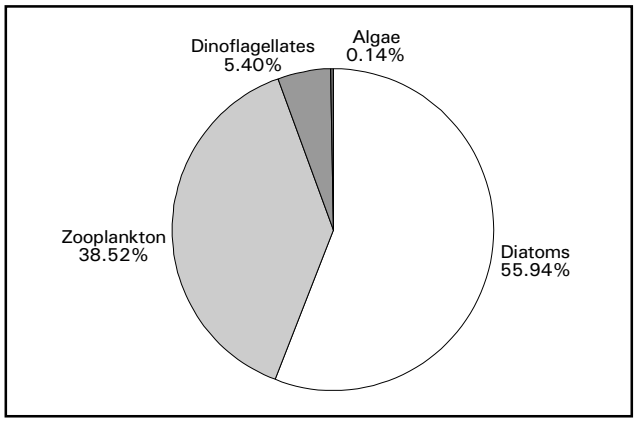

Figure 3.3. Distribution of plankton in Dumaguete using horizontal and vertical tows (day and night).

Most probable number (MPN) of total coliform per 100 ml of seawater was sampled by the SUML in the vicinity of Dumaguete City. The MPN of the different sampling sites is presented in Table 3.3. All yielded positive results for total coliform with the highest count observed in Barangay Calindagan, Dumaguete City, which could be attributed to the concentration of coastal residences in that locality. Garbage and domestic waste, especially of fecal origin were the primary source of contamination in the area (Calumpong *et al*. 1997). High counts of coliform were obtained also in the Boulevard/Pier and Lo-oc area. Sewage from Dumaguete City empties into these areas. Household interviews conducted by SUML indicated that a majority of the respondents, 60 percent, in the Lo-oc area had no toilets. Thus, human waste presumably goes to the sea. Based on these results, Barangay Calindagan is classified as Class SB - safe for swimming and fishing but not for culture and harvest of seafoods (such as bivalves and mollusks). Other stations sampled had MPN of less than 70 and are classified as Class SA, which is suitable for most mariculture activities, tourism, and recreation (DENR AO No. 34).

Table 3.3. Most probable number of total coliform counts per 100 ml of seawater sampled from the coastal waters of Dumaguete City (n = 3).

Stations	Nearshore	0.5 km offshore	1 km offshore
Agan-an	12	0	10
Bantayan	25	2	26
Looc	39	50	15
Boulevard-Pier Area	50	15	39
Tinago	25	2	25
Canday-ong	19	11	25
Calindagan	254	57	183
MEAN	61	20	46
MEAN ALL STATIONS = 42			

Source: Calumpong et al. *(1997)*

CLIMATE

The climate of the province of Negros Oriental is characterized by a short dry season from 1 to 3 months with the absence of a pronounced rainy season, known also as a Type III climate condition. A dry month is one in which rainfall is less than 2 inches. Although the northern part of the province experiences occasional typhoons, the profile area is seldom hit by typhoons and has a low annual rainfall by Philippine standards (Table 3.4).

The temperature range for the entire province is relatively uniform from 26.1 to 27.7°C. The maximum temperature is about 34.8°C and the minimum is about 20.9°C. Humidity for the whole province ranges from 77 to 80 percent with an annual average of 78 percent. From June to September the prevailing wind is the southwest monsoon, locally known as *habagat*, while the northeast monsoon, *amihan*, prevails during November to February. The season for variable winds is from March to May. Tropical typhoons rarely visit the province (PPDO 1999).

Table 3.4. Average monthly rainfall and number of rainy days in the province.

Months	No. of rainy days	Average monthly rainfall in Negros Oriental (millimeters)
January	21	93.10
February	12	12.90
March	17	69.70
April	8	43.30
May	18	118.60
June	17	94.40
July	6	12.50
August	21	140.80
September	20	111.00
October	14	44.90
November	15	178.10
December	12	76.10

Source: PPDO (1992 SEP)

SUMMARY

The profile area bordering a mountainous and steep island receives much freshwater run-off from about 14 rivers. Thus the main pollution in nearshore areas is sediment carried by the rivers. Only Dumaguete City shows significant coliform contamination. Toxic algal blooms do not generally occur in the area. The climate is mild with less rainfall than average for Philippines. Typhoons are rare.