

Chapter 6

TREASURES UNDER THE SEA (AND ALONG THE COAST, TOO)

(Coastal Habitats and Resources)



San Vicente is rich in fish and other marine resources. At the start of the nationwide implementation of the CRMP in May 1996, 35 researchers from Silliman University conducted a survey in San Vicente. The research team assessed the town's coastal zones, gathering data on vegetation, marine life, composition of the sea bottom, water quality and currents, plankton, fish catch, and the socioeconomic conditions of fishers.

The team established 108 sampling stations (Figure 6.1) for the following:

- 19 for mangroves
- 12 shallow transect stations
- 8 for corals
- 10 for soft-bottom
- 8 for plankton
- 4 for coliform
- 7 for water current
- 8 for fish visual census
- 14 for test-fishing
- 9 for fisheries profile
- 9 for socioeconomic indicators

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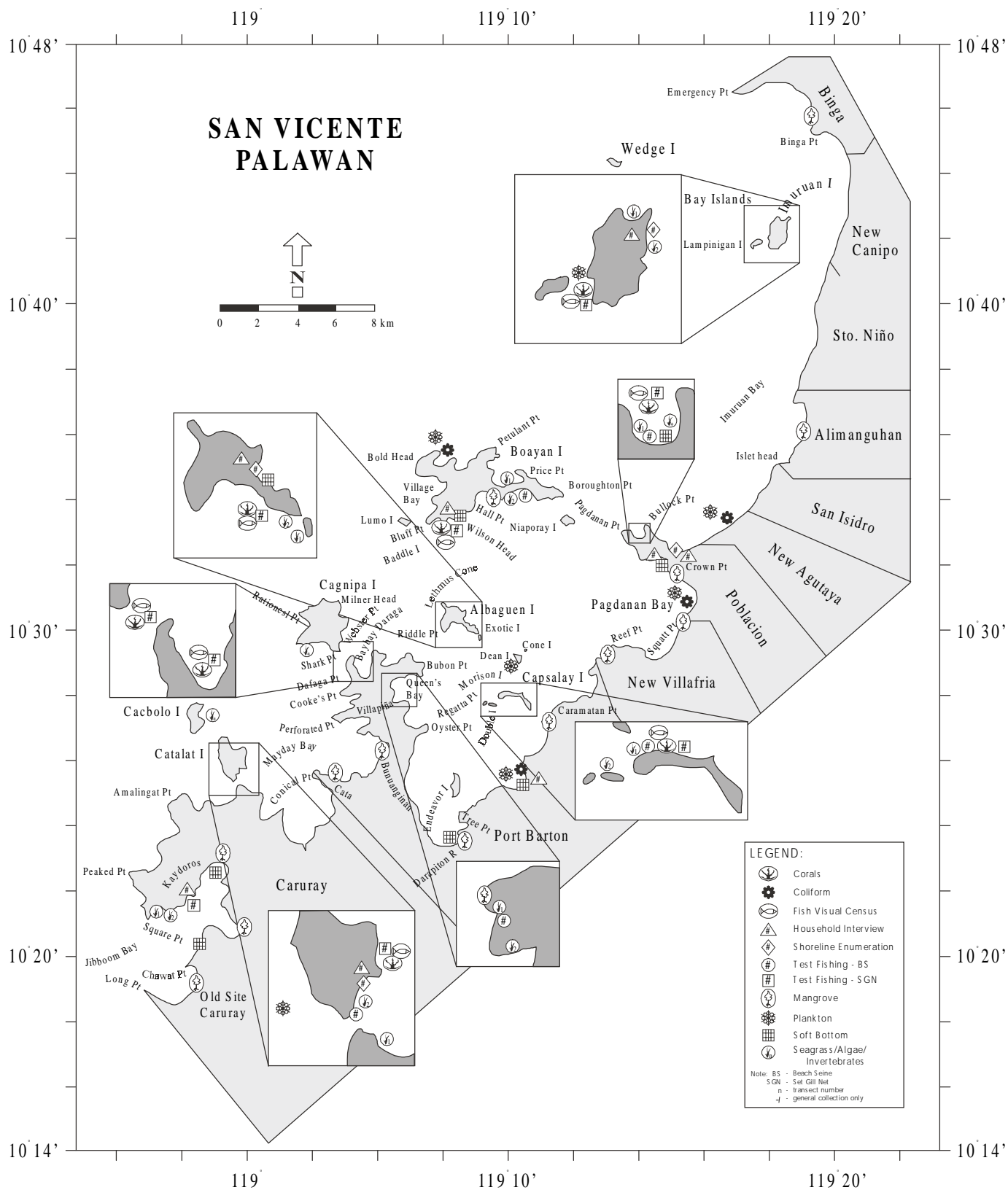


Figure 6.1. Sampling stations of the Silliman University study in San Vicente, 1996.

The results of the research on coastal habitats and resources are summarized below:

REEF FISH

A visual census found 160 species of finfish, squid and octopii in 29 families in the coral reef areas of the municipality (Figure 6.2). *Palata* or damselfishes, and wrasses, had the highest number of species. Most of the fishes recorded were reef species; there were no pelagics, such as tuna and mackerel (Table 6.1). Capsalay had the greatest number of species and highest density of fish. Imuruan had the most target species sought by fishers, the most large predatory species, and the highest average number of individuals. In terms of fishing pressure, Baybay Daraga appeared to have suffered most — the census noted the absence of large predators there.

The abundance of reef species in seagrass beds underscores the importance of seagrasses as breeding or nursery grounds for fish and the need for this ecosystem to be protected. Test fishing with a beach seine in seagrass and algal beds yielded 82 species of finfish in 36 families. Capsalay Island yielded the highest biomass of fish,

A visual census found 160 species of finfish in 29 families in the coral reef areas of the municipality.

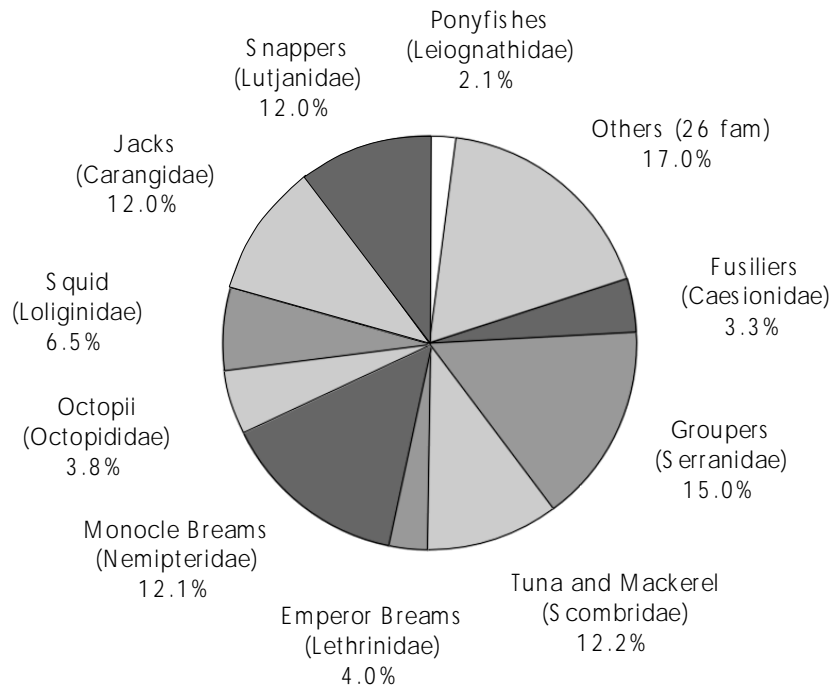


Figure 6.2. Catch composition by fish families in San Vicente (SUML 1996).

Table 6.1. Most abundant families of fishes in San Vicente (SUML 1996).

| STATION | RELATIVE ABUNDANCE (%) | | | |
|---------------|-------------------------------------|------|-----------------------------|------|
| | Number of Species | | Number of Individuals | |
| Capari | Pomacentridae (Damsels) | 27.5 | Pomacentridae | 53.5 |
| | Labridae (Wrasses) | 22.5 | Caesionidae (Fusiliers) | 24.0 |
| | Scaridae (Parrotfishes) | 7.5 | Labridae | 8.7 |
| | Chaetodontidae (Butterflyfishes) | 7.5 | | |
| Catalat | Pomacentridae | 30.7 | Pomacentridae | 78.9 |
| | Labridae | 22.6 | Siganidae (Rabbitfishes) | 12.0 |
| | Chaetodontidae | 9.7 | Labridae | 5.9 |
| Baybay Daraga | Labridae | 30.8 | Pomacentridae | 49.8 |
| | Pomacentridae | 25.0 | Labridae | 23.6 |
| | Chaetodontidae | 11.5 | Apogonidae | 17.1 |
| Shark Point | Pomacentridae | 34.0 | Pomacentridae | 67.7 |
| | Labridae | 20.8 | Apogonidae | 15.6 |
| | Chaetodontidae | 7.6 | Siganidae | 7.2 |
| | Serranidae (Groupers) | 7.6 | | |
| Casuyan | Pomacentridae | 37.5 | Pomacentridae | 88.2 |
| | Labridae | 29.2 | Labridae | 8.5 |
| | Chaetodontidae | 8.3 | Sphyraenidae (Barracudas) | 1.1 |
| Albaguen | Pomacentridae | 33.9 | Pomacentridae | 90.0 |
| | Labridae | 25.4 | Labridae | 4.6 |
| | Chaetodontidae | 8.5 | Centriscidae (Shrimpfishes) | 3.3 |
| Capsalay | Pomacentridae | 34.4 | Pomacentridae | 82.8 |
| | Labridae | 21.9 | Apogonidae | 10.0 |
| | Apogonidae (Cardinalfishes) | 6.3 | Labridae | 2.2 |
| | Chaetodontidae | 6.3 | | |
| Imuruan | Labridae | 30.0 | Pomacentridae | 77.0 |
| | Pomacentridae | 18.3 | Labridae | 19.0 |
| | Serranidae | 6.7 | Acanthuridae | 0.9 |
| | Acanthuridae (Surgeonfishes) | 6.7 | | |
| | Chaetodontidae | 6.7 | | |

and Poblacion recorded the lowest. The highest species richness was noted in Queen's Bay, the lowest in Catalat. Capsalay showed the best catch per unit effort, yielding 18 kg per man-hour (high by Philippine standards).

A comparison of sizes with previous data indicates that most species have maintained their growth, which in turn suggests that San Vicente has not been overfished unlike other areas in the country where most fishes barely reach their common reported lengths. Nevertheless, the Silliman University team noted that "the tendency toward exploitation is great and overharvesting may occur if fishing is not regulated."

COMMERCIAL FISHING POTENTIAL

To determine the level of abundance of marine species, the researchers conducted test fishing using 3 gill nets measuring 75 meters x 2 meters each. The nets had varying mesh sizes: 1.5 cm, 2.5 cm, and 5 cm. The researchers found that 75% of their catch was composed of finfish (including one tiger shark), and that the majority of this were reef species. The highest volume of catch was recorded in Albaguen, the lowest in Caruray. In terms of biomass, the species "*timbugan*" (goatfish - Mullidae) yielded the greatest number. The highest species diversity seen was for "*palata*" (damselfish - Pomacentridae). The researchers also noted that dried squid was an important source of income for fishers, especially on Imuruan Island where it was sold at P180 to P220/kg.

Imuruan Island was noted to suffer the least from fishing pressure, yielding the greatest number of species and individuals. The highest fishing pressure was noted in Baybay Daraga, where no predatory species were found.

In the 1996 annual report of San Vicente, the SEP-SVP reported that its coastal marine project protected and managed the following habitats:

- mangroves - 1,538 hectares
- fish sanctuaries - 42.77 hectares in Binga, 45 hectares in Poblacion, 123 hectares in Port Barton, 25 hectares in Caruray
- artificial reefs - 20 hectares in Binga, Port Barton and Caruray
- seagrass - 130 hectares

CORALS

Researchers identified 163 species of corals in 14 families and reported that almost all eight sampling stations had "good coral cover" (Table 6.2). The size of coral reef areas ranged from 6 hectares at Shark's Point to 150 hectares at Capsalay Island. Overall cover of live hard coral was placed at 52%, with the Boayan Island station recording the highest total coral cover (71%). The greatest number of species was found in Albaguen, which had 88 different kinds of corals. Unfortunately, in August 1998, a coral bleaching event, which raised water temperature to 34°C, has killed a sizeable portion of living corals in San Vicente (Box 6.1, Table 6.3).

Table 6.2. Characteristics of coral reefs in San Vicente (SUML 1996).

| STATIONS | CORAL REEF AREA | REEF FLAT EXTENT (WIDTH) | SLOPE | SUBSTRATE | REMARKS |
|---------------------------------|-----------------|---|------------------------|---------------------------|---|
| Boayan Island | Boayan Island | 100 m from the shoreline to the reef crest | 60° - 70° at 10 m deep | sand, rubble, rock | good coral cover |
| Albaguen Island | 85 ha | - | - | sand, rubble, rock | wide patches of corals surrounded by sandy area; good coral cover |
| Manta Ray Reef, Capsalay Island | 150 ha | 200 m from the shoreline to the reef crest | 40° - 45° at 10 m deep | sand, rubble, rock | good coral cover; branching and tabulate <i>Acropora</i> were dominant; <i>Pocillopora damicornis</i> and branching <i>Montipora digitata</i> common in the shallow area and foliose <i>Montipora</i> in the deep |
| Imuruan Island | 100 ha | 300-m wide reef flat connecting the shores of Imuruan and Lampinigan Is. 150 m from the | 10° | sand, rubble, rock | soft corals (<i>Sarcophyton</i>), tabulate <i>Acropora</i> and massive <i>Porites</i> were common |
| Capari, Poblacion | | shoreline 150 m from the | 15° - 20° at 10 m deep | sand, rubble, silt, rock | beyond 8 m deep, area is silty/sandy with sparse patches of corals; high cover of live and fragmented branching <i>Acropora</i> in the shallow station boulders with coral recruits |
| Catalat Island | | shoreline, coral reef width is 30 m from the <i>Sargassum</i> bed at 5 m deep 75-100 m from | 30° | mostly rock; sand, rubble | found within 5-12 m deep; beyond 12 m deep, substrate primarily sandy; <i>Sargassum</i> bed in shallow area soft corals abundant |
| Shark Point, Port Barton | 6 ha | the rock outcrop 200 m from the | 30° | mostly rock; sand, rubble | beyond 10 m deep, area |
| Baybay Daraga, Port Barton | 50 ha | shoreline | 15°-30° | sand, rubble, silt, rock | sandy/silty with patches of corals; numerous coral recruits |

SEAGRASS

Eight seagrass species in 6 genera were recorded, occupying an estimated area of 225 hectares (Table 6.4). Capsalay Island in Port Barton had the most diverse collection of seagrass, but the highest seagrass cover was recorded in Poblacion proper and Queen's Bay.

ALGAE

Surveys of the islands of Catalat and Boayan, as well as the shores of Gawid, yielded 96 species of algae in 55 genera. *Sargassum* was the most abundant species (Table

Box 6.1. Results of a coral reef survey in Port Barton.

In September 1998, several researchers from the PCSD and CRMP surveyed four reef sites in Port Barton. The survey coincided with a warm water bleaching event which was occurring all over the southern Philippines at the time.

Benthic results. Live hard coral cover ranged from 15% to 33.8%. This low figure can in part be explained by the large proportion of bleached coral that was recorded in the “other” category. There was large-scale degradation at all sites resulting from anchor damage, and the past use of destructive fishing, such as blast or cyanide fishing. The best site in terms of live hard coral cover was Site 1 (Manta Ray Reef); by far the worst was Site 3 (Albague Island), which had only 15% coral cover and this was heavily degraded. Albague Sanctuary also revealed the second highest incidence of dead coral, the highest being at Paraiso Reef. Excessive bleaching was a major concern – this was recorded at all sites to a high degree. All sites can be classed in the “poor to fair” category for live hard coral cover.

Fish indicator species. Fish indicator species were used to assess the level of overfishing and the targeting of certain species, such as grouper, humphead wrasse, bumphead parrotfish and Barramundi cod. No target species was recorded indicating high exploitation levels. Butterflyfish are commonly used as an indicator species of reef health. At all sites, only butterflyfish were recorded along the transect for indicator species assessment. Sites 2 and 4 had the highest number of butterflyfish, which corresponds with the sites’ high live coral cover. No other indicator species except butterflyfish were recorded for the whole transect.

Descriptions of the four sites and the results follow.

Site 1. Manta Ray Reef

High temperatures (34°C) were recorded at 3m and 10m, even higher than at surface (31°C). Visibility was 8-10m. This reef is sheltered but it is unknown whether there have been storms that caused coral damage in recent years. Anthropogenic impacts were assessed as “moderate.”

Benthic results. Despite massive bleaching at the whole site, Manta Ray Reef appeared to have the highest percentage of live hard coral along transect. Most bleaching was in shallow areas. Dead coral accounted for 23.13%.

Site 2. Paraiso Reef also known as Heinz Reef

Water was very warm. This is an exposed patch reef, close to Albague Island, of around 40m across and covering 12 hectares. There was evidence of past destructive fishing (blast and possibly *muro ami* and cyanide).

Benthic results. Live coral cover was recorded at 30.6%. The incidence of bleaching was recorded at 19.3%. Dead coral cover accounted for 31.9%.

Site 3. Albague Island near settlement

This is a fringing reef less than 100m from shore. This site is heavily degraded, with large amounts of *Sargassum* on the back reef. Silt was recorded settling on corals and some bleaching of anemones was noted.

Benthic results. This site had the lowest recorded live coral cover at only 15%. High growth of *Sargassum* and *Padina* was noted at 24.38% and 8.13%, respectively. Dead coral accounted for 13.8% but rubble (largely from blast fishing) was high at 13.1%.

Site 4. Albague Island proposed Sanctuary

This fringing reef lies 90m from shore with a steep drop-off at 60° to 30m. Coral was noted on the upper 10m only. Damage (blast scars, rubble and anchor damage) appeared quite old. Two spear fishers were sighted during survey. The reef has many fish, and the fish are relatively large (the area appears to have the highest diversity among the sites surveyed). Good site for a sanctuary.

Benthic results. This area had the second highest coral cover (33.1%) and the highest incidence of coral bleaching (25%). It also had the second highest cover of dead hard coral (27.5%).

Table 6.3. Summary of benthic assessments (percentage of frequency cover) of four sites in Port Barton (Curran and Comer 1998).

| BENTHIC CATEGORY | MANTA RAY REEF SITE 1 | PARAISO REEF SITE 2 | ALBAGUEN (NEAR SETTLEMENT) SITE 3 | ALBAGUEN (PROPER & SANCTUARY) SITE 4 |
|--------------------|-----------------------|---------------------|-----------------------------------|--------------------------------------|
| Hard coral | 33.7 | 30.8 | 15.1 | 33.2 |
| Soft coral* | - | - | - | - |
| Dead coral | 23.5 | 31.9 | 13.7 | 27.5 |
| Fleshy seaweed | - | - | 24.4 | 0.6 |
| Sponge | 1.0 | 0.6 | 5.0 | 0.6 |
| Rock | 3.7 | 4.4 | 6.9 | 6.9 |
| Rubble | 12.5 | 7.5 | 13.1 | 5.0 |
| Sand | 13.7 | 2.5 | 8.1 | - |
| Silt/clay | - | - | - | - |
| Others | 2.5 | 1.0 | 8.1 | 0.6 |
| Coral bleaching | 7.5 | 19.4 | 5.6 | 25.0 |
| Black band disease | 1.9 | 1.9 | - | 0.6 |

* all soft corals were bleached and recorded in the bleached category

Table 6.4. Extent of seagrass and algae in San Vicente (SUML 1996).

| SITE | VEGETATION | EXTENT |
|-----------------------------------|------------------------------------|------------------|
| Primary Data | | |
| Boayan Island | seagrass | 0.23 hectare |
| | foliose algae | 0.04 hectare |
| Albague Island | <i>Sargassum</i> | 50 square meters |
| | foliose algae | 0.4 hectare |
| Exotic Island | <i>Sargassum</i> | 0.225 hectare |
| Poblacion Proper | seagrass | 100 hectares |
| Imuruan Island | coralline articulated algae | 5 square meters |
| Capari | <i>Sargassum</i> | 0.695 hectare |
| Catalat Island and vicinity | <i>Sargassum</i> | 5.4 hectares |
| Gawid | <i>Sargassum</i> | 5.1 hectares |
| Queen's Bay | seagrass | 2.0 hectares |
| Capsalay | foliose algae and <i>Sargassum</i> | 1.0 hectare |
| | seagrass | 0.35 hectare |
| Secondary Data (Interview) | | |
| Binga | seagrass | 50 hectares |
| Port Barton | seagrass | 70 hectares |
| Caruray | seagrass | 50 hectares |
| Poblacion | seagrass | 45 hectares |
| New Villafria | seagrass | 10 hectares |

Table 6.5. Benthic substrate cover (%) in San Vicente (SUML 1996).

| STATIONS | CORALS | | | FLORA | | OTHER FAUNA | ABIOTIC | | | |
|---------------|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| | Live Hard Coral | Soft Coral | Dead Coral | Algae | Seagrass | | Rubble | Sand | Silt | Rock |
| Boayan Island | 71.25 | - | 8.13 | 0.94 | 0.94 | 3.75 | 0.63 | 1.88 | - | 12.50 |
| Albaguen | 63.13 | - | 5.00 | 0.63 | - | 10.00 | 3.13 | 4.38 | - | 13.75 |
| Capsalay | 69.06 | - | 10.00 | 1.25 | - | 2.81 | 10.63 | 2.50 | - | 3.75 |
| Imuruan | 43.44 | 17.34 | 1.56 | 1.25 | - | 1.72 | 19.06 | 3.13 | - | 12.50 |
| Capari | 54.38 | 12.50 | 15.63 | 0.94 | - | 0.16 | 3.13 | - | 3.59 | 9.69 |
| Catalat | 24.06 | 0.47 | 6.56 | 31.25 | - | 0.94 | 1.88 | 4.53 | - | 30.31 |
| Shark Point | 43.75 | 24.69 | - | 11.88 | - | 1.56 | - | 5.47 | - | 12.66 |
| Baybay Daraga | 49.84 | 0.47 | - | 21.30 | - | 0.16 | - | 3.07 | 12.60 | 12.55 |
| MEAN | 52.36 | 6.93 | 5.86 | 8.68 | 0.12 | 2.64 | 4.80 | 3.12 | 2.02 | 13.46 |

6.4). Areas with the highest number of algae species were Catalat, Boayan Island, and Gawid.

SUBSTRATE

The type of vegetation is generally determined by the substrate, or the composition of the sea bottom. Seagrass is usually found on sand and silt, while *Sargassum* (brown seaweed) is abundant on limestone or dead coral. The dominant substrate in the nearshore areas of San Vicente is sand. Other substrates observed were silt, rubble, and limestone (Table 6.5).

MANGROVES

Researchers counted 22 species of mangrove covering an area of 142 hectares in San Vicente. Old Site in Caruray had the highest number of species among 19 sites surveyed. *Busaing* (*Bruguiera gymnorhiza*) and *bakhaw-laki* (*Rhizophora apiculata*) were the most common species found in mangrove forests, where the consistency of the soil ranged from very coarse to very fine sand. Overall density of seedlings and mature trees was low due to the thick canopy of the vegetation. The greatest number of seedlings was recorded in Tagbalisong, for the *Busaing* mangrove species.

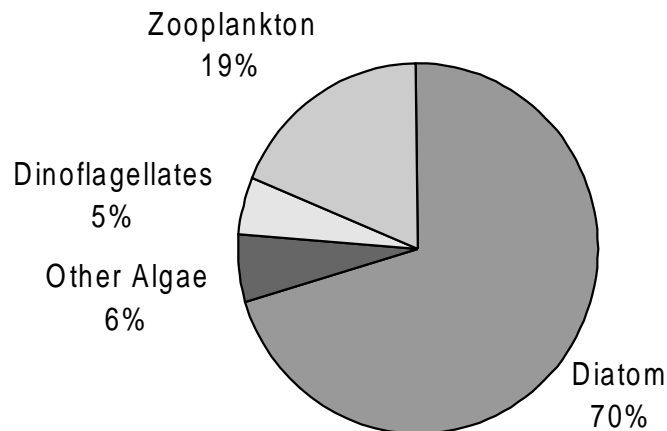


Figure 6.3. Plankton distribution in San Vicente (SUMML 1996).

PLANKTON

Seventy-one percent of the plankton community sampled were diatoms, with 69 genera recorded (Figure 6.3). The dinoflagellate group was composed of 55 species in 20 genera. There were also 37 groups of zooplankton recorded. Shrimp larvae were common. High densities of fish larvae and eggs were recorded in Catalat and Poblacion.

PCRA RESULTS

Splashes of red on most of the barangay maps produced in the PCRA show that coral reefs abound in the waters of San Vicente. Seagrass and mangroves are also found in many of the villages. During the habitat assessment sessions of the PCRA, the fishers were asked to evaluate and rate four habitats: beaches, seagrass, mangroves, and coral reefs. Later, volunteers accompanied the PCRA team in validating their assessment of coral reefs through snorkel surveys in 29 sites.

A summary of the fishers' evaluation is contained in Table 6.7. In the first six sites, the assessment of habitats was not systematically done. This explains why some entries say "not assessed." In the last site, the extensive coral reefs were too far away to be surveyed. The table also shows the findings of the snorkel survey of the coral reefs (last column).

Details of the PCRA habitat assessment for coral reefs, showing the percentages of various components of the substrate as well as the coral cover, are shown in Table 6.8.

During the resource mapping session of the PCRA, local fishers identified the

Table 6.6. Mangrove communities in San Vicente (SUML 1996).

| SITE | AREA (has) | REMARKS |
|------------------------------|------------|--|
| San Isidro, Port Barton | 1 | Mangroves in patches. |
| Pagdanan, Port Barton | 5 | Dominated by <i>R. mucronata</i> on the seaward side. |
| Isla Belasco | 3 | Mangroves seaward a mixture of <i>R. mucronata</i> and <i>R. apiculata</i> . Landward, <i>H. littoralis</i> and <i>B. gymnorhiza</i> most common. |
| Pamoayan, Port Barton | 10 | <i>R. apiculata</i> common. |
| Darapiton river, Port Barton | 100 | A zone of <i>B. gymnorhiza</i> , <i>C. tagal</i> and <i>R. mucronata</i> found at the river mouth. Inland, a zone of <i>X. moluccensis</i> (and monkeys) observed. |
| Bunuanginan, Port Barton | 10 | <i>R. apiculata</i> the most common species seaward. |
| Villapeña, Port Barton | 10 | <i>R. apiculata</i> the dominant species. |
| Bigaho, Port Barton | 1 | <i>B. gymnorhiza</i> dominate. |
| Cata River, Port Barton | 30 | Mangroves cut for charcoal production. |
| Dapi, Port Barton | 50 | Landward <i>R. apiculata</i> dominated landward and <i>R. mucronata</i> dominated seaward. |
| Pob. San Vicente | 2 | Mangroves planted adjacent to the market and near a fishpond. |
| Alimanguhan, San Vicente | 5 | Only two species, <i>R. apiculata</i> and <i>B. gymnorhiza</i> , with the latter being dominant. |
| Pulangbato, San Vicente | 2.5 | <i>R. mucronata</i> dominant. A wild dove, locally known as "balud" observed. |
| Nagbalisong, Port Barton | 10 | Only <i>R. apiculata</i> and <i>B. gymnorhiza</i> observed. |
| Cayduros | .5 | <i>R. apiculata</i> dominant. |
| Old/New Caruray | 150 | Patches of <i>R. apiculata</i> , <i>B. gymnorhiza</i> , <i>C. tagal</i> were observed in between stations. <i>Nypa</i> lined the river banks. <i>A. ilicifolius</i> found on the right bank of the deltas. Mangroves not as thick as those in the Old and New site |
| Decala, Caruray | 100 | of Caruray. <i>Sonneratia</i> dominant at the river mouth. At mid-river, patches of <i>B. gymnorhiza</i> observed. Mangroves in patches along the river. Bangus fry collection at the river mouth. |
| Kemdeng Villafria | 2 | |
| Binga | 9 | |
| TOTAL | 501 | |

most abundant and most commercially valuable resources found in the waters near their communities. Due to space constraints, only the top 10 finfishes are shown for each village visited by the PCRA team. Figure 2.3 shows the resources identified by the fishers of San Vicente as the most important to their livelihood. These resources are among the items plotted on the maps found in Chapter 4.

Another way of presenting the resources found in San Vicente, is through the use of transect diagrams. Figure 6.4 shows the results of that activity in relation to resources found in each habitat. It is important to note that the presence of a particular resource (e.g. dolphins, turtles) in the list does not necessarily mean that the fishers

catch these animals. The basic criteria for this list are the abundance of certain resources in the locality and the commercial importance of these resources to fishers. The list is not exhaustive, but it is a good reflection of the fishers' perception of their marine environment. The transect diagram is a helpful tool in managing resources according to habitat. By studying this diagram, coastal managers can easily determine which places are overfished and thus focus their efforts on controlling the exploitation of resources in these ecosystems.

Table 6.7. Results of the habitat assessment in San Vicente, PCRA 1997.

| SITE | BEACHES | SEAGRASS | MANGROVE | CORAL REEF | MEAN PERCENT TOTAL COVER (%) LIVE CORAL |
|----------------------------------|---------------|---------------|----------|------------|---|
| Pinagmalucan | good | NA | - | NA | 26.8 |
| Panindigan | good | NA | - | NA | 36.3 |
| Macatumbalen | good | good | good | NA | 33.6 |
| Daplak | fair | fair | - | NA | 33.0 |
| Casoyan | good | good | NA | NA | 27.0 |
| Pulang Bato | NA | NA | NA | NA | 42.3 |
| Catalat | fair | fair | - | fair | 25.8 |
| Sta. Cruz | fair | good | good | fair | 31.5 |
| Gawid | good | good | good | good | 33.0 |
| Decala | poor | - | good | - | - |
| Old Caruray | fair | fair | good | good | 67.3 |
| Barongbong | good | good | - | good | 68.0 |
| Albagueñ | good | good | - | good | 55.0 |
| Pagdanan (Queen's Bay) | fair | fair | good | good | 54.0 |
| Capsalay | good | good | good | good | 53.0 |
| Port Barton (Poblacion) | excellentgood | good | good | good | 62.5 |
| Pamoayan | fair | fair | good | fair | 27.5 |
| Naonao/Bigaho | fair | fair | good | fair | 44.3 |
| Baybay Daraga | good | good | - | fair | 32.3 |
| New Villafria (due to mining) | fair | fair | fair | fair | 36.0 |
| New Agutaya | excellent- | good | good | good | 59.6 |
| San Isidro | excellent- | - | fair | good | 34.4 |
| Sto. Niño | excellent- | - | fair | good | 42.0 |
| New Canipo | good | - | good | good | 28.0 |
| Imuruan | good | - | - | good | 31.5 |
| Binga/Buding | good | excellentgood | good | good | 33.0 |
| Wedge Island | - | - | - | fair | 44.5 |
| Cauban | good | - | good | fair | 78.0 |
| Alimanguan | excellent- | good | low | NA | |

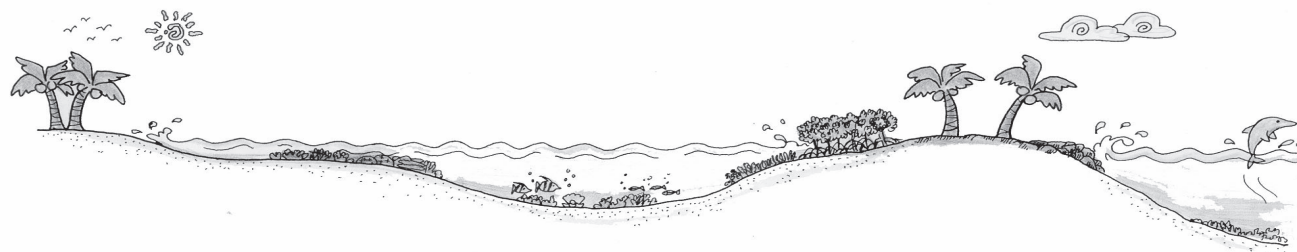
NA - not assessed

Table 6.8. Assessment of coral reefs in San Vicente, PCRA 1997.

| BARANGAY/SITIO | NUMBER OF OBSERVERS | TOTAL DEAD SUBSTRATE | HARD CORAL | SOFT CORAL |
|----------------------|---------------------|----------------------|------------|------------|
| Poblacion | | | | |
| Pinagmalucan | 4 | 73.2 | 23.3 | 3.5 |
| Panindigan | 3 | 63.7 | 36.3 | 0.0 |
| Poblacion | 5 | 66.4 | 33.6 | 0.0 |
| Daplac | 3 | 67.0 | 32.0 | 1.0 |
| Casoyan | 2 | 73.0 | 24.0 | 3.0 |
| Pulang Bato | 3 | 57.7 | 23.5 | 18.8 |
| Caruray | | | | |
| Catalat Island | 3 | 84.2 | 14.0 | 1.8 |
| Sta. Cruz | 2 | 68.5 | 26.5 | 5.0 |
| Gawid | 2 | 67.0 | 24.3 | 9.0 |
| Old Caruray | | 32.7 | 15.6 | 51.7 |
| Port Barton | | | | |
| Barongbong | 3 | 31.9 | 27.3 | 40.7 |
| Albague Island | 3 | 45.0 | 51.0 | 4.0 |
| Queen's Bay | 2 | 45.0 | 31.5 | 23.5 |
| Capsalay Island | 2 | 47.0 | 51.5 | 1.5 |
| Port Barton Proper | 2 | 37.5 | 35.5 | 27.0 |
| Pamuayan | 2 | 72.5 | 22.0 | 5.5 |
| Naonao/Bigaho | 3 | 55.6 | 33.7 | 10.6 |
| Baybay Daraga | 3 | 67.6 | 30.3 | 2.0 |
| New Villafria | 3 | 64.0 | 17.7 | 18.3 |
| New Agutaya | 3 | 40.4 | 24.3 | 35.3 |
| San Isidro | 3 | 65.6 | 8.7 | 25.7 |
| Sto. Niño | 1 | 58.0 | 6.0 | 36.0 |
| New Canipo | 1 | 72.0 | 4.0 | 24.0 |
| Binga | | | | |
| Imuruan Island | 2 | 68.5 | 22.0 | 9.5 |
| Binga Proper | 1 | 67.0 | 15.0 | 18.0 |
| Wedge Island | 2 | 55.5 | 21.0 | 23.5 |
| Cauban | 1 | 22.0 | 22.0 | 56.0 |
| Alimanguhan | NA | | | |

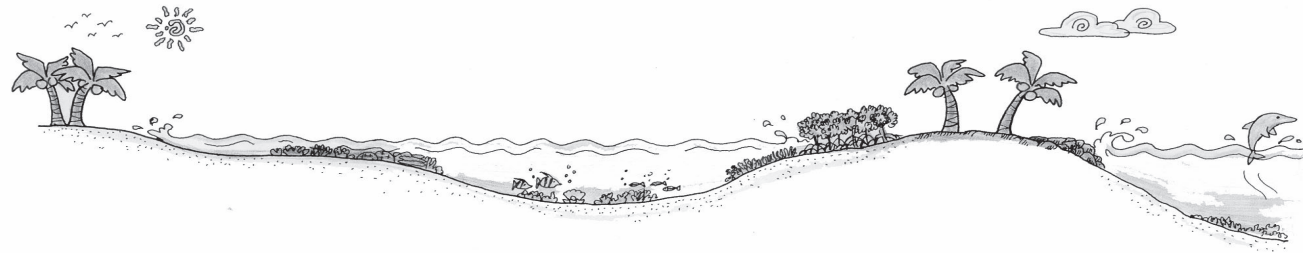
NA - not assessed

Figure 6.4. Transect diagram of coastal resources* in San Vicente classified according to habitat. PCRA 1997.



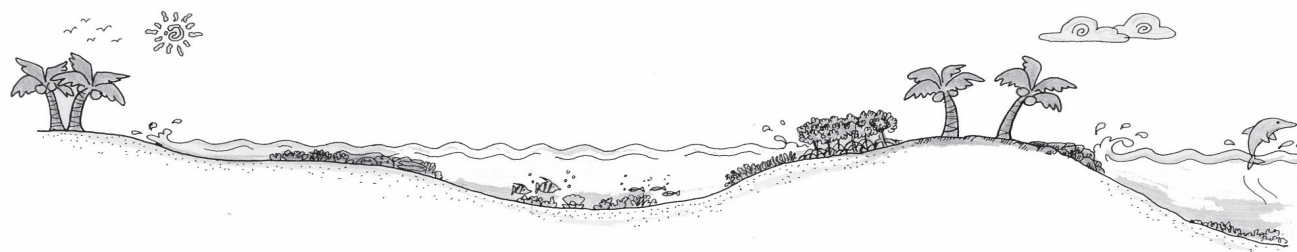
BARANGAY POBLACION

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|---------------------|--|---|--|---|--|--|
| Pinagmalucan | liswi, sikad-sikad, halaan, tagitis, kanaway | shells, seaweeds, balatan, alimasag, pugita, isdang-bato | bangus fry, alamang, sugpo, alimasag, balatan, dilis, pusit bahura, pagi, sapsap | tauban, pugita, maya-maya, danggit, lapu-lapu, taklobo, sanang | — | pusit laot, burao, kalapato, besugo, salayginto, tulingan, salmollete |
| Panindigan | tagitis, pebbles | shell, danggit, alimasag | mulmol, danggit, katambak, liswi, taklobo, pugita | lapu-lapu, kanuping, mulmol, pusit bahura, taklobo, pugita, kolambutan, banagan pusit, kanuping, | <i>Island:</i> sandy beach | torsillo, pusit laot, tangigue, maya-maya, kalapato, alumahan, tabagak, dilis |
| Macatumbalen | bagasay, tagitis, punaw | budyong, alimasag, pugita, alimango, isda, suso, hipon, tipay, liswi, tarab, lato, balatan, banagan, seahorse | kanuping, danggit, haus-haus, palata, palad, mulmol, pagi, pating | talakitok, kalapato, danggit, pagi, pating, alimasag, banagan, sapsap pawikan, suno, | <i>Mangrove:</i> alimango, talaba, tamilok | bisugo, sapsap, tulingan, tangigue, kalaso, maya-maya, tursilyo, pating |
| Daplac | bogitis, balingsara, agokoy, sihi | liswi, kasag, sa-ang, sihi, samong, taklobo, lato, guso, isdang gagmay, sikad-sikad | taklobo, matambaka, burao, pugita, tauban, banagan, alimasag, mamsa | pagi, lapu-lapu, mulmol, kanuping, tangigue, danggit lapu-lapu, lawian, dalagang-bukid, | — | tauban, pusit kalapato, lumba-lumba, galunggong, sulid, maya-maya, rompi pating, lapu-lapu |
| Kasuyan | tagitis, bagasay | sihi, kasag, lato, lapas, balatan | taklobo, liswi, saliot, mulmol, danggit, lato, banak | pugita, samong, suwahan | <i>Isla Manok:</i> samong, sihi, sisi, payong-payong, tanakogon | mamsa, tangigue maya-maya, sagisi, suso, dalagang-bukid, anay-anay, kalapato, galunggong |



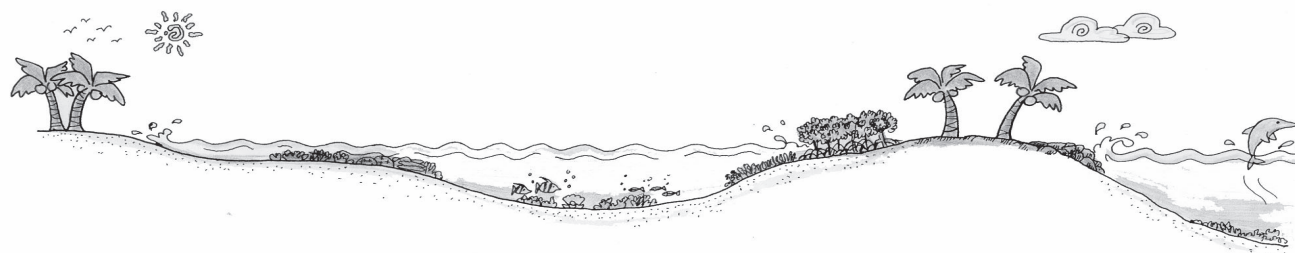
BARANGAY CARURAY

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|-------------------------|---------------------------------------|--|--|---|---|---|
| Catalat | bogitis, sihi, lapas | sa-ang, liswi, lato, kasag | pugita, pusit, banagan, lapu-lapu, kanuping, tauban, pawikan, mulmol | maya-maya, sagisi, sulid, dalagang-bukid, olpot, kalamuhoy | <i>(Catalat is an island)</i> | lapu-lapu, sagisi, banagan, pating, lipti |
| Sta. Cruz | silica sand, itlog ng pawikan, shells | alimasag, pugita, laot, sihi, sa-ang, liswi, bulatok, bangus fry | sapsap, bisugo, burao, pusit, tamban, kalapato, talakitok, hasa-hasa, pugita, lambay | danggit, kanuping, banagan, lapu-lapu, mulmol, pusit bahura, pugita pugita, tauban, | — | tangigue, tulingan, mamsa |
| Gawid | saroksarok, lapas, sisi | taktakon, sa-ang, alimasag, liswi, kapinan | pugita, kanuping, danggit, sulid, bisugo, mulmol | isdang bato, balatan, banagan | <i>Isla Garcia:</i> danggit, sulid, pugita, tauban | maya-maya, sagisi, ulpot, kalamuhoy, maya-maya, suno, mamsa, talakitok, |
| Decala | alimango, hipon, alimasag | kibaw, punaw, talaba, tamilok | bisugo, banak, pusit, sapsap, espada, tamban, lapu-lapu | lapu-lapu, | — | lapu-lapu, suno, maya-maya |
| Old Site Caruray | punaw, kaykay | sihi, balatan, lato, sa-ang, alimasag, samong | danggit, banak, liwit, mulmol, karaho, basa, banagan, taklobo | kanuping, tauban, pagi, mulmol, pakol, pusit, pawikan, taklobo, pating | <i>Isla Garcia:</i> sihi, pusit, lumban, banagan, pugita, banak, mulmol, danggit <i>Mangrove:</i> uway, nipa alimango, tamilok, pagi hipon | sagisi, lapu-lapu, pakol, pusit, samong, kalapato, tangigue |



BARANGAY PORT BARTON

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|--------------------------------|---|---|--|---|--|---|
| Barongbong | tagitis, sihi, lapas, takurog, taktakin | lato, sisi, liswi, sa-ang | taklobo, kuya, suno, danggit, kanuping, dalagang-bukid | pusit bahura, tauban, banagan, suno, mulmol | — | maya-maya, suno, olpot, tursilyo, mamsa, tangigue, tambakol |
| Albaguen | liswi, dagatan na taklobo | sihi, kuya, lapas, sa-ang, samong, tacurong, balingkahoy, lukob-lukob | bisugo, suno, kanuping, bangsi, alumahan, tulingan, galunggong | maya-maya, lapu-lapu, dalagang-bukid, sagisi, kalapato, salimburao, tulingan, tangigue | <i>(Albaguen is an island)</i> | lapu-lapu, maya-maya, sagisi, dalagang-bukid |
| Pagdanan | — <i>(Houses on stilts in water)</i> | lato, liswi | bisugo, dilis, sapsap, pawikan | lapu-lapu, pusit, burao, danggit, maya-maya, taklobo, liswi, tauban | <i>Velasco:</i> lapu-lapu, burao, kalapato | tangigue, tulingan, dolphin |
| Capsalay | — | mulmol, lato, kanuping, lumban, tarab, seagrass | liwit, hasa-hasa, balo, dalagang-bukid, dolphins | sapsap, liswi, mulmol, danggit, tauban, pusit, lapu-lapu, taklobo, pawikan | <i>(Capsalay is an island)</i> | pusit |
| Port Barton (Poblacion) | balas, bato | banak, dilis, liswi, hipon, samong, alimasag | sapsap, liwit, pitik, dolphin, matambaka, tambakol, ibon dagat | balo, pak-an, tarab, pusit, pugita, tipay, banagan, tauban, dalagang-bukid, samong, taklobo | <i>Mangrove:</i> ahas dagat, alimango | <i>Fishers rarely go to deep waters.</i> |
| Pamoayan | pawikan (nesting area), sihi, alimasag | danggit, banak, dilis, liswi, sa-ang | sapsap, bisugo, espada, pak-an, salmollete, tarab, dolphin | kanuping, bakoko, pusit, tauban | <i>Mangrove:</i> ahas dagat, alimango, hipon, kahoy | pusit |



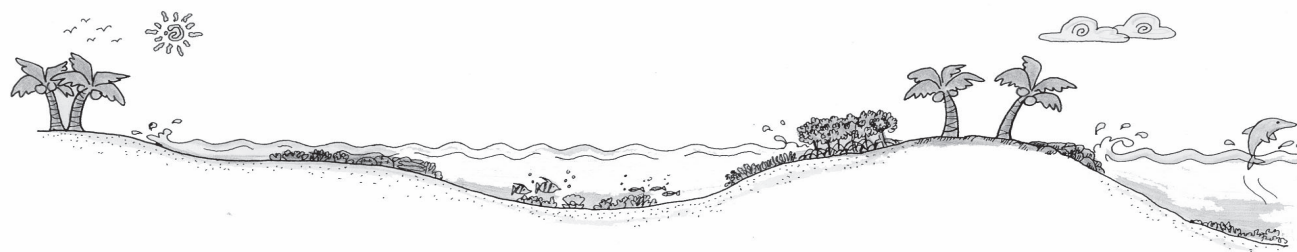
| | | | | | | |
|----------------------------|-------------|---|--|--|--------------------------------------|---------------------|
| Naonao & Bigaho | silica sand | banak, balatan, ahas dagat, liswi, sihi | bisugo, hipon, pakan, tanguige, tulingan, alimasag, danggit, matambaka | pawikan, tauban, alimasag, banagan, pitik, sang, taklobo, tarab, lapas | <i>Mangrove:</i> alimango, talaba | tulingan, hasa-hasa |
| Baybay Daraga | silica sand | talaba, liswi | tanguige, mayamaya, bisugo, dalagang-bukid, balo, danggit | pugita, pusit, tauban, taklobo, kanuping, pawikan | _____ | dolphin, tulingan |

BARANGAY NEW VILLAFRIA

| SITE | BEACH | | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|--|-------------|--|---|--|---|-------------------|
| New Villafria (barangay proper) | silica sand | banak, liswi, talaba, tarab, alimasag, hipon | kanuping, dalagang bukid, hilo, ibon-dagat, talakitok, mangagat | lapu-lapu, lato, balo, danggit, pawikan, pugita, pusit, sihi, mulmol | <i>Mangrove:</i> alimango, nipa, kahoy | ahas dagat, pitik |

BARANGAY NEW AGUTAYA

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|---------------------------------|---|---|--|--------------------------------------|---|---------------|
| New Agutaya (Bukana) | pawikan nesting site, silica sand, talabong | dillis, lapad, asohos, bangus fry, alimasag | tulingan, burao, pusit, dolphins, ahas dagat | matambaka, galunggong, pitik, tauban | <i>Mangrove:</i> mangagat, bangus fry, lapu-lapu fry, hipon, kahoy, alimango | tauban |



BARANGAY SAN ISIDRO

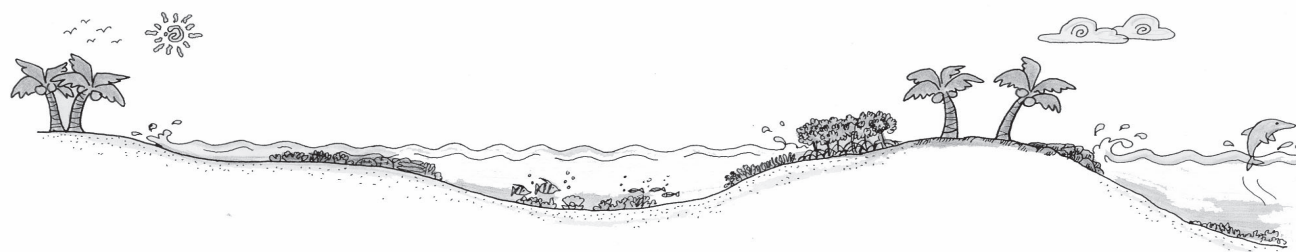
| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|---------------------|---|--------------|--|--|---|---|
| San Isidro (Bokbok) | pawikan nesting site, bato, lawin, talaba | pusit | burao, tanguige, turay (tamban family) | darag-darag, kanuping, lapu-lapu, tauban, pugita | <i>Mangrove river:</i> alimango, wild ducks | salay-salay, bisugo, karaho, dolphin, pusit |

BARANGAY STO. NIÑO

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|-------------------------|--|--------------|--|--|------------------|--------------|
| Sto. Niño (Mangingisda) | pawikan nesting site, bangus fry, alimasag, sihi, nipa | _____ | burao, pusit, bisugo, ibon dagat, sa-ang, talakitok, sapsap, asohos, espada, dolphin, sea snakes, dugong | danggit, lato, kanuping, pawikan, agahon (maya-maya family), sulid, tauban, pugita, alimango | _____ | pusit, pitik |

BARANGAY NEW CANIPO

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|------------------------------|--|--|---|---|-----------------------------------|----------------------|
| New Canipo (barangay proper) | pawikan nesting site, sihi, punaw, sea birds | dilis, banak, asohos, balo, alimasag, bangus fry | bisugo, pusit, sapsap, liswi, salayginto, dugong, dolphin | kanuping, burao, lato, pawikan, banagan, tauban, pugita | <i>Mangrove:</i> bangus fry, nipa | tauban, pitik, pusit |



BARANGAY BINGA

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP |
|---|---|--|---|---|---|--|
| Imuruan | pawikan nesting site, liswi, sihi, lumban | — | bisugo, talakitok, pusit, pagi, kalapato, sapsap, liswi, matambaka, kanuping | mulmol, danggit, tauban, banagan, pawikan, taklobo, sulid | <i>(Imuruan is an island.)</i> | galunggong, dolphin, whale, pusit, pitik, sea snakes |
| Binga (barangay proper & Boding) | pawikan nesting site, sihi, lapas, punaw, sand pebbles, sea birds | lato, sapsap | bisugo, dilis, maya-maya, dolphin (Feb-May), burao, pusit, alimasag, pitik, talakitok, kanuping burao, pusit, maya- | lapu-lapu, danggit, pawikan, sea snakes, sulid, pusit, tauban, pugita, liswi, banagan, balatan, | <i>Mangrove:</i> nipa, alimango, bangus fry, bakhaw | — <i>(Fishers don't usually go to deep waters.)</i> |
| Cauban | pawikan nesting site, sihi, lapas | dilis, pagi, pugita, samong (during habagat) | maya, kalapato, sapsap, liswi, bisugo, talakitok, tanguige | danggit, pawikan, lumban | <i>Mangrove:</i> bangus fry <i>Wedge Island:</i> danggit, taklobo, sea birds | dolphin, sea snakes, pusit, pitik |

BARANGAY ALIMANGUAN

| SITE | BEACH | INSHORE FLAT | LAGOON/ BAY | OFFSHORE CORAL REEF | ISLAND/ MANGROVE | DEEP OCEAN |
|-----------------------------|-----------------------------------|--|--|--|------------------|---------------------------|
| Alimanguan (Purok I) | pawikan nesting site, silica sand | sapsap, dilis, samong, liswi, alimasag, bangus fry | bisugo, pusit, tanguige, balatan, pawikan, pitik, birds, taklobo, pagi, burao, tulingan, dolphin | pugita, banagan, kalapato, kanuping, agahon, talakitok, sea snakes, tauban | | whale (month of November) |

* See List of Terms in the beginning section for the English names of these resources.