

UNDERWATER SURVEY OF MARINE RESOURCES

Barangay Binugao, Toril, Davao City

October 22-23, 2013

Submitted to: IDISPHIL

RATIONALE:

Barangay Binugao is one of the coastal barangays in Toril District, Davao City which covers 25 barangays, of which 4 are coastal. It is located with a grid coordinates of 6°58'46"N 125°28'45"E. The coastline has a total length of 2.687km (map generated). A team of divers perform survey on the coastal and marine life conditions in the coastal waters of barangays Binugao and Inawayan, Toril, Davao City. The surveyed reefs are found fronting the newly constructed Therma South Inc. – TSI Coal-fired Power Plant of the Aboitiz group. Binugao area is situated in the western part of Davao City and close proximity to the boundary of the municipality of Sta. Cruz, Province of Davao del Sur.

The team was able to established four (4) marine water sampling stations; every station has three replicates of water samples including the control station in the off-shore region. Water samples and sediments were collected in the shallow and deeper areas which were placed in plastic containers and clear plastic bags respectively, for heavy metals analysis.

The three (3) coral reefs were predominantly silted and has a poor water quality considering the exposure currents and tributaries nearby. Relatively soft corals can be seen in the deeper portions. Substrate is sandy to deep muddy with rubble and rock in the reef areas which obviously suffocated the live hard corals that bring high sediments load. Underwater is turbid and visibility at 3 meters.

Lack of awareness of the importance of the marine resources is now facing scarcity by the residents in the area. The fishermen in the area have experienced a decline in their fish catch compared to previous years. There is a need to protect and conserve the remaining resources in the area for the benefit of the coastal dwellers and boost tourism. The sites are potential for diving enthusiasts who are into macro photography. This will provide livelihood once it is implemented by the collaboration of the local and national government agencies.

Presently, there is a weak legislation and absence of enforcement to protect the coastal resources which are existing in our national laws. A city ordinance with the initiative of the barangay leaders should be enacted to provide a legal basis for coral reef protection. A periodic monitoring program for the coral reef ecosystem and other marine life must be developed. Build and strengthen the local communities for coastal resource management. This can be done through technical assistance and public education. Since there are coastal development in the areas the big companies should also help in protecting the environment as part of their corporate social responsibility.

SAMPLING STATIONS:

Station 1

Station one (1) was established in the center of the Aboitiz Coal-fired Power plant with is located $N06^{\circ}58'15.50'' E125^{\circ}29'06.00''$ and approximately 700 meters away from the shore. Line intercept method and fish visual census were conducted. The reef has a total length of 70 meters from edge to edge. The top of the reef is 20 meters deep and has formation. The water was recorded at 83°F. The water is turbid and the bottom is silted. Mostly sea fan, elephant ear sponge, sea whip and soft corals were grown in the site. Hard corals were also abundant due to sedimentation. Other marine invertebrates such as sea cucumber and nudibranch were also noticed. But, the highlight of this site as we surfaced a large whale shark is conspicuous a few meters away.

Station 2

Five hundred meters away from station one (1) no reef was found in such distance and even farther during the survey. But between one and two stations there were reef found at eighty feet deep measuring eighty five meters length. This reef was treated as station two. The reef has an approximate distance of 400 hundred meters away from the shoreline and positioned at $N 06^{\circ}58'11.90'' E 125^{\circ}29'16.40''$. Marine Water samples were collected, a hundred meters transect were laid perpendicular to the shore to determine the slope and sea grass bed, but sea grasses were not in existence as the substrate is entirely muddy. The bottom has a gradual slope measuring only seven meters in depth at the end of one hundred meters extent of transect line. The transect was laid during low tide and the recorded water temperature is 84°F.

Station 3

Station three (3) is located in the southeast portion fronting the coastal waters with the coordinates of $N 06^{\circ}57'06.00'' E 125^{\circ}29'08.80''$. Temperature was recorded at 83°F. This reef contains another mountainous formation same as the other reefs but has a smallest radius. Based on our survey, the reef consists of more live soft corals but has a low hard coral cover, but this site has the most numbers of economically important in terms of food fishes. It shows a large school of table size snappers (*lutjanus*) and scores of marketable size giant trevallies or jacks (*carangidae*). This reef is located off-shore 350 meters seaward from coast and has an estimated reef length of 50 meters via the transect line. A 100 meter transect line was also laid perpendicular to the shore to determine the slope and the existence of seagrasses. Along the line no seagrasses was found due to siltation.

COMMON CORAL SPECIES FOUND IN THE SAMPLING SITES AND OTHER RELATIVE MARINE ORGANISMS:

Family	Scientific name	Common name
Fungiidae	<i>Fungia spp.</i>	Mushroom coral
Faviidae	<i>Favia sp</i>	Knob coral
Poritidae	<i>Porites lutea</i>	Hump coral
Poritidae	<i>Porites cylindrica</i>	Pore coral
Caryophyllidae	<i>Plerogyra sinoussa</i>	Rounded bubble coral
Pectiniidae	<i>Oxypora lacera</i>	Porous lettuce coral
Faviidae	<i>Leptoria sp.</i>	Leas valley coral
Ellisellidae	<i>Ellisella sp.</i>	Red whip coral
Melithaeidae	<i>Melithaea sp.</i>	Sea fan
Nephtheidae	<i>Nephthya sp.</i>	Cauliflower coral
Nephtheidae	<i>Nephthya sp.</i>	Soft coral
Nidaliidae	<i>Siphonogorgia sp.</i>	Gorgonian fan
Xeniidae	<i>Junceella sp.</i>	Delicate sea whip
Faviidae	<i>Diploastrea sp.</i>	Double star coral

Xeniidae	<i>Lophogorgia sp.</i>	Sea fan
Acroporidae	<i>Montipora striata</i>	Tuberculate pore coral
Pocilloporidae	<i>Pocillopora sp.</i>	Cauliflower coral
Pectiniidae	<i>Oxypora lacera</i>	Porous lettuce coral
Acroporidae	<i>Acropora polifera</i>	Branching hard coral
Faviidae	<i>Echinopora sp.</i>	Hedgehog coral
Acroporidae	<i>Acropora sp.</i>	Staghorn coral

Other relative marine organisms:

Family	Scientific name	Common name
Sabellidae	<i>Sabelastarte sp.</i>	Common sea worm
Pteroiididae	<i>Pteroeides sp.</i>	Sea pen
Phyllidiidae	<i>Phyllidia elegans</i>	Elegant slug
Flabellinidae	<i>Flabellina spp.</i>	Flabellina
Comasteridae	<i>Comanthina sehlegeli</i>	Feather star
Oreasteridae	<i>Choriaster granulatus</i>	Granulated sea star

Porifera	<i>Xestosorgia testudinaria</i>	Barrel sponge
Porifera	<i>Lanthella basta</i>	Elephant ear sponge
Stichopodidae	<i>Thelenotaanx</i>	Anax sea cucumber
Synaptidae	<i>Synapta sp.</i>	Worm sea cucumber
Synaptidae	<i>Synaptula lamberti</i>	Lambert's worm
Holothuriidae	<i>Bohadschia argus</i>	Eyed-sea cucumber
Holothuriidae	<i>Bohadschia graeffci</i>	Graef's sea cucumber
Styelidae	<i>Polycarpa anrata</i>	Purple sea squirts
Didenidae	<i>Atriolum robustum</i>	Robust sea squirt

MARINE FISHES RECORDED DURING THE FISH VISUAL CENSUS:

Family	Scientific name	Common name
Balistidae	<i>Balistapus undulates</i>	Orangelined triggerfish
Balistidae	<i>Balistoides conspicillum</i>	Clown triggerfish
Scorpaenidae	<i>Pterois antennata</i>	Spotfin lionfish
Monacanthidae	<i>Paraluteres prionurus</i>	Mimic filefish

Serranidae	<i>Cephalopholis argus</i>	Peacock rock cod
Serranidae	<i>Epinephelus fasciatus</i>	Blacktipped grouper
Priacanthidae	<i>Priacanthus hamrur</i>	Crescent tail bigeye
Carangidae	<i>Echeneis naucrates</i>	Suckerfish
Lutjanidae	<i>Lutjanus rufolineatus</i>	Golden-lined snapper
Mullidae	<i>Parupeneus indicus</i>	Goatfish
Caesionidae	<i>Pterocaesio labivittata</i>	Widestripe fusilier
Apogonidae	<i>Pterocaesio</i>	Five-lined cardinalfish
Nemipteridae	<i>Scolopsis lineatus</i>	Black and white spinecheek
Mullidae	<i>Parupeneus pleurostigma</i>	Roundspot goatfish
Pomacentridae	<i>Acanthochromis polyacantha</i>	Spiny tail puller
Cirrhitidae	<i>Cirrhitichthys aprinus</i>	Threadfin hawkfish
Labriidae	<i>Halichoeres melanurus</i>	Tailspot wrasse
Scaridae	<i>Chlorurus bleekeri</i>	Bleeker's parrotfish
Gobiidae	<i>Amblyeleotria guttata</i>	Spotted shrimp goby
Gobiidae	<i>Signigobius biocellatus</i>	Twinspot goby

LOGISTICS AND METHODOLOGY:

Materials

- Scuba diving equipment
- Motorized *bangka*
- Underwater cameras
- Transect line tape
- Slate boards
- Gallons (water samples)
- Plastics bags (for sediments)
- GPS (Global Positioning System)

PROCEDURES:

With the used of motorized *bangka* and with the help of local fisherfolks, the team were able to determine the reef areas. The line intercept method is used to assess the coral reef and fish visual census also conducted in every station. Three (3) coral reef stations were identified during the survey. The transect line were laid parallel to the shore to determine the coral cover. All stations have underwater photo documentations for coral reef, fishes, invertebrates and other related marine life. A hundred meter transect line was also laid perpendicular to the shore in each station to determine the slope and the presence of seagrass bed. Water and sediments samples were collected to measure different parameters which will be conducted by the academe. Four (4) marine water stations were conducted as shown in Figure A.

RESULTS AND DISCUSSIONS:

After two days of preliminary investigation of the existing reefs at TSI coal plant, the team has gathered a baseline data with the effort of the local fisher folks. Based on the survey it is evident that the existing marine resources has to be protected to restore its potential of generating food especially to the local community. The dive team sighted a whale shark, the biggest fish/shark which is closed to be an endangered species. One reason why whale shark resides in the site is due to the presence of plankton and creel which there primary food. A blue-spotted stingray was also spotted closed to the shore. This benthic marine species is rarely seen in Davao gulf and even in Samal Island (IGACOS). This concludes that the area is still diverse in terms of marine species. Total status of the reef as the moment is fair and silted.

Constant urban development in the coastal, denuded forest and agricultural run-offs coming from mainland are the potential effects of siltation, damaged to coral reefs and depletion of marine resources. In addition, we observed fishers in the localities still practice illegal fishing activities using banned fishing gears.

- Identifications of marine life such as corals, fishes, marine invertebrates ,nudibranch and other marine species were based on the following references:
 - Atlas of the Philippine Coral Reefs, Porfirio M. Alinio et. Al
 - Reef Fish Identification-Tropical Pacific, Gerald Allen, et, al
 - Philippine Coral Reefs- A natural history guide, Alan T. White
 - Reef Fishes, Corals and Invertebrates of the Phil and South china sea, Elizabeth Wood and Michael Aw
 - Coral Sea Reef Guide (Fishes, Corals, Crustaceans, Snails, Cephalopods, Reptiles, Mammals, Bob Halstead)

TECHNICAL DESCRIPTION

GPS Coordinate System

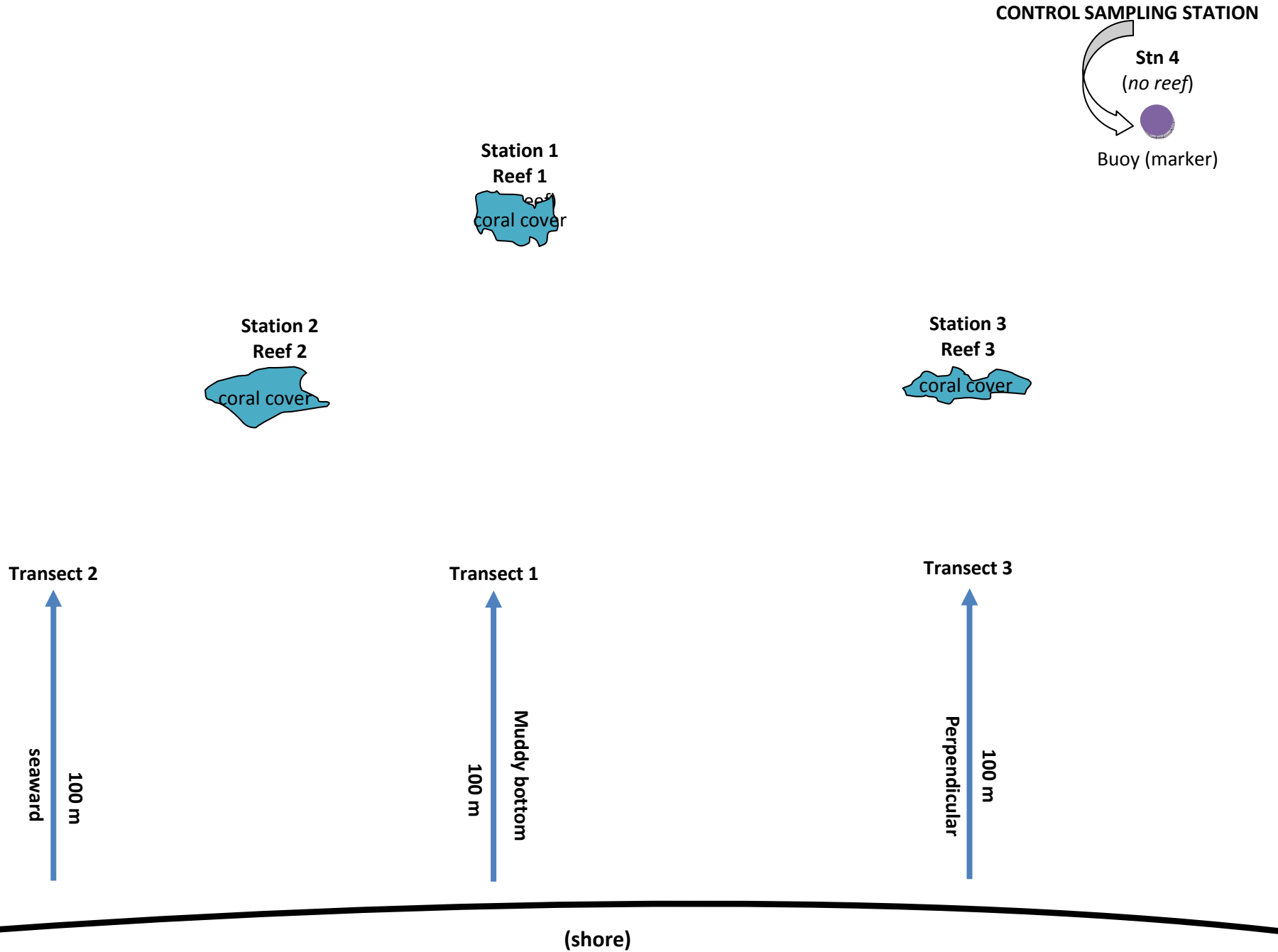
WGS

October 22-23, 2013

*Conduct marine resources survey, established marine water sampling stations and sediment samplings at barangays Binugao & Inawayan, Toril, Davao City

Reference Points	Latitude	Longitude
Station 1	N 06°58'15.50"	E 125°29'06.00"
Station 2	N 06°58'11.90"	E 125°29'16.40"
Station 3	N 06°57'06.00"	E 125°29'08.80"
Station 4	N 06°57'06.00"	E 125°29'15.70"
Station 5	N 06°57'27.45"	E 125°29'09.07"
Station 6	N 06°57'25.90"	E 125°29'14.10"

Figure A.

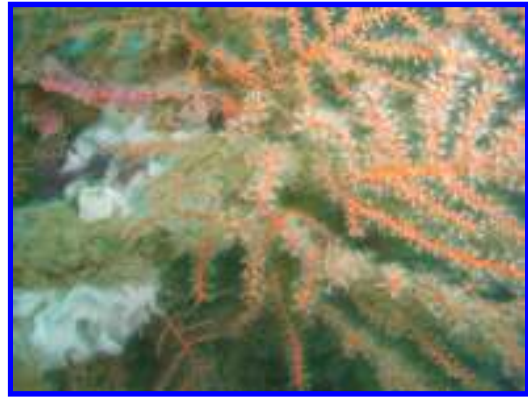


MARINE WATER SAMPLING STATIONS
COASTAL & MARINE RESOURCE MAP

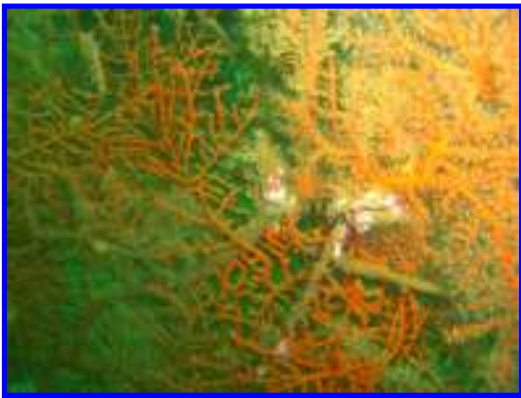
COMMON SOFT AND HARD CORALS FOUND IN SITES:



Dendronephthya sp.



Acabaria sp.



Acanthogorgia sp.
Gorgonian



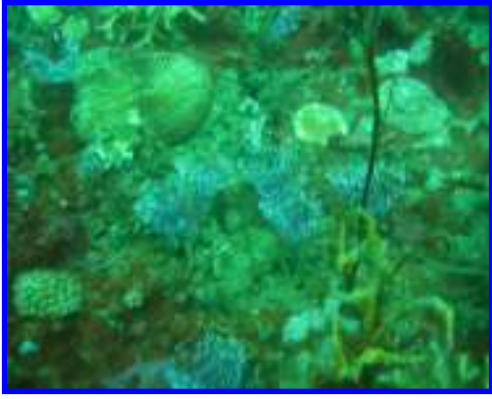
Eunicella sp.
Sea fan



Antipathes sp.
Bushy coral



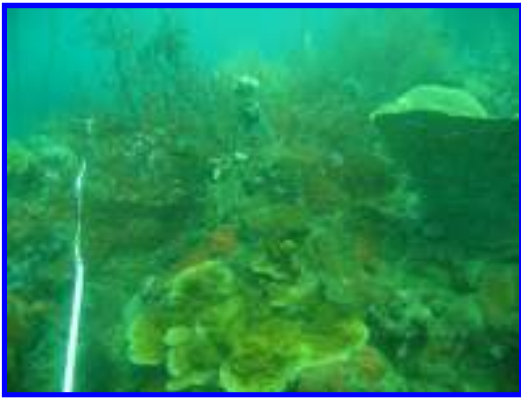
Melithaea sp.
Scarlet sea fan



Fungia sp.



Mycedium sp.



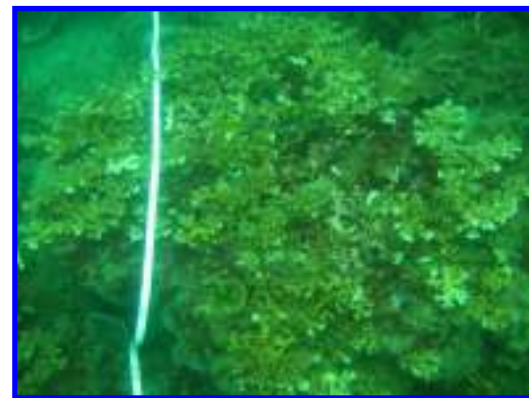
Echinopora sp.



Turbinaria sp.



Kalypildion sp.



Montipora sp.



Heliofungia actiniformis
Mushroom coral



Acropora sp.
Staghorn coral



Porites sp.
Boulder coral



Echinopora gemmacea
Hedgehog coral



Goniopora lobata
Hand coral



Plerogyra sinuosa
Rounded bubble



Haliclona sp.
Sponge



Kalypidion sp.
Tube sponge



Xestospongia sp.
Barrel sponge



Phyllospongia sp.
Fan sponge



Lanthella sp.
Curtain sponge



Leiodermatium sp.
Elephant ear

COMMON FISHES FOUND IN SITES:



Parupeneus indicus
Goatfish



Caranx ignobilis
Trevally



Lutjanus rufolineatus
Snapper



Balistapus indulatus
Triggerfish



Cirrhitichthys aprinus
Hawkfish



Cephalopholis argus
Grouper



Cheilodipterus quinquelineatus
Cardinal fish



Pterois antennata
Lionfish



Chlorurus bleekeri
Parrotfish



Scolopsis lineatus
Cardinalfish



Aspidontus taeniatus
False cleanerfish



Canthigaster petersii
Indian toby

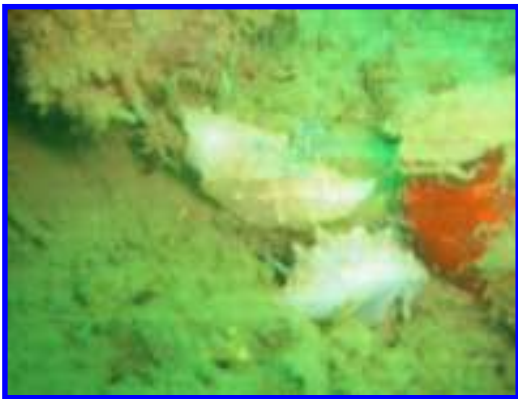


Neotrygon kuhlii
Blue-spotted stingray



Rhincodon typus
Whaleshark

MARINE INVERTEBRATES AND OTHER MARINE LIFE FOUND IN THE SITES:



Halgerda sp.
Nudibranch



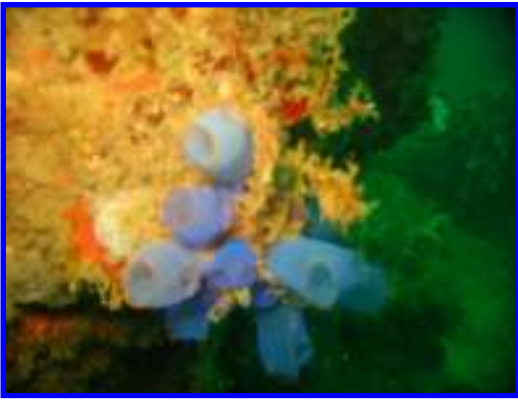
Phyllidia sp.
Nudibranch



Linckia laevigata
Sea star



Choriaster granulatus
Sea star



Rhopalea sp.
Sea squirts



Cinometra sp.
Crinoid