ENVIRONMENTAL

BASELINE DATA

The Philippines is one of 18 mega-biodiverse countries of the world, containing two-thirds of the earth's biodiversity and between 70% and 80% of the world's plant and animal species. With regards to the marine environment the Philippines has 26,000 square km. of coral reefs, roughly 12% of its land area. It represents 10% of the global total, third after Australia and Indonesia, in total reef area. Home to 464 species of stony corals, second only to Indonesia. Philippines have 42 species of mangroves, the highest in the world, and 19 species of sea grass, second to Australia. Philippine is home to 3,000 species of marine fish, 648 species of mollusks and 820 species of algae, 5 of 7 known species of marine turtles, and 27 species of whales and dolphins.

The country is also considered a biodiversity hotspot, which makes Philippine known for its ecotourism. The Philippine ecotourism is continuing to demonstrate robust growth of development which increasing tourist spots such as El Nido Palawan, Puerto Princesa, Bohol Island, Camiguin Island, Siargao Island and other more. The Tourism generates revenues and creates employment but can put enormous pressure on an area and lead to impacts such as soil erosion, increased pollution, discharges into the sea, natural habitat loss, and increased pressure on living organism. One of the common samples is the Boracay Island, the coral reef on Boracay has been seriously degraded by tourism-related activities, whereas unregulated commercial development has threatened the island's ecosystem and the water quality on the island is deteriorating due to the direct discharge of untreated waste water near the shoreline.

As the importance of preserving the marine environment is slowly understood, the Philippine Coast Guard is committed to maintain a proactive and credible Marine Environmental Protection capable of responding not only to various level of oil and chemical Spill incidents, but also in the protection and preservation of marine environment in the country. A continuous scientific study along the busy ports and areas with high vessel traffic will provide the necessary data for the development of a marine environmental data base system.

SCOPE

This Preliminary assessment study only covered the following area/site due to increasing growth in eco-tourism, dynamic activity within the area and primary route of the vessel. This study is limited only to gather water quality data at sea, port, rivers, tributaries within the following eight (8) selected are:
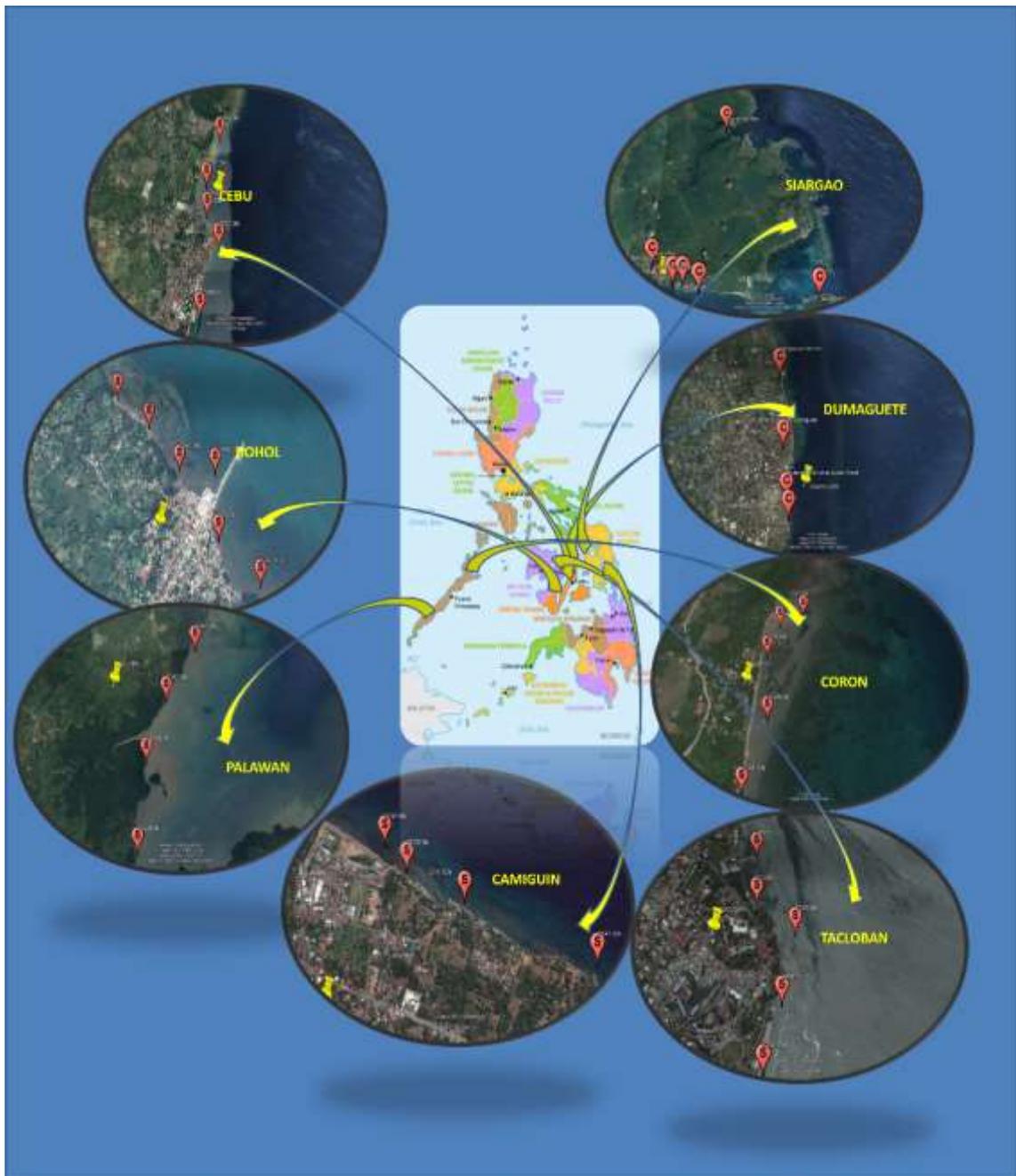

Figure 1: Sampling Site

The water quality parameters are limited to pH, Temperature (temp), Dissolve Oxygen (DO), Salinity (Sal) and Oil and Grease (O&G). The frequency of sampling for the Preliminary Assessment is once a year during summer season of CY 2017-2018.

A. Site Selection

The site selection and its sampling stations are the strategic locations/positions based on the intended beneficial use of bodies water and the dynamic activities within the vicinity. The initial sampling station established were plotted/ marked on the Table Map Survey. An actual survey were conducted to determine the coordinates of the sampling stations in situ.

B. Sampling Procedure

The sampling procedure done to collect the samples follows the standard sampling procedure as stated in the MERDC Standard Operating Procedures for Laboratory Protocols . Two (2) samples per station were collected. A clean beaker was used to collect the sample. The sample taken was then transferred to the sample bottles. Two hundred (200) milliliters of sample were taken from each station. Upon transfer, the samples are then acidified with one (1) drop of Six Molars (6M) Hydrochloric Acid (HCl). Prior attaching the bottle cap, an aluminum foil strip was attached to the lid of the bottle to prevent contamination of the water samples. The water samples were then placed in a container with ice to preserve the water sample. Samples were then brought to the MERDC Laboratory for testing.

C. Physico-chemical Parameter

Analysis methods adopted in this preliminary assessment is based on the EMB Approved Method of Analysis for Water and Waste Water . The pH, Temperature, Dissolved Oxygen and Salinity were determined using the Electrochemical and Membrane Electrode method based YSI Pro DDS Multi Parameter Meter. Sampling depth and equilibration time was standardized to one meter and two minutes respectively for all sampling site.S

D. Laboratory Analysis on Oil and Grease

Oil and grease analysis was done using the Liquid –liquid Partition Gravimetric Method . Samples taken were transferred in a separatory funnel with 30 ml extracting solvent (AR N Hexane), shaken rigorously for 2 min. Extract layer was separated and water part was removed and re-extracted twice. Extracts were combined and filtered using 10 g Na2SO4 in a filter paper to remove water. Extracts were then evaporated until dry before weighing. Calculations were used to determine the amount of oil and grease in the sample in parts per million (mg/L)

$$\text{Oil and Grease (ppm)} = \frac{F_2 - F_1 \times 1000}{\text{Volume}_{(Sample)} \text{ ml}}$$

Where:

F_1 – initial flask volume

F_2 – final flask volume (F_1 + dried oil and Grease in sample)

Volume $_{(sample)}$ - volume of sample in ml

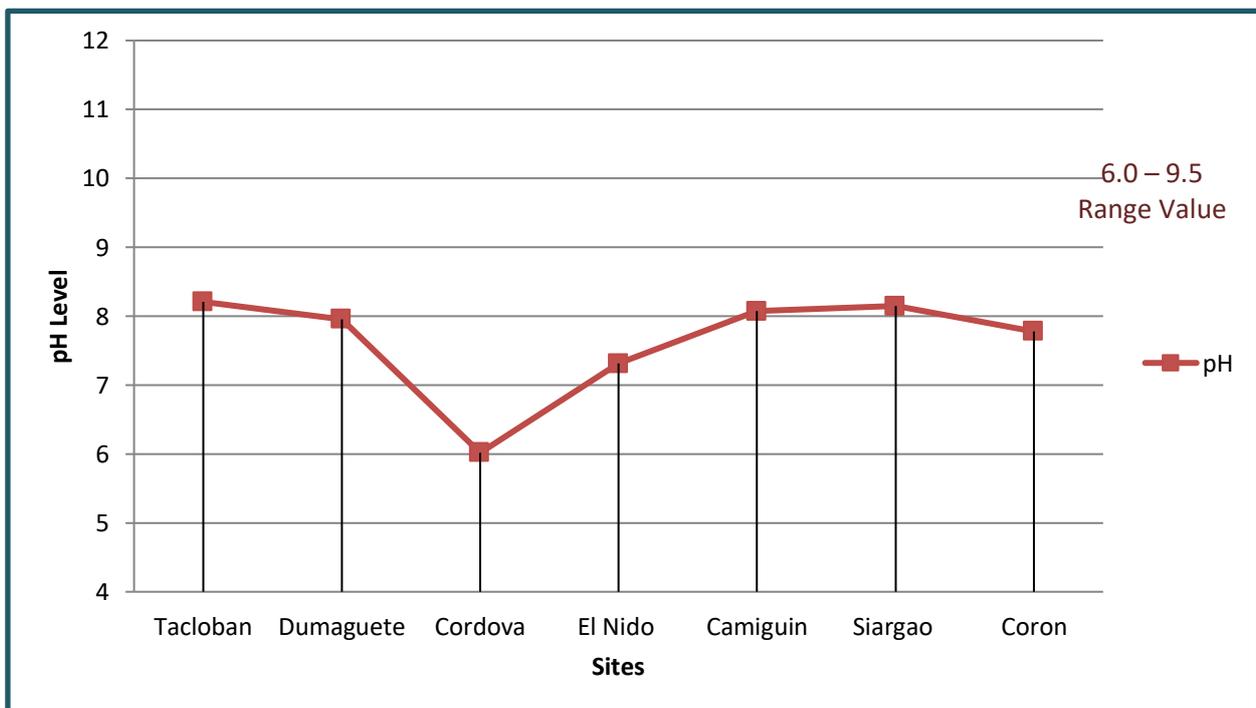## RESULTS AND DISCUSSIONS

A. Over-All Data in Graph

Figure 2: pH levels

Figure 2 graph showed that pH level with the highest mean value of 8.207 (Tacloban) and the lowest mean value of 6.015 (Cordova), all of the sampling site are within the allowable range.
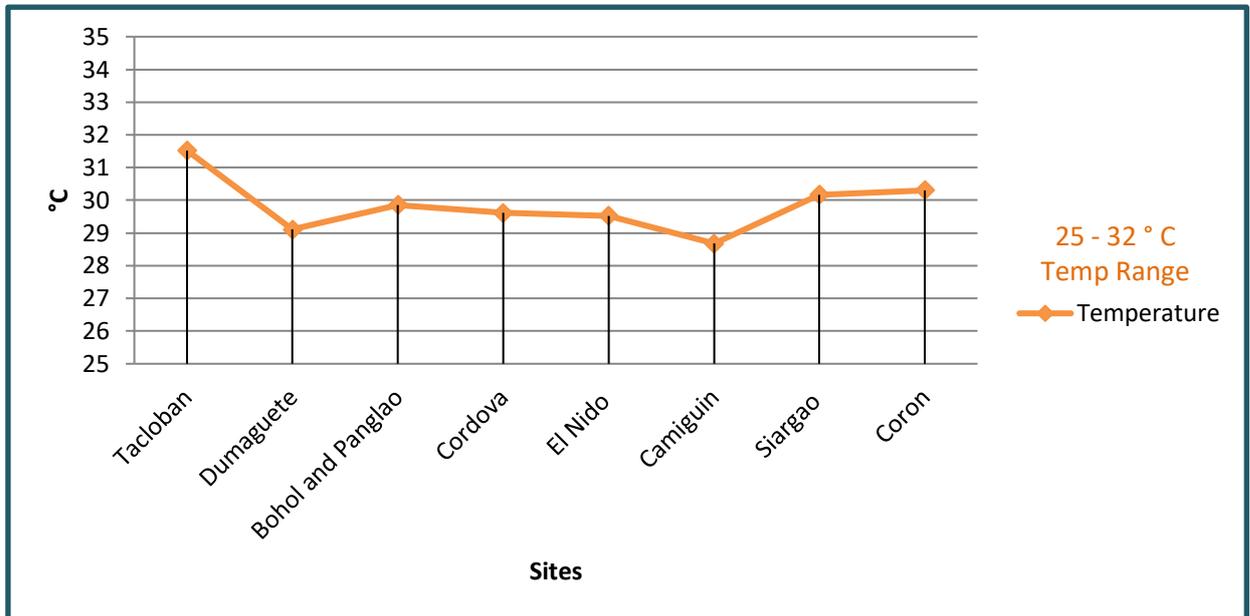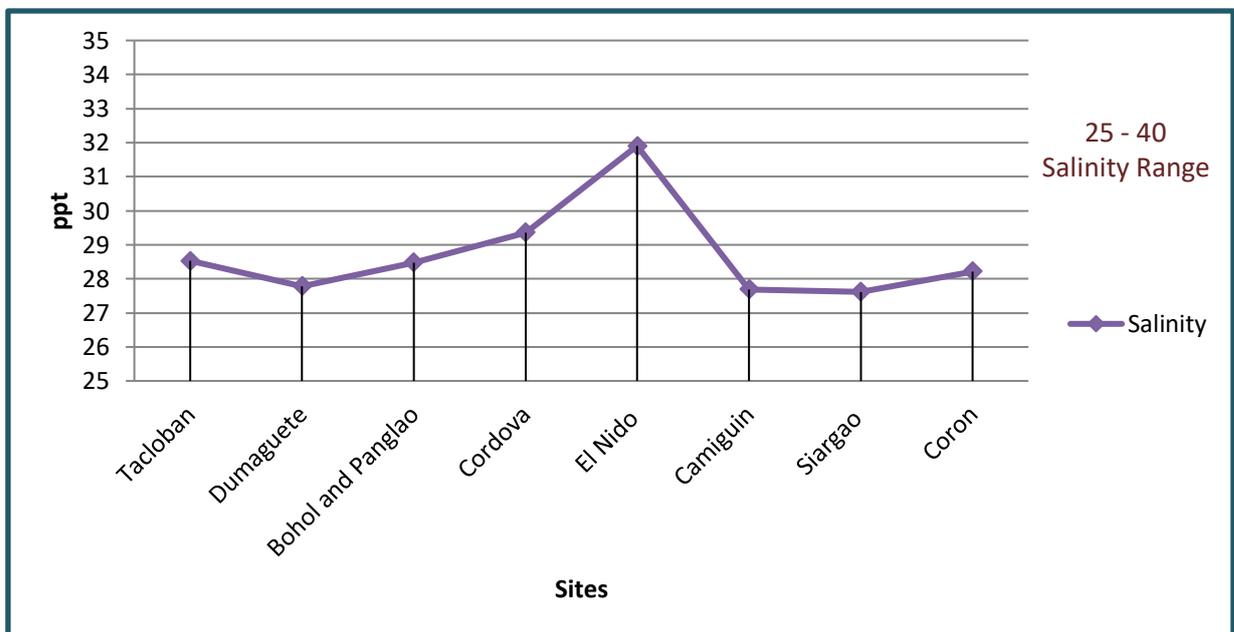

Figure 3: Temperature

Figure 4: Salinity

Figure 3 and Figure 4, the salinity of the water samples varies on the temperature of the water in all stations. The highest mean value of Temp is 31.52° C (Tacloban) and the Lowest is 28.677° C (Camiguin) while in Salinity the highest

mean value is 31.902 ppt (El Nido) and the lowest 27.616 ppt (Siargao). Both Temp and Salinity were within the Allowable range.
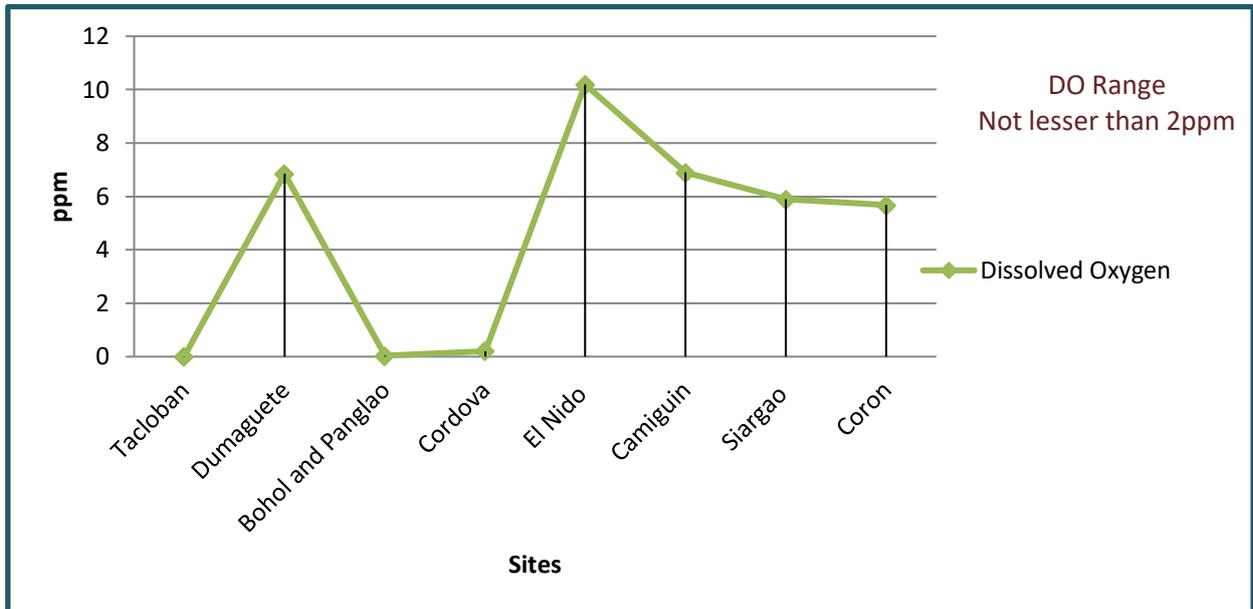

Figure 5: Dissolve Oxygen (DO)

Figure 5, the graph showed the highest Concentration mean value of DO is 10.192 ppm (El Nido) and the lowest mean value is 0 ppm (Tacloban, Bohol and Cordova). Tacloban, Bohol and Cordova areas did not met with the allowable limit of DO not lesser than 2 ppm. The cause of drift of value on the said areas is undetermined and required further monitoring.
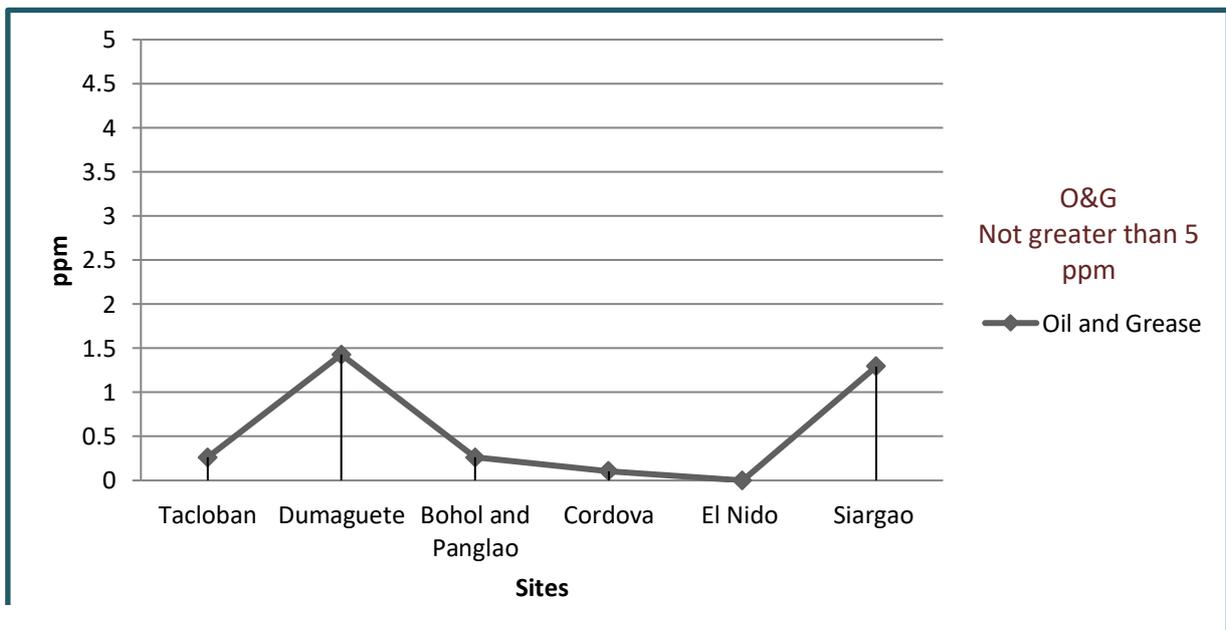

Figure 6: Oil and Grease (O&A)

Figure 6, the graph showed on the O&G the highest mean value concentration is 1.429 ppt (Dumaguete) and the lowest mean value 0 ppt (El Nido). All sampling site is within the allowable limits not greater than 5 ppm.

RECOMMENDATION

This Preliminary assessment of marine water quality on the selected Site is an initial data for further baseline studies. This preliminary assessment studies recommends the following:

1. Regular water sampling to monitor the water quality on the selected areas for baseline data.
2. The water sampling is to be done every quarter for a period of three years to monitor the water quality of the subject areas and also to predict the trend of the water quality. Once the trend of the data gathered is determined, preventive measures can be introduced which is in accordance with one of the mandates of the PCG.
3. Technical training of MEPU personnel in the areas about water sampling procedures. The trained MEPU personnel shall conduct water sampling from the sampling stations established in their respective area of responsibility and regularly submit water samples to MERDC laboratory for the data base.
4. Additional sites to be included in the data base to have a broader and wider coverage of areas for assessment of marine water quality.
5. Adaptation of the analysis methods stated in this study as the standard method to be used for future baseline gathering.
6. Additional Parameter on marine water quality to monitor of Nutrient pollution through Nitrate and phosphate concentration analysis.

REFERENCE

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