Pilot Projects for Summer 2003 High School Teacher Marine Science Experience Workshop

Chris Tran, Mayfair HS
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The Interrelationship between Temperature, Depth, Dissolved Oxygen and Phytoplankton Propagation

Chlorophyll A in various depths, temperature, salinity, and dissolved oxygen represent many of the key measures (bio-indicators) of water and habitat quality for living resources such as fish, crabs and oysters. Like the atmosphere we are more familiar with, the LA Harbor waters are a dynamic environment. Just as our weather - temperature, humidity and precipitation - varies from hour to hour and from season to season, the LA Harbor’s habitats - using measures such as dissolved oxygen, chlorophyll (algae) in various depths, salinity and temperature - are constantly changing as well. In order to understand our impacts on the Bays and long term trends in water and habitat quality, we must be able to measure and account for these short-term and seasonal dynamics. It is our hope to gain a greater understanding of possible human impacts on the marine environment through the study of such interactions.

Shannon Tuttle, Notre Dame HS

Solids Dissolved in Los Angeles Water

In order for my Introduction to Science Methods students to understand the real-life application of solubility, I am designing a study that involves water quality at various Los Angeles locations. The question we will be asking is: Are there differences in levels of dissolved solids in water collected inside the Los Angeles Harbor, outside the Los Angeles Harbor, in the Los Angeles River, and from the Los Angeles Department of Water and Power?

In order to answer this question, my students will collect data pertaining to the following variables: temperature, pH, chlorine, ammonia, nitrates, phosphates, salinity, and dissolved oxygen. This data will be collected through the use of LAB Aids Water Pollution Kits and the on-board Seabird. Students will use the Niskin bottle to extract water from the two Harbor sites at zero meters. A teacher will extract water from the Los Angeles River. The tap water will be taken from a classroom sink.

Once all data has been collected, the students will be instructed to select two variables and to determine what, if any, relationship exists between the two. This
task will enable students to practice inquiry-based learning, as well as practice creating and interpreting graphs on Microsoft Excel.

Kenneth Sreshta, Hamilton HS

**Food Chain and the Food Webs in the Marine Environment of Los Angeles Harbor: Study of the White Croaker.**

The study will involve the water quality that determines the marine environment. The work will include the estimation of Oxygen, Carbon Dioxide and Salinity of the water both at the surface and the bottom.

General data will include water temperature, location, ambient temperature, Secchi disc reading to determine the turbidity and the Forel reading.

Study of the White Croaker, a bottom feeder and the assessment will include the fish population in the area, size of the fish, and general condition of the fish population. Dissection of the fish and examination of the stomach contents-Record of the food consumed and determine the food habits and build a food chain.

Samantha Coyne, Archer School for Girls
Deanna Poulsen, San Fernando HS

**Abundance and Distribution of Plankton in the Los Angeles Harbor**

Purpose: The purpose of this study is to compare the relative abundance and distribution of plankton inside and outside Los Angeles Harbor.

Significance:
1. To become more familiar with local planktonic organisms.
2. To demonstrate the importance of plankton in marine food webs for future lesson plans.
3. To illustrate the physical and environmental conditions that impact plankton distribution and abundance in marine ecosystems.

Research Methods:
1. Obtain samples from different stations inside and outside of LA Harbor. The exact locations sampled will be:
   a. inside harbor (several)
   b. just outside breakwater
   c. Rock Pile
   d. White’s Point
2. At each of the specified locations, samples will be obtained through water quality tests (Forel scale and Secchi disk), vertical plankton tows, horizontal plankton tows, and water sampling at various depths (Niskin bottles).
3. The Forel scale and Secchi disk will be used to determine the photic zone depth and water color.

4. Temperature, pH, and salinity will be recorded for each water sample collected.

5. Relative abundance of phytoplankton and zooplankton will be determined for each site based on an approximation. For example, more than 100/area calculated or less than 10 per area calculated.

6. Distribution of organisms will be determined based on the dominant species found in each tow. For example, the station sampled using the 250 micron mesh net during a horizontal tow yielded a majority of copepods and radiolarians.

Kenny Shresta, Hamilton HS
Soon Toh, Granada Hills HS

**White Croaker: Stomach contents and Biomagnification of DDT**

Great concern has been expressed over the years about contamination of DDT on land and water. This pilot study will examine the stomach contents of White Croakers (Tom Cod, Kingfish) in the San Pedro Harbor and White’s Point areas. Using the Otter Trawl on the R/V Vantuna, samples of white croakers will be collected and dissected. The stomach contents will be examined under magnifying glass and stereomicroscopes. Various studies have indicated that dumping of old DDT in the sea bottom of the Long Beach-San Pedro areas may have biomagnified in the flesh and organs of white croakers. This study will attempt to clarify the issues of DDT contamination and safety of consuming white croakers as a fish protein. For this study, no bioassay of DDT in the white croakers will be attempted due to time and financial constraints. Only seawater and general marine data will be collected and analyzed along with stomach contents of white croakers. Mud trawl examination and literature research should shed some light on the severity of DDT in white croakers.

Gwenda Lynn, Reseda HS
Juan Hernandez, Animo HS

**Comparative Fish Study**

A comparative study of fish length and adaptations between species found in the open mid-water and those in the deep soft-bottom areas. The purpose is to identify adaptation trends that allow species to flourish in these various locations. We will take samples of fish from both a deep (90 meters) soft-bottom area by an otter trawl, and a mid-water (550 meters) sample using the Isaacs Kidd trawl. From the
sample, we will measure the length of each fish to determine an average length within each area by species; as well as fish counts by the adaptations of mouth type and eye size.

Patricia Barker, Hollywood HS

Global Warming Studies Supported by Evidence of Carbon Dioxide Data Sampling of Coast of Southern California.

Global warming involves a labyrinth of intricate integrated earth processes affecting our everyday lives as well as the future of our planet. Greenhouse gases are involved in these processes of warming and include carbon dioxide and water, just to name a couple. The ocean covers a large portion of our planet and could act as a heat-sink for these gases. Barbara Leedom-Hearst, another TOPS-MSE teacher, and I are collaborating on a project to find evidence of carbon dioxide in water and air samples while out in various places on the Vantuna. In support of our efforts we will be using Vernier probeware and software to record and document our results. The relation of carbon dioxide to our other data collection will be an area for my implementation. Implementation of the TOPS project may also include other water quality issues in relation to global issues of ecosystems and biological magnification of poisons originating in plankton growth.

Tom Traeger, La Canada HS
Daphne Richer, Gabrielino HS

Winds of Change

The focus of this study will be to look at how wind affects primary production through Ekman transport and upwelling in the area near the Los Angeles Harbor. Seabird data and shipboard wind data, along with satellite imagery from SeaWifs and Topex-Poseidon remote sensors, will be used to analyze both spatial and temporal changes in primary productivity. Data will be analyzed on a spatial scale to compare different areas near and in the Los Angeles Harbor. Data will be analyzed on a temporal scale to compare seasonal changes, both in an El Niño year (2002-2003) and a non-El Niño year (2000-2001).

Barbara Leedom-Hearst, Blair HS

Changes in Carbon Dioxide Levels in Sea Water and in the Interface between Sea Water and Air as a Possible Indicator of Global Warming
The study attempts to investigate a cause and effect relationship between concentrations of carbon dioxide in sea water as evidence for global warming. Vernier software and probes will be utilized to collect and record water samples from a variety of sampling sites. Data will also be collected at the interface between the air and sea and compared to water carbon dioxide concentration levels. Carbon dioxide levels have increased significantly in the atmosphere since the Industrial Revolution with the burning of fossil fuels. During this same period the earth's temperature has increased. The basic question is whether a direct relationship exists between the increase in carbon dioxide molecules in the atmosphere and global warming. The earth's oceans serve as a sink for carbon. All marine life receives its carbon from carbon dioxide in the water. In this study Patricia Barker and I hope to show evidence for increasing carbon dioxide levels in the ocean by comparing our data to previous base line data studies for carbon dioxide.