Executive Summary

SIO now hosts a new undergraduate Marine Biology major. Each student enrolled in this major is required to take SIO 136 (Marine Biology Laboratory). Starting this academic year (spring 2014), SIO 136 incorporates a 1 day at-sea cruise experience into the laboratory class.

The goals of the cruise are to (1) demonstrate the different types of instrumentation used to study the biology of marine organisms (2) generate hydrographic data illustrating features of the southern CA shelf (e.g., thermocline, chlorophyll maximum, mixed layer, oxygen and pH declines) (3) recover phytoplankton, zooplankton, and fish eggs in plankton tows, (4) survey epibenthic invertebrates and fish with an otter trawl, (5) recover biological specimens from the midwater zone with an Isaacs-Kidd midwater trawl. The work would take place outside of San Diego Bay over a 13-hr period.

These cruise activities will give students a unique opportunity to experience work at sea on an oceanographic research vessel and expose them to ecosystems and organisms not otherwise accessible from shore. Unlike some of the other SIO course cruises, the material recovered will be returned to SIO for full lab workup (sample sorting, quantification, analysis of feeding modes, lifestyles, & diversity) on subsequent class days.
Cruise Plan

Prior to the date of the cruise, students will be assigned to teams and given priority responsibilities associated with the different cruise activities. All students will also be asked to sign required forms, advised of appropriate attire, sea sickness medication, and personal expectations for the cruise. On the day of the cruise, students will meet at SIO to board shuttles bound for the Nimitz Marine Facility at 0630 hrs. All students should have all weather field notebooks or clipboards with all weather paper for taking notes, making drawing, etc.

We will depart the dock at 0800 hrs, and will steam to our plankton sampling site, located between the tip of Point Loma and our otter trawl location (1 hr en route?). Once on site, we will carry out a zooplankton tow, a short phytoplankton tow, and a short fish egg tow (the latter two samples for subsequent lab material). We will also deploy acoustic floats while en route to the site for cetacean call monitoring (all activities, 30 minutes).

Location:
Pt. Loma Ocean Outfall, 32° 39.412’N, 117° 19.490’W, Heading : 0 degrees N, 95m
Equipment/supplies Required:
- Zooplankton tow net (mesh size?) w/ tow cable
- Phytoplankton tow net (mesh size?) w/ tow cable
- Fish egg tow net (mesh size?) w/ tow cable
- Acoustic drogues (3?)
- 20 sample vials (size?)
- 20 Petri dishes
- 10 dissecting scopes
- 1 dissecting scope with camera and video screen
- 2L 95% ethanol

While the students and instructors are sorting and viewing the plankton sample using scopes, we will steam to the otter trawl location, NW of Point Loma (1hr en route). The otter trawl will be deployed and the contents brought onto the deck (deployment and recovery, 2 hrs).

Location:
~7km off Pt. Loma - 32° 41.448’N 117° 22.554’W Heading: 0 degrees N, 300m.
Equipment/supplies Required:
- Otter trawl
- Depth recorder archival tag
- 20 sample vials/containers (size?)
- 10 Sorting trays
- 2L 95% Ethanol?
- Formaldehyde?
- ID books/Keys
- Point and shoot camera

While the otter trawl contents are being sorted, studied and inventoried, we will steam to the site of the Isaacs-Kidd midwater trawl (1.5 hr en route). Once at the site, we will do a CTD cast (24 bottles, 1.5 hrs), and then conduct the trawl (3 hrs). Following CTD cast, we will conduct pH dips in each of the bottles to look at pH as a function of depth. During the CTD cast and midwater trawl, will do marine mammal / bird surveys.

Location:
~25km of Pt. Loma - 32° 35.133 N 117°28.983 W Heading: 330 degrees N, 300m?

Equipment/supplies Required:
- IKMT
- Depth recorder archival tag
- 10 small aquaria
- ID books/Keys
- Sample vials/containers (size?)
- 2L 95% Ethanol?
- Formaldehyde?
- ID books/Keys
- Point and shoot camera

While the IKMT contents are being sorted, studied and inventoried, we will steam back to the Nimitz Marine Facility (2.5 hours en route). Total cruise time will be ~13 hours, given all the activities and transit times outlined above.