



Southern California Coastal Ocean Observing System (SCCOOS)
U.S. Integrated Ocean Observing Systems (IOOS) Project Progress Report:
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The Regents of the University of California, San Diego

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I.) PROJECT SUMMARY

The Southern California Coastal Ocean Observing System (SCCOOS) is one of eleven regions that contribute to the national U.S. Integrated Ocean Observing System (IOOS[®]). The primary goal of SCCOOS is to provide the scientific data and information needed to inform decision-making and better understand the changing conditions of the coastal ocean in Southern California.

GOALS & OBJECTIVES

SCCOOS has aligned its priorities and objectives with the focus areas designated by U.S. IOOS, as identified by users and stakeholders throughout the nation.

- **Ecosystems and Climate:** to monitor ocean climate trends and environmental changes in the Southern California Bight by collecting physical, chemical, and biological variables.
- **Water Quality:** to provide monitoring, tracking, and prediction tools for harmful algal blooms, outfall and storm water plumes, and surfzone contaminants.
- **Marine Operations:** to advance integrated, customized products that are critical for safe and efficient navigation, search and rescue, and oil spill response.
- **Coastal Hazards:** to provide accurate, validated inundation models and information with the long-term goal of improving coastal safety.

II.) PROGRESS AND ACCOMPLISHMENTS

1. Ecosystems and Climate

- Offshore glider surveys are proceeding successfully, extending the sustained record of observations to five years for survey lines 80 and 90, and four years for line 66.7.
- Conducted the first deployment of a dissolved oxygen sensor on a Spray glider, to quantify trends in hypoxia and improve monitoring of the coastal ecosystem.
- In collaboration with SCCOOS, a spray glider was deployed in the Mexican EEZ of the southwest Gulf of Mexico with funds contributed by the Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California (CICESE); measured variables include pressure, temperature, salinity, velocity, colored dissolved organic matter (CDOM).
- The California Cooperative Oceanic Fisheries Investigations (CalCOFI) program continues to take measurements at nine nearshore stations, supported by SCCOOS, and incorporates these data into the long-term CalCOFI time series used to inform fisheries management.
- SCCOOS is working with the California Ocean Science Trust's Marine Protected Area Monitoring Enterprise on the development and successful execution of a monitoring program for Southern California's newly established network of marine protected areas.

2. Water Quality

- The SCCOOS HAB program contributes to the statewide HAB Monitoring and Alert Program (HABMAP) initiated by NOAA, the California Ocean Science Trust, and the Southern California Coastal Water Research Project (SCCWRP).
- HAB data and samples (plankton net tow and monthly mussel samples) are sent to the California Department Public Health Plankton Monitoring Program.

- A “red tide” algal bloom of *Lingulodinium polyedrum* was detected along the coast of Southern California; information was disseminated via email announcements, local news and media outlets, and posted on scoos.org.

3. Marine Operations

- Initial implementation of surface currents measured by the SCCOOS HF radar network are now accessible by U.S. Coast Guard for search and rescue (SAR) applications using their Environmental Data Server.
- The live feed of HF radar data is now available for oil and hazardous spill response in the Environmental Response Management Application[®] (ERMA) map viewer for the southwest region.
- Near real-time and archived surface current measurements have been used in the National Preparedness for Response Exercise Program (NPREP) drill scenarios led by the U.S. Coast Guard in San Diego, Los Angeles, and Ventura.
- Surface current measurements are integrated into the General NOAA Operational Modeling Environment (GNOME) for oil spill trajectory analysis.
- Customized, interactive map displays of wave and surface currents were developed for Naval Air Systems Command (NAVAIR) in Point Mugu and San Francisco Bay.
- Glider data is provided to the Naval Oceanographic Office (NAVO) for assimilation into operational models.
- A new HF radar system was installed at Torrance Beach and both a mid-range HF radar and a long-range radar were installed at Point Arguello, on Vandenberg Air Force Base.

4. Coastal Hazards

- Monthly beach sand level surveys, conducted by all-terrain vehicles equipped with global positioning systems (leveraged by U.S. Army Corps of Engineers and California Department of Boating and Waterways), provide baseline observations for the inundation models funded by SCCOOS.

5. Outreach and Education

- SCCOOS signed a Memorandum of Understanding with CeNCOOS and NANOOS to expand and strengthen coordination on the West Coast, which will enhance efforts to contribute ocean observing information to regional management efforts including coastal and marine spatial planning and the West Coast Governors’ Agreement on Ocean Health.
- SCCOOS surface currents and Coastal Data Information Program (CDIP) waves are featured on an interactive touch-screen kiosk at the Birch Aquarium as part of "Boundless Energy," an exhibit on sources of renewable ocean energy.
- In partnership with SCCOOS PIs and staff members, the Centers for Ocean Sciences Education Excellence (COSEE)-West and University of Southern California Sea Grant educators conducted the annual “Ocean Observing Systems: Summer Teacher Institute” (August 1-5, 2011), an online workshop, “Ocean Observing Systems: From Your Eyes to Satellites” (October 31-November 18, 2011), and continue to provide a new education program for HABs sampling and analysis.
- As part of Tijuana River Action Month, SCCOOS presented online tools and data for a South San Diego Water Quality Workshop, in collaboration with WILD COAST, SurfRider, San Diego Coastkeeper, the County of San Diego Department of Environmental Health, and the Regional Water Quality Control Board (October 12, 2011).

III.) SCOPE OF WORK

SCCOOS continues to collect coastal ocean observations and expand data products as possible within funding levels. SCCOOS is also committed to contributing to larger coastal and ocean observing efforts regionally, nationally, and internationally. There are no current or anticipated changes to the Scope of Work or ability to achieve milestones and deliverables.

Ecosystems and Climate:

- Collect offshore underwater glider measurements of temperature, salinity, chlorophyll, and current velocity.
- As part of CalCOFI program, measure variables in nearshore region including temperature, salinity, zooplankton, phytoplankton, fish eggs, and invertebrate larvae.
- Conduct shipboard observations three times yearly to count seabirds and marine mammals by the Farallon Institute in conjunction with CalCOFI surveys.
- Meteorological stations provide wind speed and direction, air temperature, sea surface temperature, barometric pressure, humidity, and rainfall levels.

Water Quality:

- Monitor HABs at six pier stations by collecting weekly measurements of temperature, salinity, chlorophyll, nutrients, and toxic species; distribute data.
- Expand HABs website to include Central and Northern California.
- Continue automated sampling at four shore stations to measure temperature, salinity, chlorophyll, turbidity, and water level.
- Implement the 3-km California statewide ROMS ocean forecasting system for real-time operations and conduct a systematic validation of the model.
- Analyze pollution dispersal in finescale, nearshore, and shelf ROMS for the San Pedro and Santa Monica Bays.

Marine Operations:

- Operate and maintain HF radar systems; display surface current maps and tools online.
- Provide Weather Research & Forecasting Model (WRF) wind and precipitation forecasts online from the UCLA Department of Atmospheric and Oceanic Sciences, Climate Sensitivity Research Lounge.
- Maintain integrated map displays for ports and harbors with multi-layered views of near real-time surface currents, wave nowcasts and forecasts, and nautical charts.
- Deliver ocean current data and surface wind analyses to aid oil spill and Search and Rescue (SAR) real-time recovery and post-analysis trajectories.

Coastal Hazards:

- Validate and refine inundation models based on surveys of beach sand and water levels.
- Expand online development and integration of inundation information.
- Conduct event-related sand level surveys and analysis after coastal storms.

IV.) PERSONNEL AND ORGANIZATIONAL STRUCTURE

There are no changes in key scientific or management personnel in this reporting time period.

California Polytechnic State University, San Luis Obispo

Mark Moline manages the array of six HF radar sites for the central California coast and oversees the HAB water sampling program off the Cal Poly Pier in San Luis Obispo Bay.

Farallon Institute for Advanced Ecosystem Research

William Sydeman oversees shipboard observations of the distribution and abundance of marine birds and mammals, conducted three times yearly in conjunction with the California Cooperative Oceanic Fisheries Investigations (CalCOFI) Long-Term Ecological Research (LTER) ship surveys.

Scripps Institution of Oceanography (SIO), University of California, San Diego

Spray underwater glider operations are conducted by Daniel Rudnick and Russ Davis of the Instrument Development Group. Ralf Goericke manages the nine stations that comprise the nearshore component of the CalCOFI Program. John McGowan and Melissa Carter collect and analyze water samples to monitor HABs at the Scripps Pier. Robert Guza and William O'Reilly conduct coastal hazards projects in order to develop validated, customized warnings of wave and tide-induced coastal inundation. Eric Terrill serves as Technical Director, with his team at the Coastal Observing Research and Development Center, operates and maintains the HF radar systems and automated shore stations as well as the data management component. Julie Thomas serves as SCCOOS Executive Director and provides wave data and models from the CDIP buoys in Southern California.

University of California, Los Angeles (UCLA)

Rebecca Shipe conducts the HAB monitoring program at Santa Monica Pier. Jim McWilliams, Oceanic Research Group, and Yi Chao, Jet Propulsion Laboratory, develop the Regional Oceanic Modeling System (ROMS).

University of California, Santa Barbara (UCSB)

Libe Washburn manages the operation of HF radar systems in the Santa Barbara region, and along with Mark Brzezinski, oversees the HAB monitoring program at Goleta Pier and Stearns Wharf.

University of Southern California (USC)

Burt Jones manages the HF radar systems and coastal glider operations for discharge plume tracking and HAB detection; he collaborates with David Caron to lead the HAB monitoring program in San Pedro Bay, specifically the collection of water samples at the Newport Beach Pier.

V.) BUDGET ANALYSIS

U.S. IOOS regional awards were finalized by the National Oceanic and Atmospheric Administration (NOAA) in late August 2011, funding was received in September, and work on this award is just beginning. Partner sub-awards were all distributed in October and November 2011. To date, actual budget expenditures are in line with anticipated budget expenditures, including salaries, travel, and payment of restricted dues to the National Federation of Regional Associations for Coastal and Ocean Observing (NFRA).