

South Bay Coastal Ocean Observing System
California Clean Beaches Initiative

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to
City of Imperial Beach

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Background

Scripps Institution of Oceanography is establishing the South Bay Coastal Ocean and Observing System under contract to the City of Imperial Beach through funding provided by the California Clean Beach Initiative. The contractual start date for this project was July 1, 2002. The region monitored will encompass a region spanning from Point Loma to the U.S. - Mexico Border and waters offshore to distances of approximately 30 km. The funds have been provided to conduct real-time measurements of key oceanographic parameters relevant to understanding the complex coastal transport mechanisms present in this region and their relevance to local water quality issues. Not only is the incidence of bacterial contamination and associated beach closures a problem, but time lags between sampling of the coastal water and completion of the analysis likely result in situations when beach waters may be clean when posted, and not clean when not posted. The multiplicity of possible sources within a close proximity of a few miles radius to the beaches of Imperial Beach has made source identification difficult and has resulted in stalled mitigation and abatement efforts. While this source identification is the first step in any mitigation or abatement program, the statistics of beach closures suggest that the sources and physical transport processes in this region are complex and need to be examined and continuously monitored with sufficient temporal and spatial detail if solutions to beach closures that result from non-local pollution are to be developed. It is recognized that the city's local beach problems requires examination on a framework of regional scales.

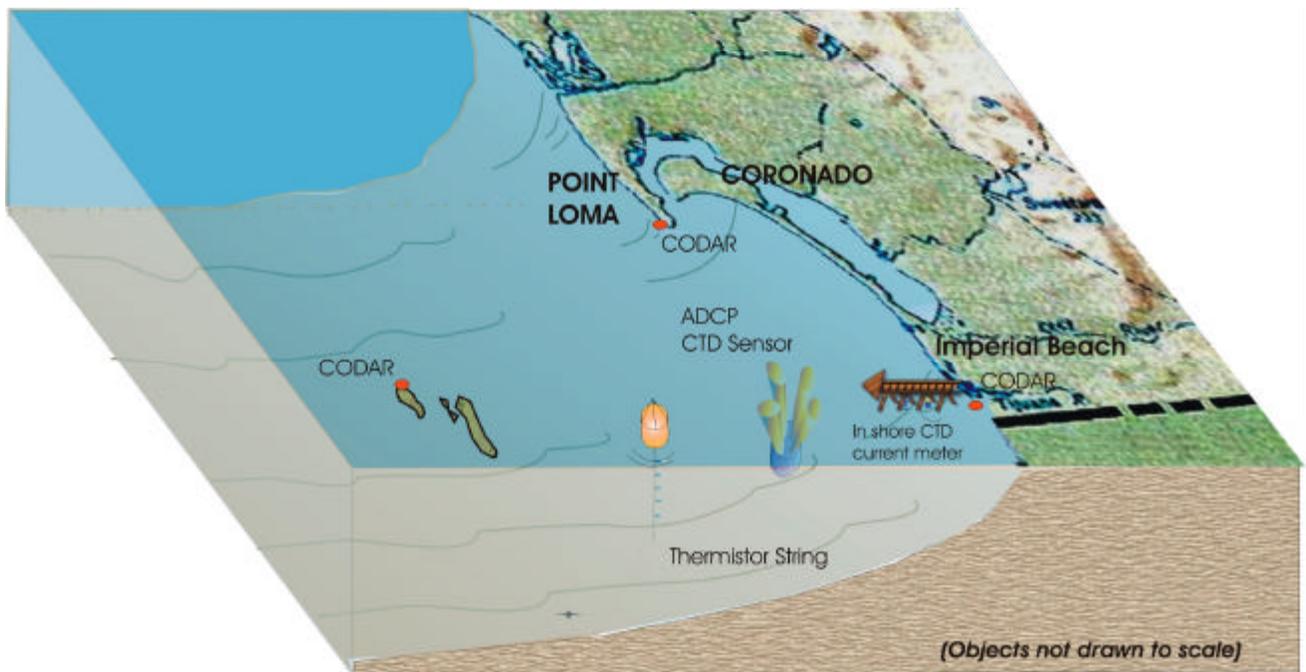


Figure 1. A conceptual view of where the real-time environmental sensing equipment which composes the Coastal Observing System will be located in the South Bay region.

The project timeline proposed under the contract is as follows:

TASK ITEM	Schedule completion date based on a July 1, 2002 start
<i>1.1. Coastal Ocean Dynamics Application Radar</i>	
1.1.1 – 1.1.3 site planning, array design, order system	September 15, 2002 (2.5 months)
1.1.4 – 1.1.6 system installation	January 31, 2002 (6.5 months)
1.1.5 – 1.1.8 system calibrations and optimization	September 15, 2003 (14.5 months)
1.1.9 data integration	continuous effort through June 30, 2004 (24 months)
<i>1.2. Nearshore Currents and Water Type Sampling</i>	
1.2.1 – 1.2.2 system fabrication, site planning	December 15, 2002 (5.5 months)
1.2.3 – 1.2.4 system installation	January 15, 2003 (6.5 months)
1.2.5 – 1.2.6 data integration	continuous effort through June 30, 2004 (24 months)
<i>1.3. Surf-zone Currents and Water Quality Sampling System</i>	
1.3.1 fabricate system	December 15, 2002 (5.5 months)
1.3.2 install system	January 15, 2002 (6.5 months)
1.3.3 install data cable / logging computers	January 15, 2002 (6.5 months)
1.3.4 data integration	continuous effort through June 30, 2004 (24 months)
<i>1.4. Water Column Stratification Measurement System</i>	
1.4.1 – 1.4.2 system fabrication and installation	January 1, 2002 (6 months)
1.4.3 data integration	continuous effort through June 30, 2004 (24 months)
<i>1.5. Central Data Acquisition and Real-Time Data Distribution System</i>	
1.5.1 – 1.5.3 database development, data merger, online access tool development	continuous effort through June 30, 2004 (24 months)
<i>1.6. Data Integration and Interpretation</i>	
	continuous effort through June 30, 2004 (24 months)
<i>1.7. Reporting</i>	
1.7.1-1.7.3 progress reports of activities, milestones, data summaries, and interpretation efforts	continuous effort through June 30, 2004 (24 months)

Activities undertaken for the above timeline:

Tasks 1.1 – Coastal Ocean Dynamics Application Radar

Three CODAR sites have been identified and appropriate permissions obtained from the various land owners/managers. The three sites include Point Loma, Border Field State Park, and the South Island of the Mexican owned Coronado Islands. Permissions were required from local and national Navy Public Works

Offices, SPAWAR system center in Charleston, California State Parks, and the Mexican Department of State. The CODAR equipment and supporting hardware has been purchased.

CODAR systems have been installed at Point Loma (August 30, 2002) and at Border Field State Park (Sept 7, 2002).

CODAR antenna patterns were measured over water using transponder and GPS surveys from a small vessel.

Task 1.2 Nearshore Currents and Water Type Sampling

This system has been designed and is currently in the fabrication and testing stage. Note: Installation will require an offshore piling on the City's pier to be cleaned to allow the installation of a cable conduit. City Personnel and San Diego Port Authority staff have been notified of this need.

Task 1.3 Surf-zone Currents and Water Quality Sampling System

The current meter portion of this system has been designed, purchased, and installed on the south side of piling 28 on the City's Pier. The pier piling was cleaned by Scripps divers prior to the current meter installation which took place the same day. A cable for the system was run from the piling to the first floor of the lifeguard tower located offshore. System components for the water quality sampling system have been identified and will be purchased in the near future. Pump tests are currently underway for identifying the appropriate seawater pump for the water quality sensors.

Task 1.4 Water Column Stratification Measurement System

We are currently in the design and fabrication stage of this component of the program.

Task 1.5 Central Data Acquisition and Real-Time Data Distribution System

Real-time connections to the two U.S. CODAR sites have been established and are currently transmitting data to Scripps. A web page has been established for the project (<http://sdcoos.ucsd.edu>) which provides for easy access to the data products being generated for this project. Also contained within the web page are a description of the project and the technology being used. Access to recent County water quality data is also provided by external agreements Scripps has made with the San Diego County Department of Environmental Health.

Data Summary

Due to the infancy of the project, very little data that has undergone an appropriate quality assurance process is available. However, over the course of the operation of the system, we have made unique observations of the ‘South Bay Gyre’ which plays a role in the residence time of the waters in southern San Diego. The observations indicate the variability of the coastal currents in this region. Additional observations are available at the web site quoted above.

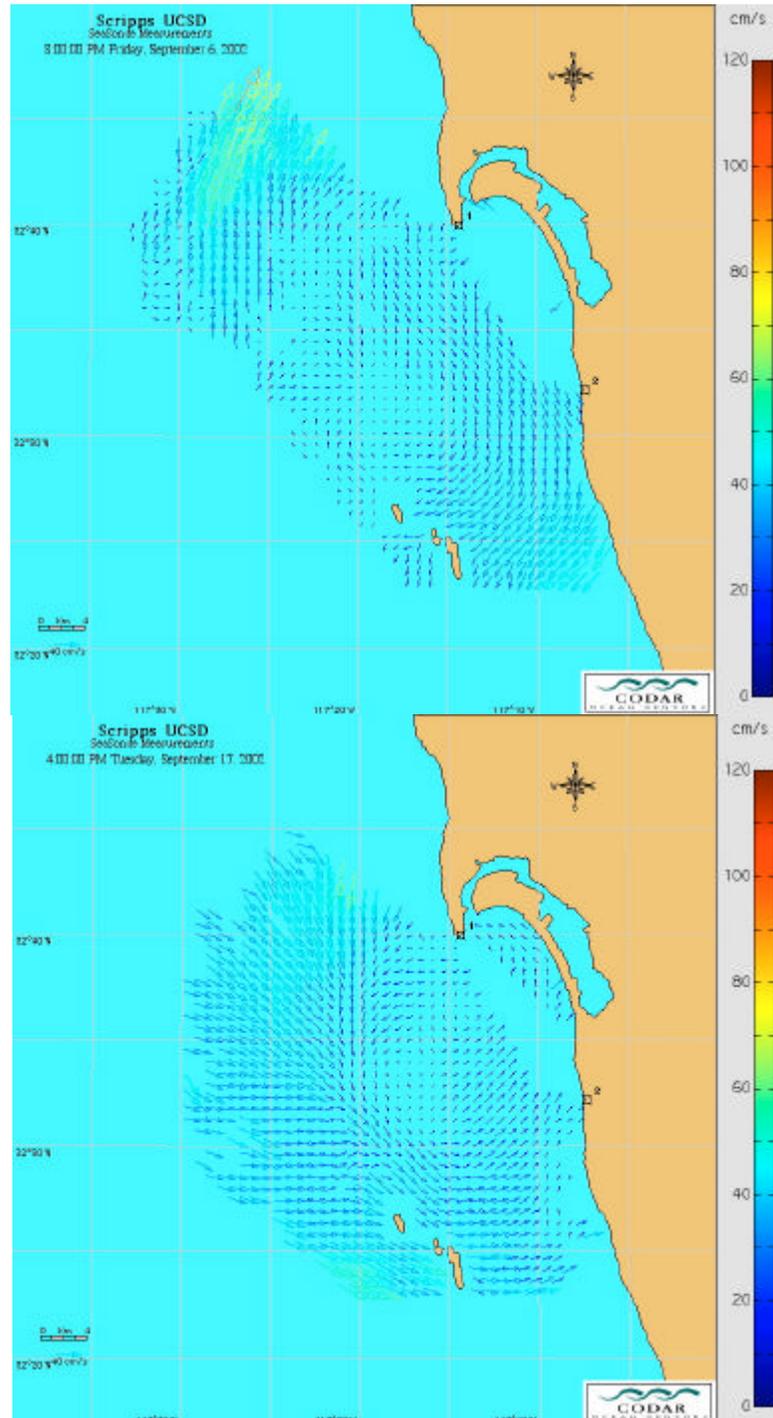


Figure 2. Example ocean current maps obtained by two of the three CODAR sites that are being installed for the Observing System. Top. Observations of an eddy structure in the bay on September 6, 2002 showing clockwise rotation. Bottom. Observations of a similar scale eddy on September 17, 2002 that is rotating counter-clockwise. While these observations were obtained very early on in this project, they indicate the variability in the coastal currents that are present offshore Imperial Beach.