

**South Bay Coastal Ocean Observing System**  
*California Clean Beaches Initiative*

Second Quarterly Report  
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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. Images of the coastal zone near the City of Imperial Beach. Monitoring equipment has been deployed onto the City's pier to monitor the northward/southward transport of water in the region.

The project timeline proposed under the contract is as follows:

<b>TASK ITEM</b>	<b>Schedule completion date based on a July 1, 2002 start</b>
<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**

Efforts in the last quarter at the CODAR hardware installations at Border Field State Park and Point Loma have focused on enabling real-time access to the data streams. The networking infrastructure at the Border Site consists of a wireless link using an antenna installed on a light post at the Border that directs a signal to the Marine Safety Center located at the foot of the Imperial Beach Pier. Upon receiving the signal, the

network is connected to a high speed cable modem that was installed by COX Cable Company. High speed internet access to the Point Loma CODAR site has been provided by an internet connection provided to Scripps by SPAWAR Naval Systems Center. We have experienced some difficulties in maintaining stable access to the CODAR site, potentially as a result of existing network firewalls that exist on the spawar.navy.mil domain. Alternative networking topologies that consisting of wireless links from the Point Loma site to Scripps are being discussed with a networking research consortium that is funded by the National Science Foundation (HPWREN and ROADNET). We will probably pursue a collaborative effort with this group in the upcoming quarter to install additional wireless telemetry equipment that will allow stable access to the data generated by the CODAR point Loma site. In addition, we expect this collaborative effort will assist in the telemetry links that will be required for the Coronado Islands installation. Dropouts in telemetry only affect the real-time web transition of the data as the data is also stored at each individual site where it can be downloaded manually by staff during periodic maintenance. All permissions are now in place for the installation of the CODAR system at the Coronado Islands. The solar system for the island has been designed, components have been ordered, and initial fabrication of the system has begun. In addition, we have pursued collaborations with colleagues in Mexico to link up their CODAR station that is located in Rosarito Beach to the CBI array. Due to isolated location of this system, and difficulty in accessing its data, we plan to install a high-speed wireless link at the site to telemeter data to the U.S.

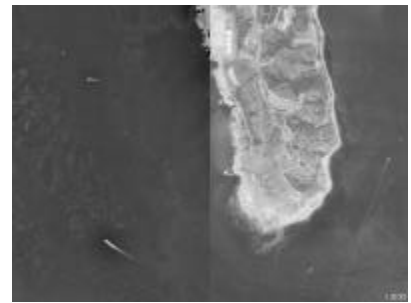


Figure 2. CODAR antenna installed at Point Loma. Images show site location of equipment. Permissions were obtained from SPAWAR Systems Center and the U.S. Navy to locate the equipment on Navy land.

### Task 1.2 Nearshore Currents and Water Type Sampling

The design and fabrication of the offshore mount for this system has been completed and the current profiler has been purchased and tested in the laboratory here at Scripps. We have also taken delivery of the armored cable that will be used with the system and appropriate underwater connectors have been molded onto the cable. In planning for the installation, we have arranged for the San Diego Port Authority to clean an agreed upon offshore piling that will be used to mount a cable conduit. This cable conduit acts as a shield for the cable in the surface wave zone. The Port had experience delays in the cleaning of the offshore piling due to contractor delays and weather delays. We are currently awaiting a clear weather window that works with the group schedule to proceed with the installation.



Figure 3. Photograph of what the bottom mounted acoustic current profiler looks like. The profiler will be fixed to the seafloor approximately 300 feet offshore of the I.B. pier.

### 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. The acoustic current meter is mounted inside of a copper nickel tube to prevent fouling from mussels on the instrument as well as protect it from the elements. The mounting system that was engineered has survived several storms to date. 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.



Figure 4. Left. Photograph of divers installing the equipment onto a piling on the south side of the Imperial Beach Pier (divers: Millikan and Terrill). Axel Pierson is suspended from a bosun's chair and is guiding the hardware into place. Right. What the current meter looks like when mounted to the pier piling. The current meter (see inset) fits into the end of a copper/nickel pipe with the sensing head sticking 2" out of the end. This pipe is banded to the wood piling by stainless steel bands. The instrument is protected from the elements inside the pipe and has already withstood the forces of several winter storms.

### Task 1.4 Water Column Stratification Measurement System

The design of this system has been completed and major components of the system have been ordered. Parts are currently being built at the Marine Science Development Shop operated by Scripps.

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

The real-time data distribution system for the system is still in an active stage of development. We currently are providing access to following data fields at (<http://sdcoos.ucsd.edu>).

- HF radar derived current maps for the South Bay region. This data is generated from the partial deployment of the funded array for the area.
- Tide data and predictions.
- Local marine forecasts.
- Wave observations and modeled forecasts from the Scripps Coastal Data Information Program.
- Weather radar. This includes precipitation rates derived for the region.



- Visible satellite imagery showing cloud cover for the region
- Marine forecasts
- Up-to-date water quality observations made by the San Diego County Department of Environmental Health. These data are linked to the online system using data that is emailed to us on a routine basis. We have also met with the City of San Diego and the IBWC groups to begin working on how we can access their bacteria data for the region. A product that is currently in development is the aggregation of these data from the various agencies into a centralized data base. This data database will allow on-line graphing of statistics of the data for the various sites in the region. In addition, aerial imagery for each of the AB411 sites have been generated and will be incorporated into the database to provide visual references to beach goers.



Figure 5. A screen shot of the home page of the data distribution system. The system will continually be expanded over the course of the project to provide on-line tools and products to the various agencies who have interest in the area.

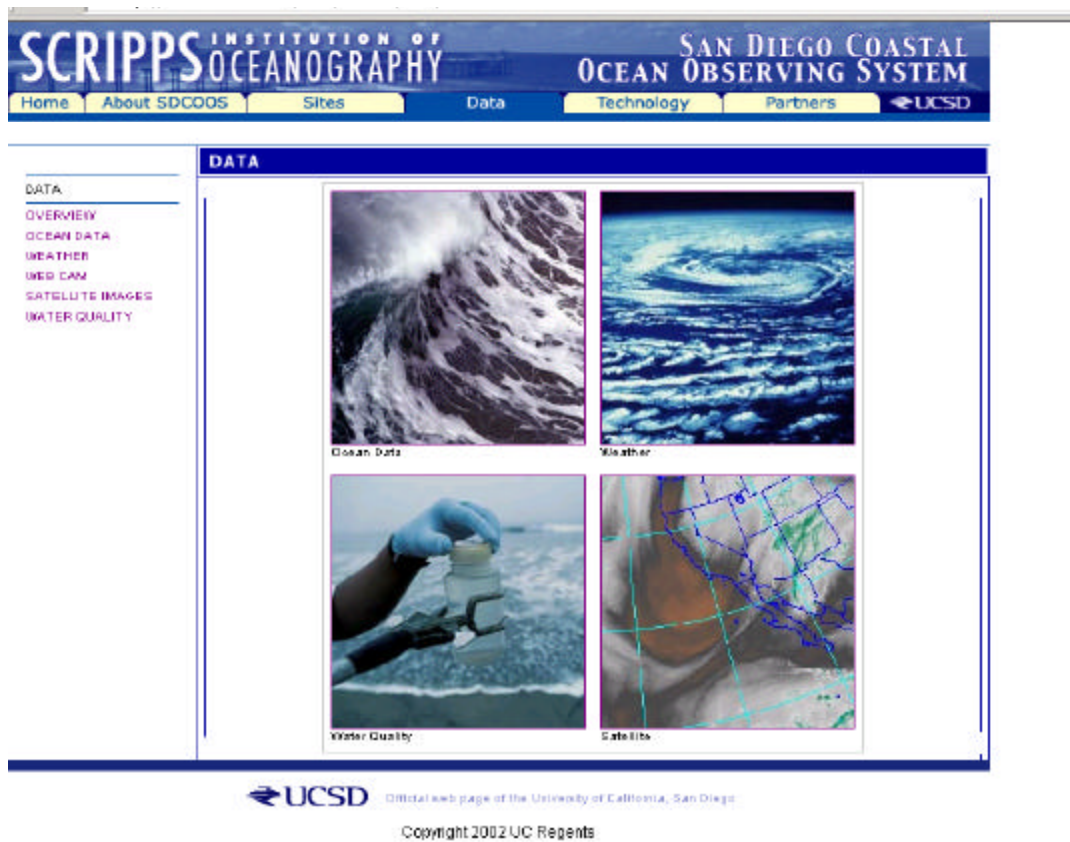


Figure 6. The data interface page which guides users to the various data sets available on-line.

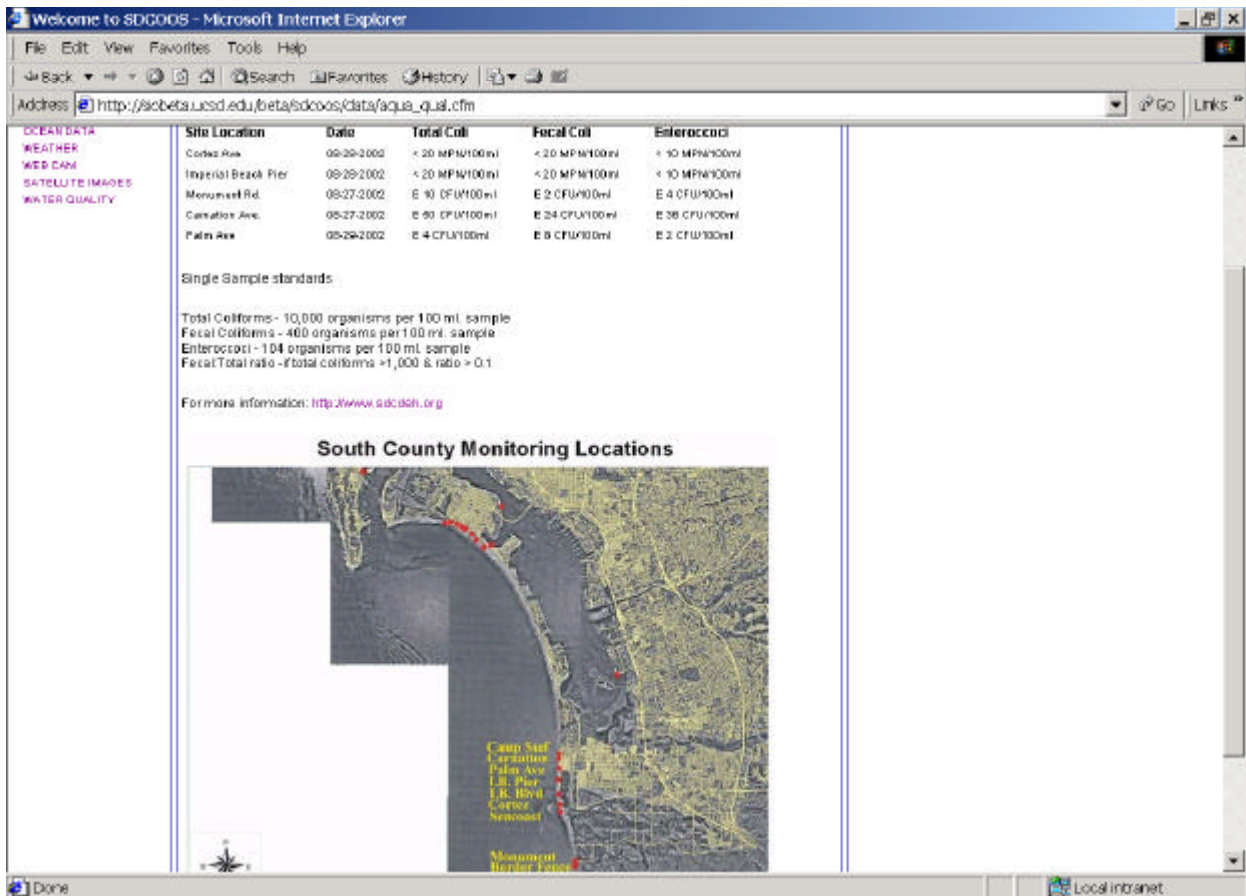


Figure 7. On-line presentation of up-to-date water quality obtained by the San Diego County Department of Public Health. There is interest in extending this effort to include a web-accessible database which marries the water quality data obtained by the various agencies in the region, including the data obtained by the permit dischargers.