

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

Third Quarterly Report  
April, 2003

to  
*City of Imperial Beach*

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## Executive Summary

This quarterly reports reflects efforts conducted under a contract between Scripps Institution of Oceanography and the City of Imperial Beach under California's Clean Beaches Initiative for the period between January 1 2003 – March 31, 2003. Resources provided under this contract are to be used to establish a Coastal Observing System in the San Diego Southbay region to provide real-time time measurements of key oceanographic parameters that are relevant to understanding the complex coastal transport mechanisms present in this region and their relevance to local water quality issues.

Efforts conducted during this time period are as follows:

- Obtaining appropriate permits to transport monitoring equipment to the Mexican owned Coronado Islands. This included a) clearances for the use of a U.S. owned helicopter to enter Mexican airspace from Tijuana air traffic control b) permission from the Mexican Navy to land a helicopter on south Coronado Island. c) permission from the U.S. Border Patrol to stage a helicopter lift operation from Border Field State Park d) submittal of U.S. Customs paperwork for the transport of scientific instrumentation outside the U.S.
- Installation of the HF current mapping radar (CODAR) system on the southern island of the Coronado Islands and the associated support infrastructure including the solar system and wireless telemetry system. Antenna patterns for the Coronado site antenna were measured to provide a calibration for the system.
- Integration of CODAR data from a system operated by colleagues at CICESE/UABC and located near Rosarito Beach, MX. Costs for integrating the system and real-time data telemetry were provided by funds received by the National Science Foundation. Data from this system is merged into the SDCOOS web site.
- Signal cables were run on the underside of the Imperial Beach Pier using a manlift system. These cables will connect the current and wave measurement system that will be located offshore the pier to the lifeguard tower.
- Integration of County monitoring data into the SDCOOS web site.
- Continued development and expansion of the SDCOOS web site (<http://www.sdcoos.ucsd.edu>) to include project descriptions and access to real-time data.
- Response to wet weather events. This included working with the County DEH to examine the local circulation during period of high bacteria counts and flow from the Tijuana River. Environmental data obtained by the SDCOOS observational capabilities (still in development) assisted in tracking the Tijuana River plume water when coupled with the County's data.

Project Timeline – Schedule update

<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 during the time period of this report:

### **Tasks 1.1 – Coastal Ocean Dynamics Application Radar**

The CODAR site located at the south Coronado Island was established in mid February 2003. Unique to the system is that it is autonomously powered by solar panels and a wind generator. Real-time communication to the site is provided by a link connecting the island to Point Loma.

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

Data from a fourth CODAR site operated by CICESE/UABC at the PEMEX plant at Rosarito Beach is integrated with data from the CBI sponsored SDCOOS sites.

### **Task 1.2 Nearshore Currents and Water Type Sampling**

This system has been fabricated and is awaiting deployment. Delays on deployment have arisen from winter weather conditions which made it difficult for the piling to be cleaned (necessary for the installation of a cable conduit). Contractors from the San Diego Port Authority staff have agreed to clean the piling as part of the IB pier structural inspection.

### **Task 1.3 Surf-zone Currents and Water Quality Sampling System**

Data from the current meter has been acquired by the system and being evaluated for QA/QC purposes prior to release to the public. Sensors for the water quality component of this system have been identified and ordered.

### **Task 1.4 Water Column Stratification Measurement System**

This system has been fabricated and is awaiting deployment.

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

Real-time connections to the CODAR sites have been established which allow for continuous acquisition of the data at Scripps. The hourly vector map of the currents are displayed to the SDCOOS web page for public access with the understanding that it is not QA/QC'd. Additional QA/QC software is being written for the system to allow QA/QC to be conducted in real-time. Additional data products are being generated from the system that will indicate the transport direction of the Tijuana River plume. We continue to expand the SDCOOS site with additional information that we feel is relevant to the region including weather data and satellite remote sensing data. t (<http://sdcoos.ucsd.edu>) which provides for easy access to the data products being generated for this.



Figure 1. Helicopter transport was used to move the scientific instruments and power system to the Coronado Island. Shown is the solar panel system that powers the CODAR system on the islands. Antennas located on the old lighthouse (antennas not visible) provide the wireless link to Point Loma.



Figure 2. Scripps staff from the Marine Physical Laboratory installing a signal cable on the underside of the Imperial Beach Pier. This cable will connect an offshore sensor package to the lifeguard tower, allowing real-time access to the data. Also shown is the computer system that was installed in the lower floor of the lifeguard tower. This system forms the hub for the environmental sensors that are located on the pier.



## Data Summary

While we are still in the hardware implementation phase of this project, we had the opportunity to address a number of wet weather events during periods of rainfall in February and early March. The next few pages summarize the observations during this time period and their correlation with the County's monitoring efforts.

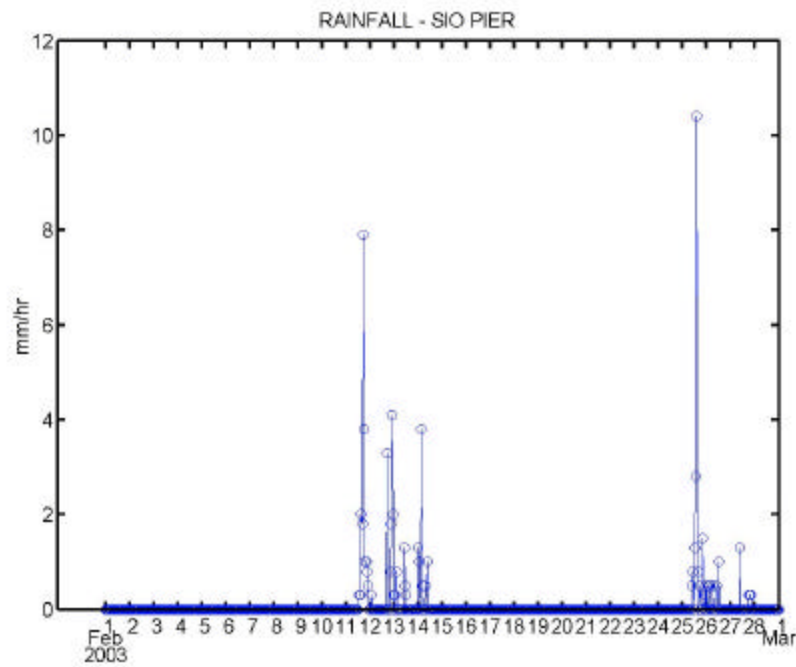
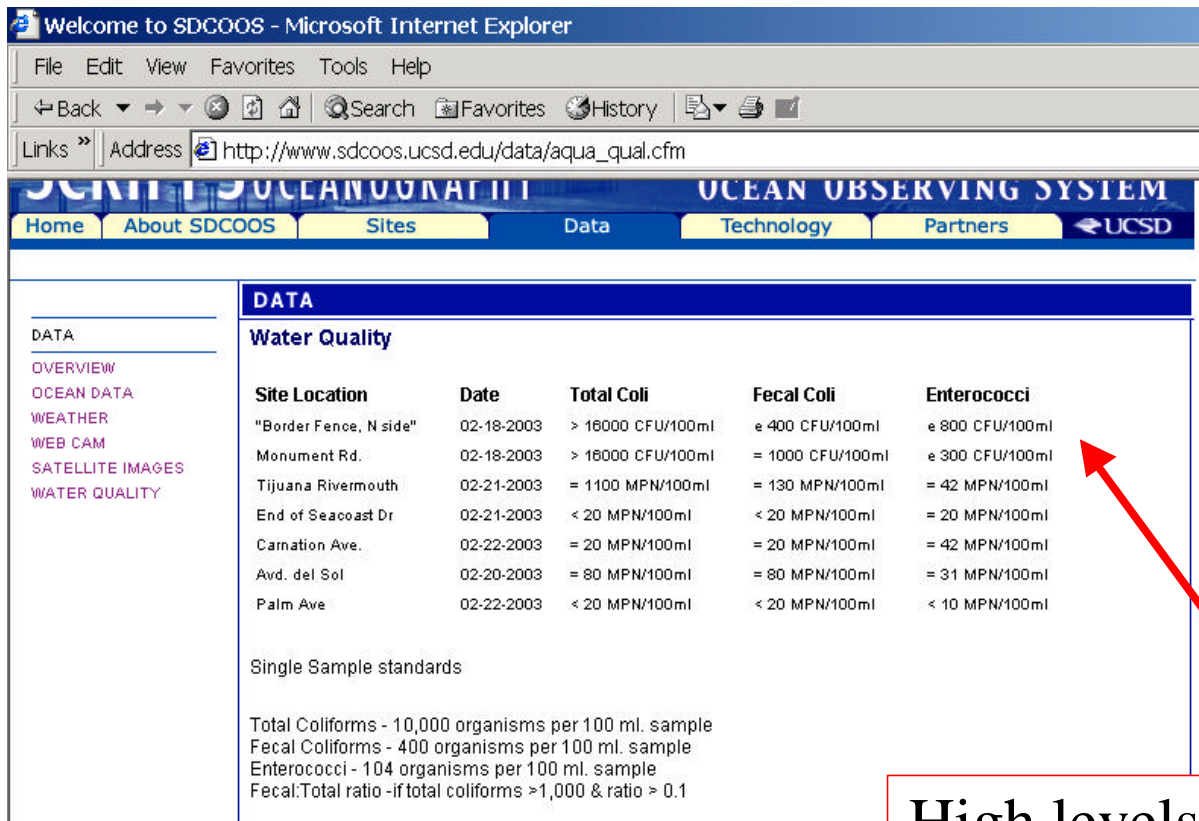


Figure 3 – Rainfall measurements in the San Diego region (shown here is Scripps Pier data). Measurable rainfall occurred mid February and at the end of the month.

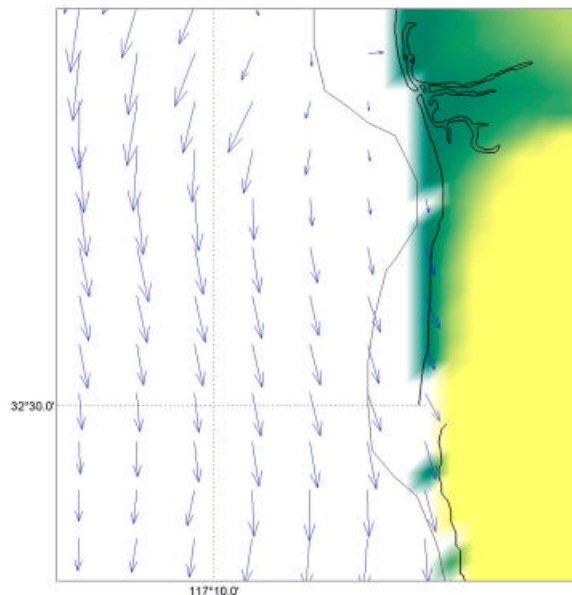
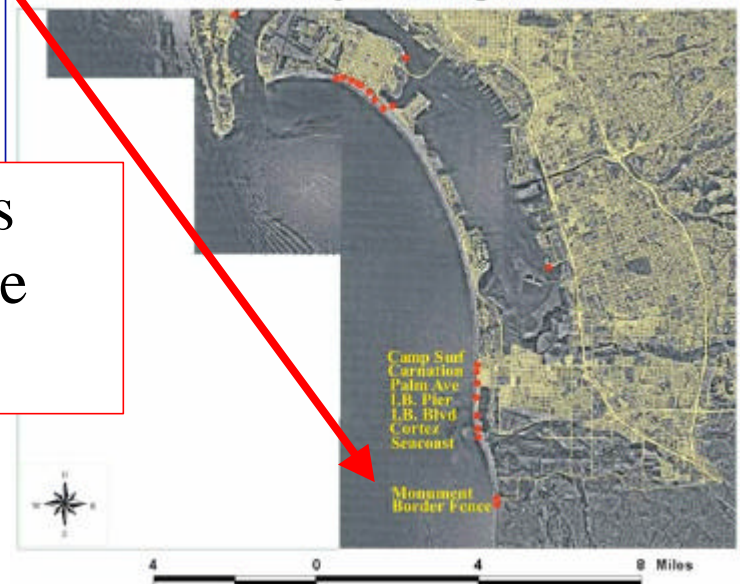


Linking the transport to  
the WQ stations sampled  
by the County DEH

February 18, 2003

High levels  
south of the  
TJ river

South County Monitoring Locations

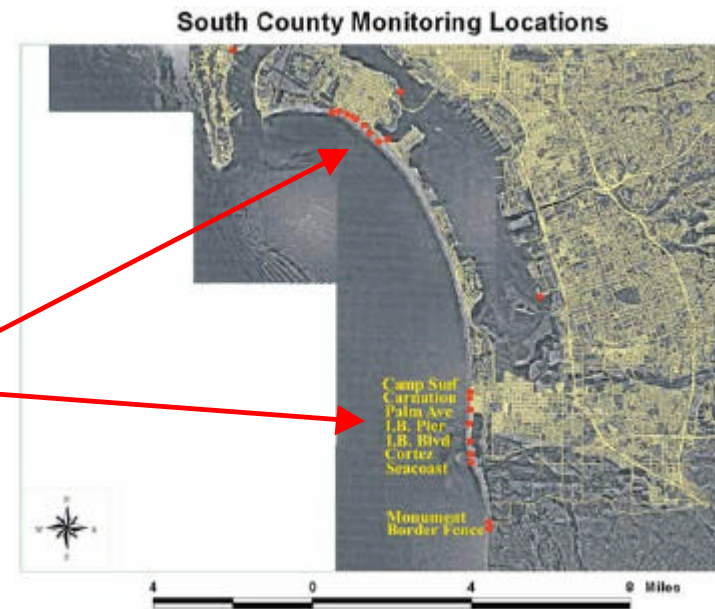


Southward currents dominant during the  
2/18/03 time period.  
High counts south of TJ River.

Figure 4. A summary of the flow conditions at the County DEH sampling results (shown on the SDCOOS web site). Beaches were impacted south of the TJ river mouth as a result of the south moving currents.



# County DEH WQ Results from 2/25-26, 2003. High Counts present in I.B. and Coronado.



Silver Strand N end (ocean side)	2/25/03 11:58 AM	TOTAL COLI	MF	>	16000	CFU/100ml
Silver Strand N end (ocean side)	2/25/03 11:58 AM	FECAL COLI	MF	=	1800	CFU/100ml
Silver Strand N end (ocean side)	2/25/03 11:58 AM	ENTERO	MF	e	300	CFU/100ml
Silver Strand N end (ocean side)	2/26/03 10:07 AM	TOTAL COLI	MF	>	16000	CFU/100ml
Silver Strand N end (ocean side)	2/26/03 10:07 AM	FECAL COLI	MF	=	2600	CFU/100ml
Silver Strand N end (ocean side)	2/26/03 10:07 AM	ENTERO	MF	=	2600	CFU/100ml
Carnation Ave.	2/25/03 12:00 AM	TOTAL COLI	MF	>	16000	CFU/100ml
Carnation Ave.	2/25/03 12:00 AM	FECAL COLI	MF	=	9400	CFU/100ml
Carnation Ave.	2/25/03 12:00 AM	ENTERO	MF	=	1300	CFU/100ml
Carnation Ave.	2/26/03 9:50 AM	TOTAL COLI	MF	>	16000	CFU/100ml
Carnation Ave.	2/26/03 9:50 AM	FECAL COLI	MF	=	10000	CFU/100ml
Carnation Ave.	2/26/03 9:50 AM	ENTERO	MF	=	9000	CFU/100ml
Carnation Ave.	2/28/03 9:20 AM	TOTAL COLI	MTF	=	1100	MPN/100ml
Carnation Ave.	2/28/03 9:20 AM	FECAL COLI	MTF	=	230	MPN/100ml
Carnation Ave.	2/28/03 9:20 AM	ENTERO	IDX	=	429	MPN/100ml
End of Seacoast Dr	2/25/03 10:59 AM	TOTAL COLI	MF	>	16000	CFU/100ml
End of Seacoast Dr	2/25/03 10:59 AM	FECAL COLI	MF	>	12000	CFU/100ml
End of Seacoast Dr	2/25/03 10:59 AM	ENTERO	MF	>	12000	CFU/100ml
End of Seacoast Dr	2/26/03 9:40 AM	TOTAL COLI	MF	>	16000	CFU/100ml
End of Seacoast Dr	2/26/03 9:40 AM	FECAL COLI	MF	=	8200	CFU/100ml
End of Seacoast Dr	2/26/03 9:40 AM	ENTERO	MF	=	11000	CFU/100ml

*DEH county data*

Figure 5. Summary of County DEH data for an event towards the end of February. Results show high counts of indicator bacteria north of the TJ river.

24hr averaged ocean currents, 2/25/03  
Northward flow present during the time period of contamination in  
Imperial Beach, City of Coronado.

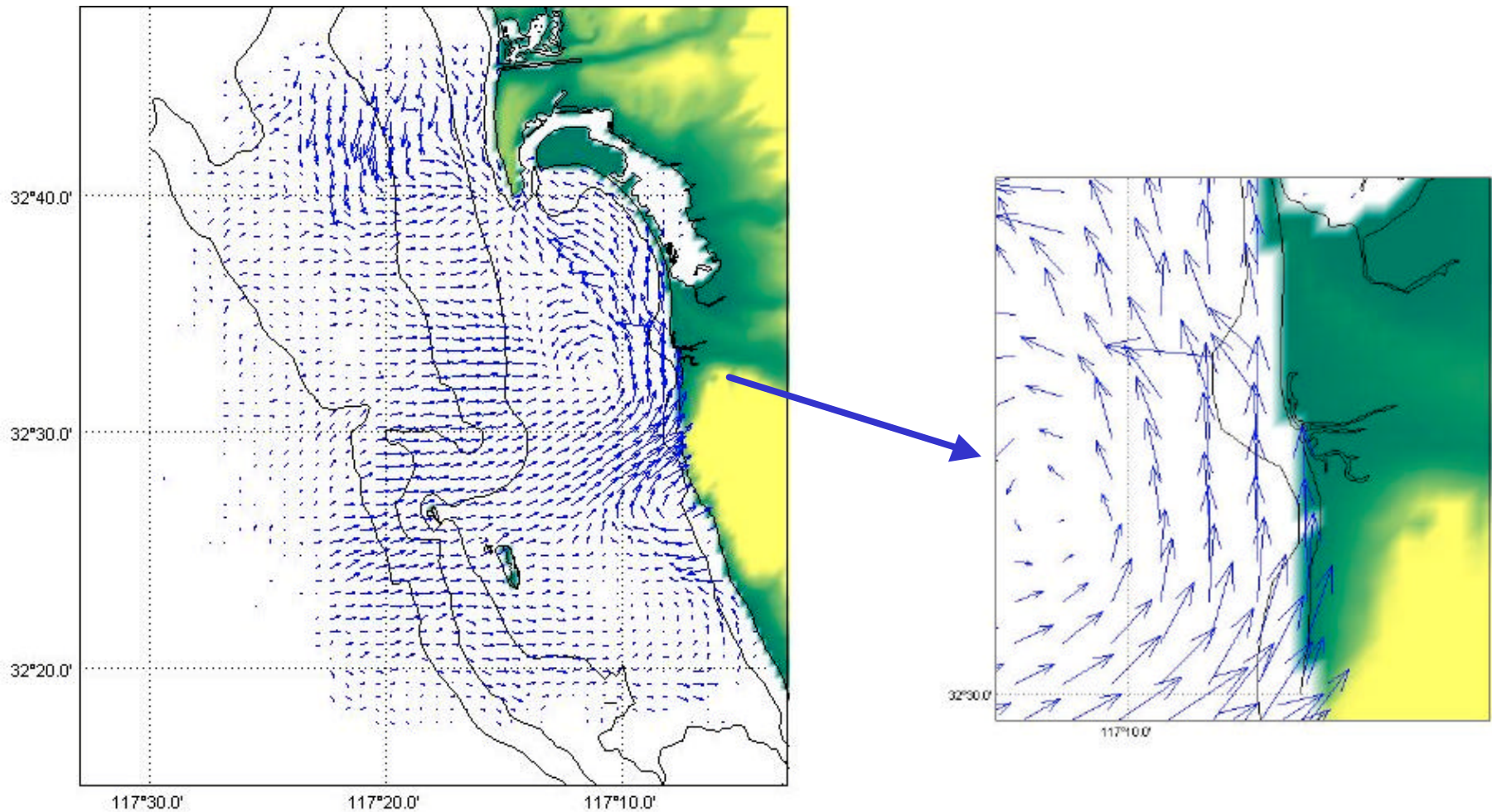


Figure 6. Ocean currents during this time period of contamination. As a result of the counter-clockwise eddy, northward transport is occurs along the coast of Imperial Beach. At this time period, the TJ river was flowing due the recent rainfall.

*Summary of nearshore currents and their relationship to three water quality events in February and March 2003 time frame.*

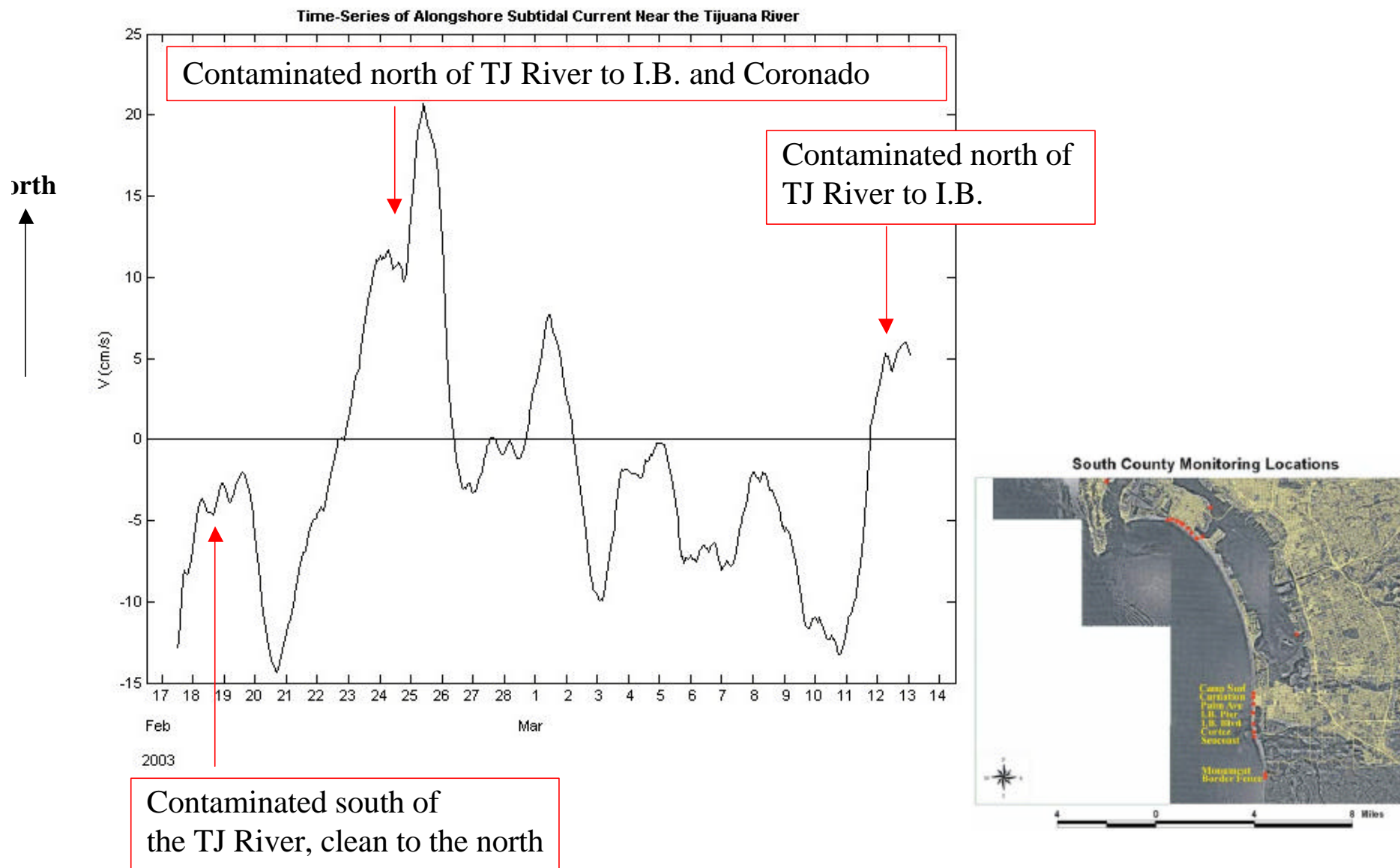


Figure 7. A time series of the sub-tidal north-south currents near the TJ river (positive values indicate northward). The orientation of the currents correlate with the County's sampling results during this period of runoff. Additional analysis of the environmental data during this time period is currently underway.