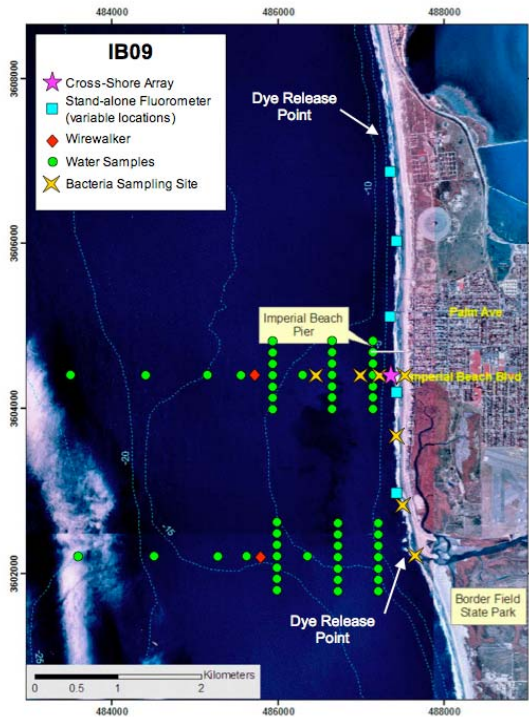


EXPERIMENT SITE

Imperial Beach between the Tijuana River to the south, and the Silver Strand to the north, is selected for its long straight coastline that allows tracking of pollutants over relatively long distances.



A cross-shore array of instrument frames supporting pressure sensors, temperature sensors, current meters, and fluorimeters (to measure dye and chlorophyll) will be placed in the water. The frames are anchored to the sea bottom.

EXPERIMENT SCHEDULE

The experiment will take place from September 8, 2009 through October 31, 2009. Deployment of the fixed instrument cross-shore array will begin September 9, 2009 and will take approximately 7-10 days. Data collection will last for approximately 1 month. Retrieval of the instruments will begin on approximately October 22, 2009 and will take about 1 week depending on wave conditions.

CONTACT INFORMATION

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<http://cdip.ucsd.edu/ib09>



IB09

Imperial Beach Pollutant Transport and Dilution Experiment

September 8 - October 31, 2009

EXPERIMENT GOALS

California beaches are culturally, economically and ecologically important. Significant health risks and economic losses are associated with bacterial pollution at California beaches. While recent improvements in the treatment and disposal of sewage have reduced coastal pollution from offshore sewage outfalls, contamination in many urban locations still happens during dry weather primarily due to runoff that drains directly onto the beach or from tidal flushing of contaminated creeks and estuaries. The transport and mixing of these pollutants by ocean waves, currents and tides are poorly understood.

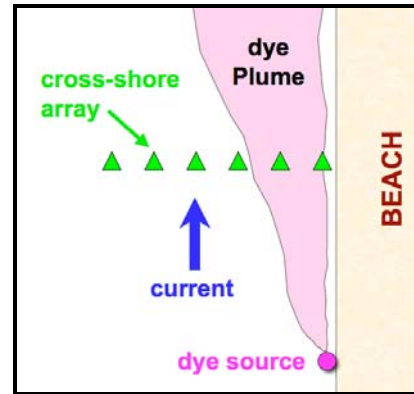
The goal of the Imperial Beach Pollutant Transport and Dilution Experiment (IB09) is an improved understanding and modeling of pollutants discharged directly into the surfzone during dry-weather (when the Tijuana River flow is very small, and beach usage is maximum).

Pollutant transport measurements will be enhanced with an intensive biological sampling program to better understand the physical and biological dynamics governing bacterial and phytoplankton patchiness in the shallow near-shore waters. Wave and current predictions will also be tested and numerical model predictions for the region will be available through the Coastal Data Information Program (CDIP) web site for use by beach managers, sanitation districts, and county health agencies.

EXPERIMENT DESCRIPTION

Pollution transport and dilution will be simulated by releasing pink dye at selected shoreline locations. The dye will be carried along by the prevailing alongshore currents to form a plume, similar to that created by wind blowing past a smokestack. Wave, current, tracer, depth, and biological measurements, obtained with instruments and techniques described here, will be used to track the plume and the rate at which it widens and dilutes. During south swell conditions (i.e., northward dominated currents) dye will be released just north of the Tijuana River mouth. During north swell events (i.e., southward currents) dye will be released at the northern limit of the experiment site south of the Silver Strand State Beach.

SCHEMATIC DYE PLUME



DATA COLLECTION

Dye Studies: Non-toxic Rhodamine WT, the most recommended dye for use in groundwater, lake, and ocean work, will be used. Dye quantities and concentration levels will meet Environmental Protection Agency safety standards:

http://www.turnerdesigns.com/t2/doc/appnotes/998_5104.html

Cross-shore Array of Fixed Instruments: Pressure sensors, temperature sensors, current meters, and fluorometers (to measure fluorescence from dye or chlorophyll) will be mounted on metal frames anchored to the sea bottom on a cross-shore transect between the shoreline and the 5 meter depth contour, offshore of Imperial Beach Blvd. The frames will remain in place during the experiment, and will be marked by fiberglass poles and/or flags above the water surface.

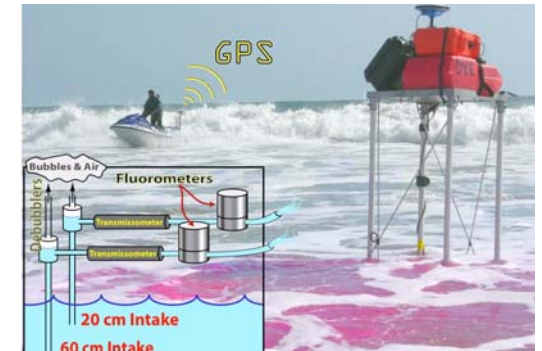
For your safety please stay clear of these frames.



Stand-alone Fluorometers: Six submerged fluorometers attached to poles anchored to the sea bottom will be temporarily (~8-10 hours) deployed in the surfzone at various alongshore positions during dye experiments. For your safety please stay clear of these instruments (marked by poles, flags, and signs).

Wirewalkers and Acoustic Doppler Conductivity Profilers (ADCP): Two continuously profiling wirewalkers and ADCPs will be moored in 8-20 meters water depth. Continuous measurements of currents, temperature, salinity, and chlorophyll fluorescence structure from these instruments will provide insight into the internal wave field and subsurface chlorophyll gradients.

Jet ski Sampling System: A jet ski will be used in the surfzone to measure temperature, conductivity, turbidity, and fluorescence (dye and chlorophyll).



Small Boat Surveys: Daily small boat surveys will map current, temperature, depth, fluorescence, and nitrate on cross-shore sections between the shoreline and about 40 meters depth.

Surfzone Drifters: Surfzone drifters will be repeatedly released, retrieved, and reseeded along the beach. The drifters follow the water and thus measure surfzone circulation. Drifters are harmless to bathers and surfers.



Bathymetry Surveys: Surveys of the beach and offshore depths will be made using GPS-equipped All Terrain Vehicles (ATV), jet skis, and a hand-pushed cart.