

Southern California Coastal Ocean  
Observing System:  
Harmful Algal Bloom Monitoring Program  
(Collaborative HAB programs)

David A. Caron  
(University of Southern California)

Sidenotes:

- from the perspective of a HAB researcher.
- with interaction of CenCOOS.
- emphasis on the 'nuts & bolts' of a collaborative OOS-HAB program.

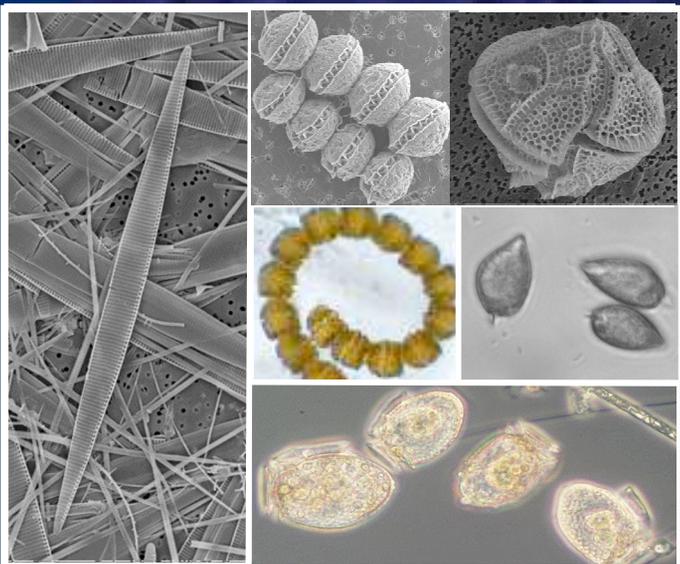
# Southern California HAB Monitoring Program (SCCOOS - HABs)

Duration of Project  
One year (since Fall '08)

SB

LA

SD



# southern california bight



Buoy



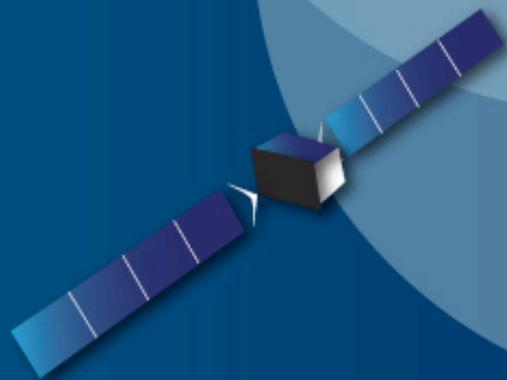
Mooring



Glider Track



SCCOOS Shore Station



What do OOSs have to offer HAB  
research and monitoring?  
Tremendous oceanographic context!

# SCCOOS HAB Collaborators

Mark Moline (California Polytechnic State University, SLO)

Mark Brzezinski (University of California, Santa Barbara)

Grace Chang (University of California, Santa Barbara)

Rebecca Shipe (University of California, Los Angeles)

Burt Jones (University of Southern California, Los Angeles)

David Caron (University of Southern California, Los Angeles)

John McGowan (University of California, San Diego)

Melissa Carter (University of California, San Diego)

# SCCOOS HAB Group Weekly Pier Sampling Sites



# Overall goal

Provide template for OOS-HAB interactions

## Specific goals

### Bloom monitoring

(Shoreline [i.e. pier] surveillance of HABs and toxins)

### Product Development and Display

(Web-based dissemination of information)

(Jennifer Bowen - UCSD)

### Bloom Tracking (space and time)

(Glider observations, buoy reconnaissance)

### 'Event Response' Sampling

(by region - very limited!)

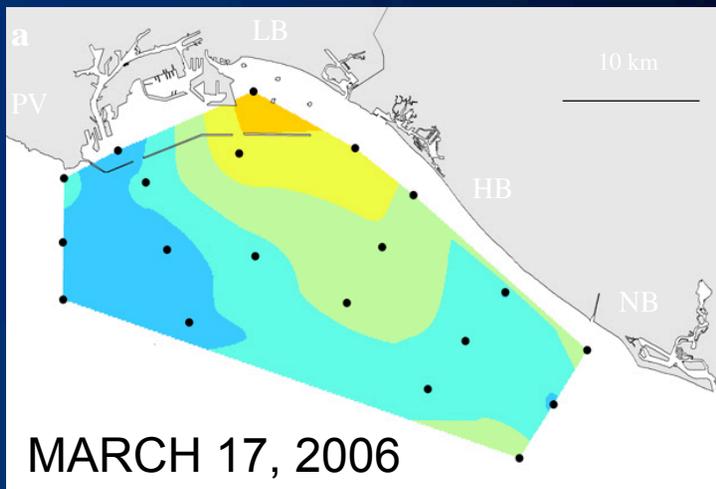
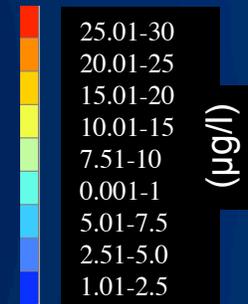
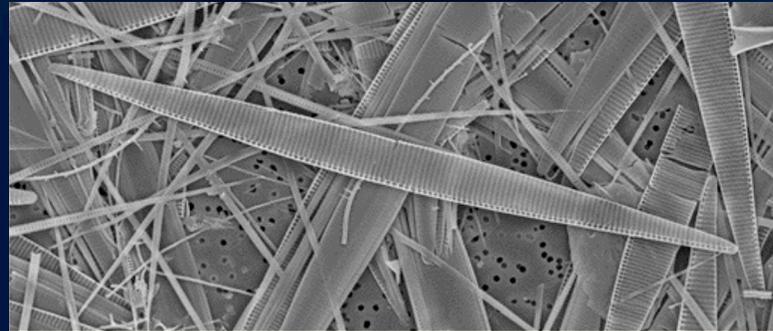
### \*Regional Ocean Characterization\*

(Environmental forcing factors)

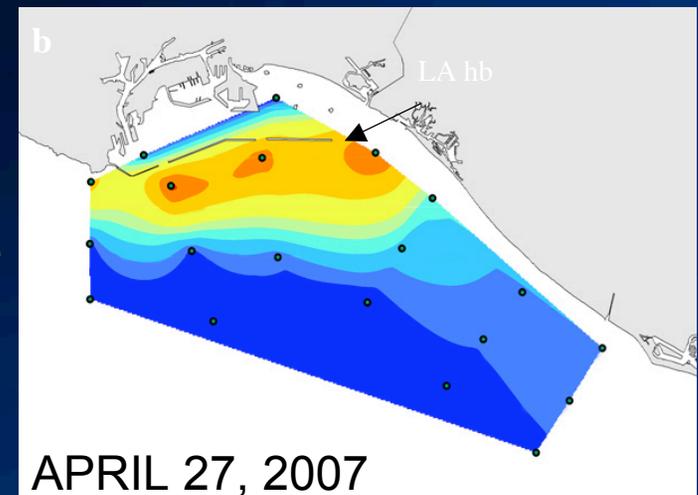
(Nutrient upwelling mapping, modeling)

# Focus of the 1-year SCCOOS-HAB effort is *Pseudo-nitzschia* and domoic acid

(although a variety of other species are being tallied as well)



Fine-scale geographic distribution of domoic acid in the LA-LB harbor & San Pedro shelf, 2006 and 2007.



# SCCOOS HAB Group

## Parameter measurements

(Weekly pier-based measurements)

1) Live and preserved specimens for major HAB species.  
(a 'HABMAP' format)

2) Domoic acid concentrations in plankton samples.  
ELISA  
(Samples processed at USC)

3) Primary inorganic nutrients.  
Nitrate + nitrite  
Phosphate  
Silicate  
(Samples processed at UCSB)

4) Extracted chlorophyll from plankton samples.

5) Temperature, salinity.

...sent on to SCCOOS for web design

# SCCOOS HAB Group

## 'Event Response' measurements

(this will be a very limited effort)

### 1) Glider studies

SCCOOS & MERHAB (RAPDALERT) Webb SLOCUM gliders

Temperature, salinity, chlorophyll fluorescence,  
CDOM, phycoerythrin, optical backscatter at  
three wavelengths\*\*\*.

(We're going in the water later this week!)

### 2) Limited ancillary ship work to characterize extent of a HAB event\*\*\*.

\*\*\*Bight '08 (SCCWRP, regional collaborative effort, now in '10)

# SCCOOS

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

ABOUT DATA, PRODUCTS and MODELING PROJECTS CLASSROOM INTERACTIVE HOME



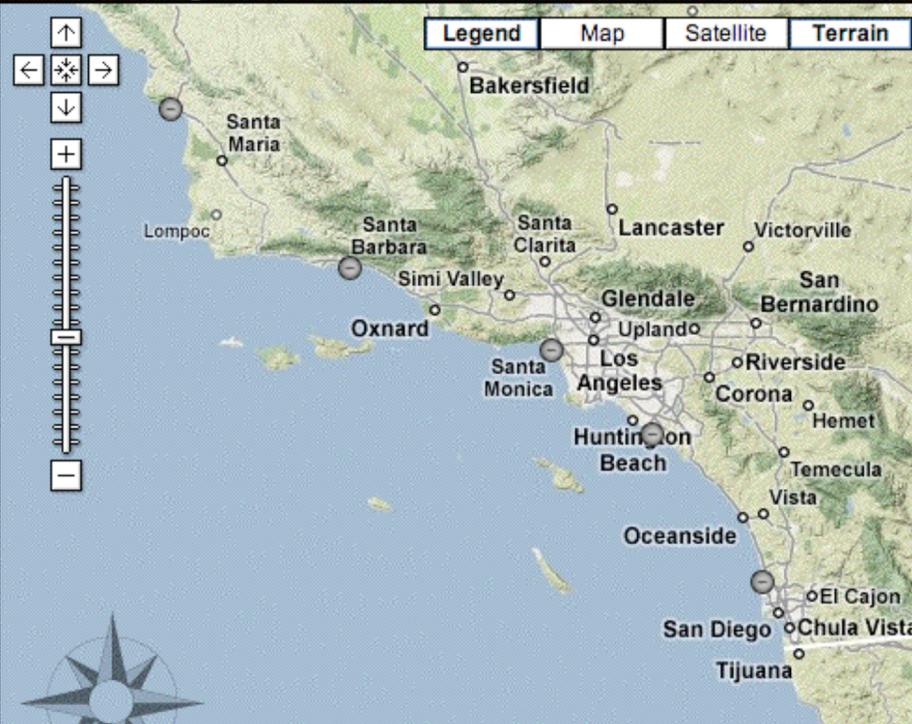
Click for observation map

## HARMFUL ALGAL BLOOMS

← back to Data Products

View harmful algal bloom study efforts on the map below, or learn about why algal blooms are problematic, how field sampling is conducted, and how species identification is performed.

click for Full Page View



LEGEND	
<span style="color: green;">●</span>	HAB species below limits
<span style="color: yellow;">●</span>	HAB species near limits / Domoic Acid detected
<span style="color: red;">●</span>	HAB species / Domoic Acid above limits
<span style="border: 1px solid gray; border-radius: 50%; padding: 2px;">○</span>	Data older than 14 days
SITES	
<span style="border: 1px solid gray; border-radius: 50%; padding: 2px;">○</span>	Cal Poly Pier
<span style="border: 1px solid gray; border-radius: 50%; padding: 2px;">○</span>	Stearns Wharf
<span style="border: 1px solid gray; border-radius: 50%; padding: 2px;">○</span>	Santa Monica Pier
<span style="border: 1px solid gray; border-radius: 50%; padding: 2px;">○</span>	Newport Pier
<span style="border: 1px solid gray; border-radius: 50%; padding: 2px;">○</span>	Scripps Pier

- Southern California Regions**
- [Morro Bay](#)
  - [Santa Barbara Channel](#)
  - [Ventura County](#)
  - [Los Angeles](#)
  - [South Channel Islands](#)
  - [Orange County](#)
  - [North San Diego](#)
  - [San Diego / Mexico](#)

- Available Products**
- [Automated Shore Stations](#)
  - [Manual Shore Stations](#)
  - [Bathymetry](#)
  - [Moorings](#)
  - [Meteorological Observations](#)
  - [Winds & Rainfall Forecasts](#)
  - [Satellite Imagery](#)
  - [Shoreline Water Quality](#)
  - [Surface Current Mapping](#)
  - [Wave Conditions \(CDIP\)](#)
  - [Cast Data \(Ships & Gliders\)](#)
  - [Chlorophyll and HABs](#)
  - [Plume Tracking](#)

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- [ROMS Model Output](#)
- [Ports & Harbors](#)

[Grab Raw Data](#)

click for Full Page View

Legend   Map   Satellite   Terrain

**SCRIPPS PIER**

32° 52.02' N, 117° 15.42' W

Provided by: SIO

Last Sampled: 2 weeks ago

[2009-01-22 17:10:00 UTC · 2009-01-22 09:10:00 PST]

**HAB Species**

SPECIES	CELLS/L	LIMIT
Akashiwo sanguinea		
Alexandrium spp.		
Dinophysis spp.		
Lingulodinium polyedrum		
Prorocentrum spp.		
Pseudo-nitzschia delicatissima group		
Pseudo-nitzschia seriata group		

Last Sampled: 2 weeks ago

[2009-01-22 17:10:00 UTC · 2009-01-22 09:10:00 PST]

**Observations**

OBSERVATION	VALUE	LIMIT
Average Chlorophyll	1.08 mg/m3	
Silicate		
Temperature	14.6 °C	58.28 °F

[View History](#)

Note: Harmful algal bloom data is collected for the purpose of scientific study and is not intended to be used as an indicator of health or safety. For information on

**LEGEND**

- HAB species below limits
- HAB species near limits / Domoic Acid detected
- HAB species / Domoic Acid above limits
- Data older than 14 days

**SITES**

- Cal Poly Pier
- Stearns Wharf
- Santa Monica Pier
- Newport Pier
- Scripps Pier

# Some Issues/Questions for Conducting HAB Monitoring Programs within OOSs...

## Conceptual:

Potentially different missions/observation sites  
How to integrate chem/phys/HAB products of OOSs  
\*Predictive HAB modeling

## 'Nuts and bolts':

How to fund HAB monitoring component  
Coordinating and standardizing sampling/analyses  
Sampling: when, how, what  
Analyses: analytical methods  
\*west coast 'bake-off'  
Format(s) for web presentation  
\*Style pages (for 'non-core' HAB data)  
(extrapolate to inter-state efforts)

## The Potential:

West coast OOSs and HAB programs already coexist.  
The potential for mutual benefit is great.