Harmful Algal Blooms Sensor Plan
May 8, 2017

Background

Harmful Algal Bloom (HAB) stations consist of a network of monitoring stations that are affiliated with several pier locations along the California coast. These stations monitor HAB species, algal toxins as well as water temperature, salinity, and nutrients. These data can provide local and regional information on mixing and upwelling, land run-off, and algal blooms.

The SCCOOS HABs Stations are located at:

1. Santa Cruz Wharf*
2. Monterey Wharf*
3. Cal Poly Pier*
4. Goleta Pier
5. Stearns Wharf
6. Santa Monica Pier
7. Newport Pier
8. Scripps Pier

(*CeNCOOS provides HABs station support)

HAB stations collect water samples and net tows once per week to monitor the following variables:

Phytoplankton relative abundance for key HAB genera
Volume counted
Chlorophyll
Water Temperature
Domoic Acid (DA) (where measured)
Volume Filtered for DA (where measured)
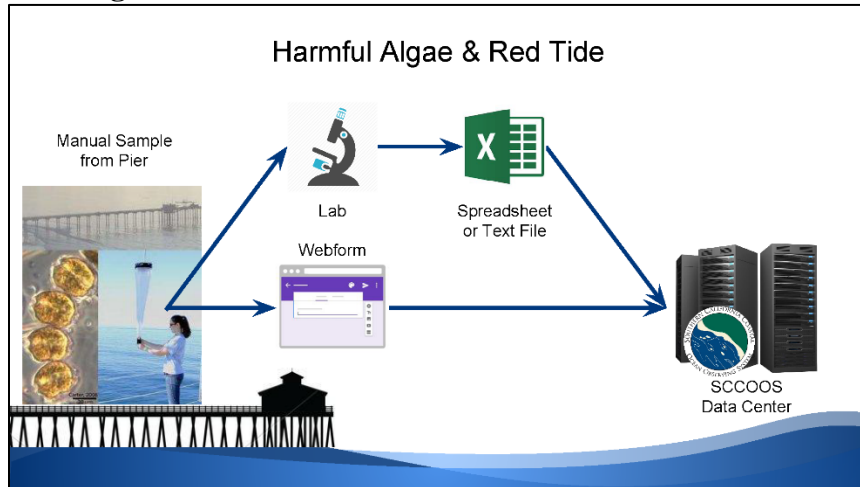Nitrate (where/when measured)
Nitrite (where/when measured)
Silicic Acid (where/when measured)

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Data Ingestion

1. Water samples are taken weekly through manual pier-based measurements.
2. These data are then uploaded manually to the SCCOOS HABs database for public visualization and download.

Data Management
After the Principal Investigator's (PI) upload their individual spreadsheets, the SCCOOS site provides a query interface for users to download customized data files.

Data Distribution
After weekly samples are taken, the phytoplankton abundance data are updated biweekly and the domoic acid and nutrient data are updated every 3 months.

The HABs data are distributed in ASCII and Comma or Tab Separated formats. Data are also distributed weekly through a publicly available listserv that is managed by SCCWRP to serve the Cal HABMAP community (a consortium of PI's, regional researchers, managers, and stakeholders interested in HABs)
http://sccoos.org/query/?project=Harmful%20Algal%20Blooms

NetCDF files will be implemented by June of 2018.

Quality Control

Each HAB PI is responsible for local data management and quality control. This is a manual quality control process done by a human analyzing these data. The Caron Lab at UCSB performs quality control for all stations but, Scripps Pier. The McGown Lab at UCSD performs quality control for the Scripps Pier data. Quality control follows best practices for microscopy and

molecular techniques developed by the science community for UNESCO. Specific pages are referenced per parameters. http://hab.ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=5440

Domoic acid (DA) analysis is based on the best published methods for measuring phycotoxins by enzyme-linked immunosorbent assay (ELISA) (D. Caron, UCSB) and by liquid chromatography-mass spectrometry (LC-MS). Weekly sampling of DA are only done by Newport Pier, Stearns and Santa Cruz Wharf unless the pseudo-nitzschia threshold exceeds 10,000 cells/liter at other stations. When Santa Monica and Scripps exceed this threshold, samples are sent to the Caron lab.

Parameters:
The following parameters use the QARTOD manuals:
- Temperature (http://www.ioos.noaa.gov/qartod/temperature_salinity/welcome.html)

The following parameters use best practices thresholds done manually by the PI:
- Chlorophyll (spike, range, flat line, syntax tests)
- Phytoplankton relative abundance for key HAB genera- The relative abundance is a derived variable from the cell counts based on abundance thresholds set by the Cal-HABMAP community. Standards are derived from UNESCO pgs. 1-47, 55-67,
- Volume counted- Standards are derived from UNESCO pgs. 1-47
- Domoic Acid (DA) (where measured)- Standards are derived from UNESCO pgs. 31-47 (spike, range, flat line, syntax tests)
- Volume Filtered for DA (where measured)- Standards are derived from UNESCO pgs. 31-47

Nutrient concentrations are not consistently measured across all sites. When nutrient concentrations are taken, best practices and quality control methods are done by the UCSB Marine Analytical Laboratory (flow-through injection method on a Lachat QuickChem 800 instrument).
http://msi.ucsb.edu/services/analytical-lab/instruments/flow-injection-analyzer
http://www.globalfia.com/index.php?option=com_content&view=article&id=47&Itemid=57
- Nitrate (where/when measured)- (spike, range, flat line, syntax tests)
- Nitrite (where/when measured)- (spike, range, flat line, syntax tests)
- Silicic Acid (where/when measured)- (spike, range, flat line, syntax tests)

Archiving
SCCOOS will archive the NetCDF files once they are created at the National Centers for Environmental Information (NCEI) by June 2018. Darren Wright, Data Manager, will be in

contact with Matt Biddle at NCEI regarding the archive process during the month of October, 2017. Matt will determine the timeframe for ingestion of the data archive. These files are setup for yearly archival.

NCEI will harvest data directly from our THREDDS server for HAB similar to the Burkolator http://sccoos.org/thredds/catalog/caf/catalog.html.

On our end we will keep a manifest similar to the Automated Shore Stations data http://sccoos.org/dr/metadata/ncei/autoss_archive_manifest_sha256.txt
This manifest is what NCEI uses to determine the location of the data to grab for archival.

Permission Restrictions
Current funding is provided by the National Oceanic and Atmospheric Administration (NOAA). When used for web displays and online resources, please provide a link to the SCCOOS homepage. For instance, in standard html:

Data courtesy of SCCOOS

For offline references, please choose the appropriate form from the recommended acknowledgements below.

   • Short form (figure captions, etc.)

"... data from SCCOOS"

   • Longer form (in text)

"...data were furnished by the Southern California Coastal Ocean Observing System."

   • Full form (acknowledgements at conclusion of papers, etc.)

"...data were furnished by the Southern California Coastal Ocean Observing System (SCCOOS), a regional partner of the United States Integrated Ocean Observing System (IOOS®)."

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 quarantines and statewide hab updates, please visit the california department of public health website. for information on water safety and beach closures, please visit the heal the bay beach report card website at http://www.healthebay.org/. for official reports on water quality and beach safety, please visit the california state water resources control board at http://www.swrcb.ca.gov/.

Intellectual Property
The funding agency & the University of California, San Diego through a contractual agreement.

Publications:

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