

Hypoxia/Upwelling 2008 planning meeting notes

Held: Wednesday, April 16th from 2-4pm.

Goal: Brief descriptions of who is doing what, where and when to facilitate information exchange and collaborative research.

Brief Summary: Results during early 2008 from the glider program (Barth/Shearman), OrCOOS mooring (Levine/Barth), and NOAA biweekly surveys (Peterson) indicate the presence of relatively cold and low-oxygen, but not hypoxic, water over the central Oregon shelf. Bill Peterson noted that ocean conditions over the past winter have been characterized by markedly cold bottom water. The early appearance of low DO and cold water on the shelf can lead to increased likelihood of hypoxia as the upwelling season progresses. The group agreed to provide informal updates as conditions change via email and postings on the hypoxia research page on the www.orcoos.org portal. We identified a need for a Fall 2008 meeting that would serve as a forum for sharing preliminary findings from the 2008 field season.

Jack Barth, COAS/OSU

NH-10 Mooring

- 10 miles offshore of Newport
- ~80 m water depth
- redeployed 10 April 2008
- data available in near real-time on <http://www.orcoos.org>

gliders

- Newport Hydrographic line ~ weekly
- starting to occupy Umpqua River line
- plots available on web (soon)

Alexander Kurapov, COAS/OSU

Coastal ocean circulation pilot forecast model

output from the coastal ocean circulation pilot forecast model will continue to be available on a daily basis, at <http://www.orcoos.org> under Near Real-Time Ocean Info./Ocean Observing Forecast Fields or at <http://www-hce.coas.oregonstate.edu/~orcoss/SSCforecast.html>. Plots of bottom salinity from the model are available on these sites as a possibly useful proxy for oxygen concentration.

Francis Chan, PISCO/ Zoology/OSU

2008 *Elakha* schedule:

Mooring cruises: May 13-16, 19; June 16-20, 25-27; July 21-25; Aug 25-29; Sept 15-19.

Area of operation includes inner-shelf between Lincoln Beach and Strawberry Hill with cross shelf CTD/Niskin casts out to 100m isobath as weather/schedule permits.

Cross shelf transects: May 28-30; June 3-6; July 8-11; August 5-8, 18; Sept 10-12.

Targeting monthly transect lines off Cascade Head, Lincoln Beach, Newport, Seal Rock, Waconda Beach, Strawberry Hill. CTD and Niskin casts for inorganic nutrients, extracted chlorophyll, Winkler DO, PON, and respiration rates.

Mooring locations: Lincoln Beach (with bottom DO), Seal Rock, Yachats, Strawberry Hill (with bottom DO)

Mike Donnellan, ODFW

3 ROV surveys (no fixed dates): Port Orford, 6-8 days; Siletz Reef, June; location TBD, after June. Committed to continuing Cape Perpetua surveys with PISCO, will coordinate with Francis.

Bill Peterson, NOAA

Regular biweekly *Elakha* trips, at night, to NH 25 and return

- *McArthur* Cruise (22-27 April)
 - Astoria to Cape Blanco along shelf break.
 - Steve Rumrill will be using our Seabird 43; Jennifer Menkel to help with plankton sampling
- *Miller Freeman* Cruise (12-23 May)
 - Grays Harbor to Eureka with NH and CC to 200 miles.
 - Jay Peterson and Eric Bjorkstedt
 - Hitting PaCOOS and LTOP Lines; CTD/oxygen along with chl, nutrients and plankton net sampling
- *McArthur* Cruise (11-22 July)
 - Grays Harbor to Eureka with NH and CC to 200 miles
 - Hitting the PaCOOS and LTOP lines; CTD/oxygen along with chl, nutrients and plankton net sampling
 - Experimental work on tolerances of copepod and euphausiid eggs to hypoxia

Rick Brodeur, NOAA

SAIP (Stock Assessment Improvement Program) cruises: weather dependent; planning for 5 day cruises during each month from May through September starting around the 15th of the month. 20 stations along Heceta Bank line, Newport, Columbia River, Willapa Bay.

Steve Rumrill, South Slough NERR

Pre-hypoxia event baseline characterization along the Oregon continental shelf (Astoria to Cape Blanco / NOAA *McARTHUR II* cruise April 20-27, 2008). Plan is to conduct the baseline spring characterization in late April 2008. Same as 2007, collecting measurements of DO values throughout the water column at about 50 stations along the coast in zigzag pattern from 100m to 300m isobaths.

Mary Sue Brancato, OCNMS

- 2007-2008 continuous DO recorders at 8 sites
- Vertical profile data during mooring array servicing & if an event is reported
- Volunteers surveying the beaches monthly

Waldo Wakefield, NOAA

NOAA Fisheries NWFSC studies on demersal fish abundance in relation to the hypoxia - with Aimee Keller

- Conduct standard swept area bottom trawl survey – and also include DO sampling in selected area, e.g., off central Oregon
- Conduct focused hypoxia trawl survey in late August, building on 2007 study ~ 3 days

Tony Bertagnoli and Giovannoni Lab, Microbiology/OSU

OMZ Microbial Community Analysis

- Continue monthly sampling at SH50; monthly time series data will be the first of its kind for the OR coast.
- Want more hypoxic samples; coordinate with PISCO to collect water from areas that are receiving low oxygen, whether they are at SH50 or other locations within the inner-shelf during 2008.
- For hypoxic/anoxic waters, want samples for nucleic acids analysis (2 20L carboys), CTD casts, nutrients, and proteomics (5 20L carboys, time/resource dependent)

Chris Langdon - HMSC

No cruises scheduled; would like to piggyback; need 10-100 ml water samples

Research questions:

- Is deep anoxic zone water the source of *Vibrio tubiashii* in Oregon's coastal waters?
- Do copepod populations amplify *Vibrio tubiashii*?
- Are blooms of *Vibrio tubiashii* having harmful effects on wild populations of bivalves and other taxa?
- Will be receiving samples collected by PISCO cruises

Lorenzo Ciannelli – COAS/OSU

Fish larvae and hypoxia study:

- Time: Summer 2008 and 2009
- Target organisms: Ichthyoplankton, pelagic juveniles, benthic juveniles
- Sampling for 2008: *Elakha* (3 days, May, June, August), *Miller Freeman* (May), *Wecoma* (August)
- Gears: multinet Hydrobios (*Elakha*), Methot trawl, beam trawl, camera sled

Dafne Eerkes-Medrano and Joe Tyburczy, PISCO/Zoology/OSU

Larval distributions in relation to hypoxia:

- Samples to come from:
 - Share plankton samples collected by Lorenzo Ciannelli (4 sampling days)
 - Research cruises with Francis Chan (monthly cruises from May-Sept)
- Sampling locations:
 - Strawberry Hill Line - 15, 30, & 50m isobaths
 - Lincoln Beach Line - 15, 30, & 50m isobaths

- Sampling protocol (want to sample within & outside of hypoxic waters along the vertical water column)
 - 333µm 5 net MOCNESS (Ciannelli cruises) - oblique tows, 5 depth bins
 - 150µm closing plankton nets (Chan cruises) - vertical tows, 2 depths, 2 replicates
- Dafne's larval lab experiments:
 - Expose barnacle & mussel larvae to various levels of hypoxia/acidification and monitor growth, development, mortality & settlement
- Joe's moored larval trap study:
 - Bidaily monitoring of zooplankton flux past 30, 15m moorings off Cape Foulweather, Whale Cove, Yaquina Head from 23 May – 14 June
 - Larval traps at 4, 8, 13, 28m depth
- Additional PISCO (RIOT) larval sampling include:
 - Bidaily settlement of barnacles & mussels at Cape Foulweather, Seal Rock, Yachats Beach, Cape Perpetua from 6 June – 31 August
 - Biweekly/monthly subtidal mussel recruitment (5, 10m)

Clare Reimers – COAS/OSU

Measuring benthic oxygen fluxes by eddy correlation.

2008 objectives:

- develop a benthic tripod equipped with sensors to measure total benthic oxygen exchange by *eddy-correlation*, and diffusive benthic oxygen exchange and sediment oxygen penetration depth by *microprofiling*
- make preliminary measurements in Yaquina Bay and at Lincoln Beach PISCO site; compare to sediment core measurements

2009 objectives:

- assess benthic oxygen exchange rates at 25, 50 and 80 meters water depth on Newport line (April-October).
- address the hypothesis that benthic exchange rates are temporally variable and controlled predictably by forcing events such as the spring transition (wind) and onset of plankton blooms associated with upwelling events (carbon flux).

Craig Risien will put together a 2008 hypoxia research calendar and map based on the meeting; it will be available on www.orcoos.org