

## **Notes for Hypoxia 2009 planning meeting**

Time: Wednesday, April 1<sup>st</sup> from 10am -12pm.

Locations: Burt 193, OSU, HMSC Guin Library

### Purpose

1. Make each other aware of what hypoxia-related sampling is planned for 2009
  - Ship sampling (when, where, what, ...)
  - Autonomous sampling (moorings, gliders, ...)
  - New science investigations (benthic, satellite, ...)
  - Communications (web page, list-serve, ...)

Hypoxia web pages:

<http://www.orcoos.org> "Hypoxia Research" tab

<http://www.piscoweb.org/outreach/topics/hypoxia>

Frequently Asked Questions (FAQ) sheets available

1-page summary sheets available

### **Introduction and overview of COAS plans: Jack Barth**

- NH-10 data from OrCOOS buoy updated every 6 hours, available on [www.orcoos.org](http://www.orcoos.org). Mooring serviced 3/19/09.
- Gliders: cross-margin transect twice per week since April 2006: CTD, dissolved oxygen, chlorophyll fluorescence, CDOM fluorescence, light backscatter  
Barth/Shearman/Erofeev/Rubiano-Gomez/Broderson (OSU)
- Science and Technology Center (aka CMOP) Cruises (contact Murray Levine, COAS): CTD, biogeochemistry, etc. Some of the shelf lines include: NH, CR, LaPush. Much time in plume, estuary and river. Some berths still available.

May:

R/V Pt Sur – 13 to 26 May (2 legs)

R/V New Horizon – 12 to 30 May (2 legs)

August:

R/V PtSur – 1 to 14 September

R/V New Horizon – 29 Aug to 11 September

DO Mapping effort (in progress) (w/ Steve Pierce)

What is the spatial extent of low DO near-bottom water in PNW waters?

How does the spatial extent and intensity vary seasonally and interannually?

Compare with historical data. Focused on 2006 and 2007. "Sum is greater than the parts"

Data sources:

- PISCO central Oregon (Lincoln City to Cape Perpetua, ongoing, Chan et al.)
- OSU glider (NH line, ongoing, Barth/Shearman/Erofeev)
- NOAA hake survey (42-49N, July-Aug 2007, Pierce/Barth)
- NOAA CO<sub>2</sub>/pH survey (42-49N, May-June 2007) (Feely, Sabine, Hales, et al.)
- BPA surveys (44.25-48.25N, June and Sep, 2006-2008; Peterson et al.)
- NSF STC (44.25-48N, 2007-2008)
- NOAA OCNMS (various hydro lines, ongoing, Brancatto et al.)
- Others?

### **Overview of PISCO/MI\_LOCO research plans: Francis Chan**

MI\_LOCO: Microbial Initiative in low oxygen areas off Conception and Oregon. Collaboration with Giovannoni lab. Focus on SH line. April to Sept – mooring at SH-15. Goal for 2009 is to have SH-15 data available real-time. New measurements: pCO<sub>2</sub>, pH. Possibility of shiptime on Elahka and samples for sure.

### **Overview of NOAA plans: Jay Peterson**

- Fortnightly sampling of the NH Line out to 25 nautical miles (7 stations)
  - SBE19 CTD
  - Fluorescence (Wetlabs)
  - DO (SBE 43) + sporadic Winkler titrations.
  - Zooplankton (integrated)
  - Phytoplankton (surface)
  - Nutrients (surface + 150m)
- See R/V Elakha calendar for intended cruise dates.
- PaCOOS survey: August 7 – 17, 2009, San Francisco – Seattle. ~10 transects CTD, SBE 9/11, Fluorometer, D. O. (SBE 43), Some Winklers, Zooplankton (integrated)
- Bonneville Power Administration (BPA)/NOAA survey for juvenile salmonids.  
May, June and September, Newport – La Push, WA  
~8 transects: CTD, SBE 9/11, Fluorometer, D. O. (SBE 43), Zooplankton (integrated), Fish Trawls  
Contact Cheryl Morgan for data, Cheryl.morgan@oregonstate.edu
- NOAA – Northwest Fisheries Science Center  
Plan for 2009 is to sample from Monterey, CA to Vancouver Island (June 20th – Aug 22nd) aboard the R/V Miller Freeman. CTD transects are 20 naut. miles apart

CTDs (w/ Oxygen sensor) across the shelf (50, 75, 150, 300m isobaths) and XBTs (no oxygen) off the shelf.

NOAA/NWFSC/FRAMD, Steve Pierce (COAS) will be doing the CTD and ADCP work.

### **NOAA NMFS NWFSC Groundfish Group's 2009 Sampling Plans: Waldo Wakefield**

- In 2007, established 2 longitudinal lines at 50 and 70 m; continue time series initiated in 2007 and coordination of sampling off Oregon with OSU programs
- 13 Trawl stations within hypoxia study area + 14 additional stations with CDT/DO casts
- Timing of first and second passes of trawl survey vessels off Oregon and Washington: 1st pass – May 18 - June 14, 2nd pass – Aug 17 - Sept 16. Hypoxia cruise leg off Newport Sept 3-4.
- NMFS NWFSC FRAM Sampling in 2009: For the third consecutive year continue Aug/Sept sampling along the 50 and 70 meter isobath off OR – embedded in NMFS bottom trawl survey stratified random sampling grid.
- Collaborative NOAA NURP funded project w/ Barth and Pierce: Keller et al. "Demersal fish species composition and biomass in relation to the Oxygen Minimum Zone (OMZ) along the U.S. West Coast" "Ruggedized" oceanographic sensor package to integrate with bottom trawl survey trawl system: *temperature, depth, salinity, DO, chlorophyll fluorescence, and optical backscatter*
- Ongoing OSU Sea Grant project with Ciannelli, Brodeur and Barth: "Effects of hypoxia on ichthyoplankton and micronekton communities off the Oregon coast"

### **Plans for studying coastal microbial community structure: Steve Giovannoni**

- Our lab will collecting samples that will be part of the MILOCO effort
- Sampling will occur approximately once a month-see Elakha schedule
- Will be collecting samples from the SH70 station at depths 5m, deep chlorophyll-maximum, mesopelagic and nepheloid layers. Will also be collecting samples from SH100-nepheloid layer.
- All samples will be analyzed via terminal restriction fragment length polymorphisms targeting the 16S rRNA gene.
- At the end of the summer, a small collection of samples will be submitted for high throughput sequencing analysis. Will be analyzing environmental DNA (metagenomes) and cDNA (metatranscriptomes).
- Found bacterial groups in our tRFLP data from 2007-2008 that are abundant in other low oxygen environments.
- Our lab has cultured representatives for some of these groups (gammaproteobacteria ARTIC96BD-19). Working on reviving these organisms from frozen stocks for genetic and physiological analysis.

## Update on Oregon Fishermen in ocean observing research: Jeremy Childress

- Temperature Study 2005-Present
- 2009 – Adding a Dissolved Oxygen Component
- Sensor Design
  - Aanderaa Optical DO Sensor 3835
  - Acumen Instruments Datalogger
  - 4" PVC Housing with Acrylic Endcap
  - 2 battery packs should permit 2 months of capture at 10 min intervals
- 5 Units
  - 1 x 5 battery prototype
  - 4 x 2 battery units currently being assembled
- Methods
  - Site Selection - ?
  - Cooperation with Al Pazar to deploy between Newport and Florence
  - Attached to 5 separate crab pots
- Goals
  - In the water by May 16th, 2009
  - Record DO variability and upwelling events
  - All Data available by September 1, 2009
  - [www.or.fioor.org](http://www.or.fioor.org)

## Plans for fish larvae and hypoxia study: Angela Johnson

- *Determine if low DO (<2.0 mg/L) affects the **abundance** of fish early life-stages both in and within the immediate vertical and horizontal proximity of the hypoxia zone.*
- *Determine if low DO affects the **diet** of fish early life-stages both in and within the immediate vertical and horizontal proximity of the hypoxia zone.*
- *Determine if low DO affects the **feeding intensity and body condition** index of fish early life-stages both in and within the immediate vertical and horizontal proximity of the hypoxia zone.*
- Sampling locations: Cascade Head, Lincoln Beach, Newport, Seal Rock, Wakonda Beach, Strawberry Hill. Sample 'demersal' fauna over the upper few cm of the bottom (e.g., settled juvenile flatfish). Relatively shallow waters (<100m) or estuaries. Moolack Beach, Newport Line
- Elakha time: June 12, July 25, August 22

## Planktonic larval invertebrates and low oxygen: Dafne Eerkes-Medrano

- Field research aims to answer how planktonic larval invertebrates are affected by low oxygen conditions?
  - Are different taxonomic groups impacted differently?

- Within the cirripedes and decapods are there differences in tolerance between species/larval stages?
- Lab experiments will investigate the effect of low oxygen conditions on survival, growth and development of cirripedes.
  - Experimental setup built in 2008
  - Experimental trials to be run April-Sept 2009
  - eerkesmd@science.oregonstate.edu

### **Clare Reimers**

Testing of oxygen flux probe along Newport Line  
Wecoma cruises: 6-14 June, 15-23 Aug, 17-21 Oct

### **Burke Hales**

Carbon and Water project, off Newport (and/or Heceta Bank ?)  
Wecoma cruises: 20 May to 3 June, 22 July to 12 Aug

### **Feely et al.**

CO<sub>2</sub>/pH survey: Wecoma cruise: 6-13 Oct  
(note that Dick and Burke provided the data from their '07 survey to Steve Pierce and Jack Barth for inclusion in our mapping synthesis effort)

### **Discussion**

DO calibration:

- Annual factory servicing
- Francis does pre-mid-post season lab calibrations to categorize drift, combined with Winkler samples alongside casts, to know when drift occurs. Others invited to join lab calibration.

Data Collection and Hosting:

- Meta-data is important
- OrCOOS can host, and will transition some data to NANOOS. Add moored equipment tab to OrCOOS with lat, long, who owns it. Craig will send this to Waldo for trawl ship captains.

In-season Communication:

- OrCOOS: Craig will put up research calendar
- Email to science group when things happen
- Having glider data available close to real time is helpful
- Monita Cheever at OSU ship operations for information on Elakha schedule

Fall 2009 meeting: ½ day format proposed and agreed on by many