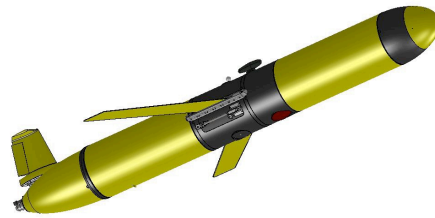
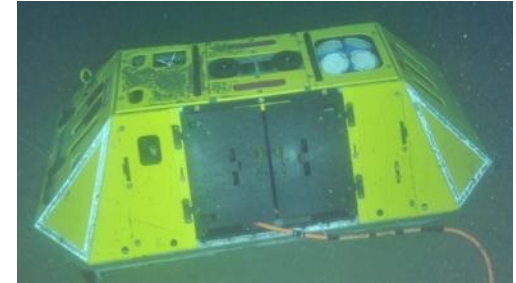




Ocean Observatories Initiative



September 26, 2017



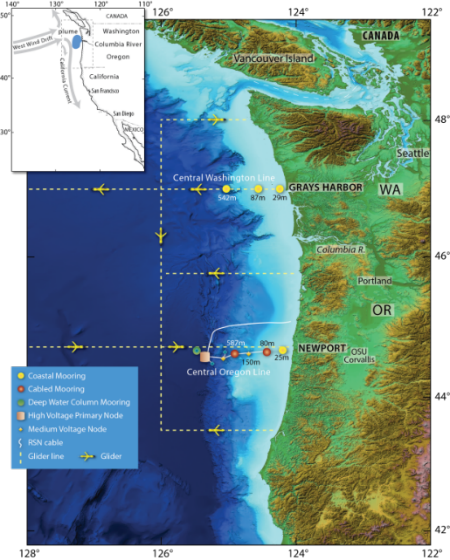
# The Endurance Array

Jack Barth (Project Scientist), Ed Dever (Project Manager/Principal Investigator),  
Jon Fram (Systems Engineer), Bob Collier (former Project Manager/Principal Investigator),  
Tom Kearney (Operations and Management)

Chris Wingard, Craig Risien, Linda Faylor, Tully Rohrer, Stuart Pearce, David Neiman, Russ  
Desiderio, Johna Winters, Jeff Woods, Jonathan Whitefield, Ian Black

... in collaboration with our WHOI (buoys, design, etc.), UW (cabled infrastructure) and  
Rutgers/Raytheon (CyberInfrastructure) colleagues

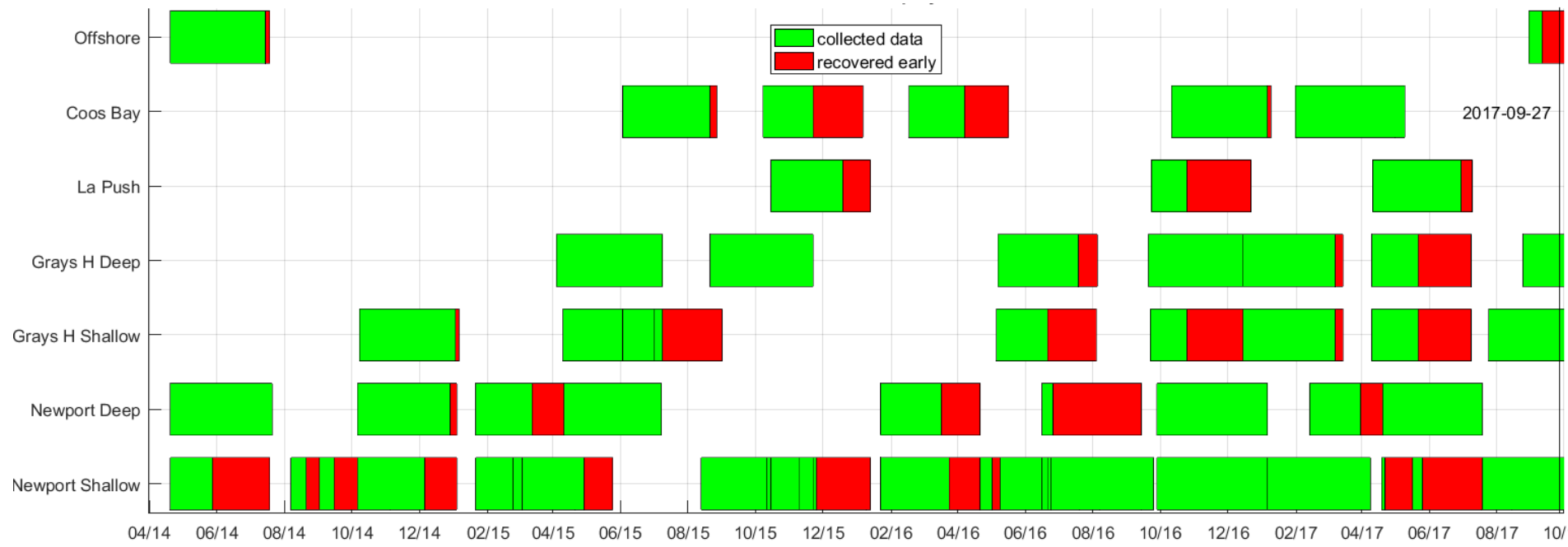
barth@coas.oregonstate.edu   edever@coas.oregonstate.edu  
jfram@coas.oregonstate.edu



# Endurance Array Glider Coverage

Since May 2017 meeting:

- Two full deployments completed
- Three gliders deployed and at sea operating normally
- Four gliders stopped early
  - Two stuck under Columbia River Plume
  - One forward compartment leak
  - One lost—power failure

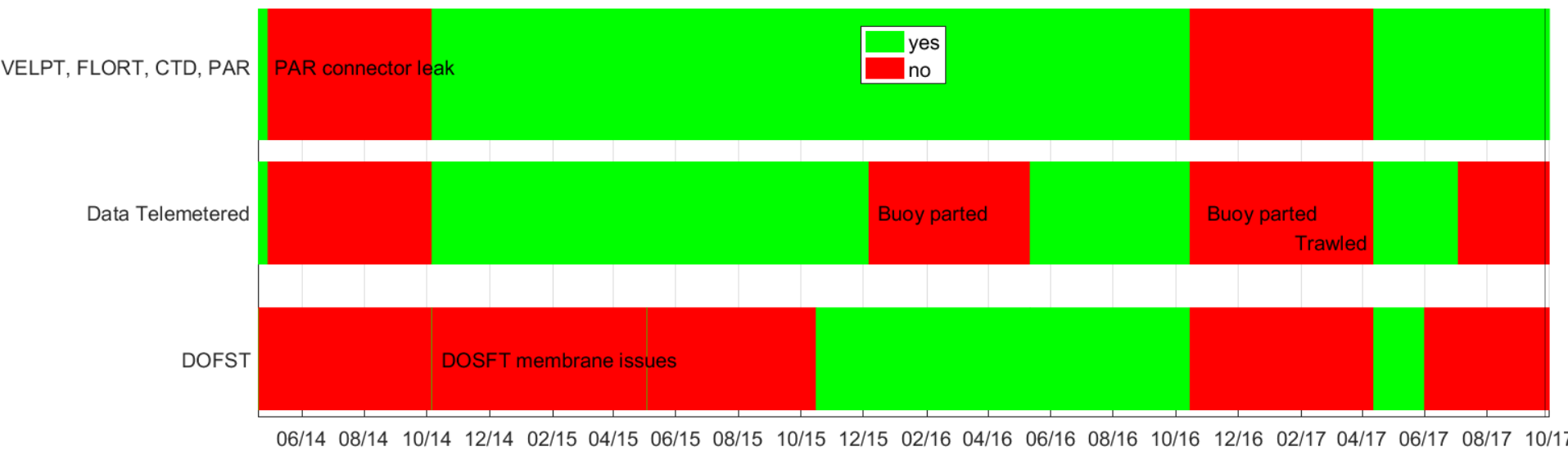


# Offshore Washington

## Wire Following Profiler (CE09OSPM)

Since May 2017 meeting:

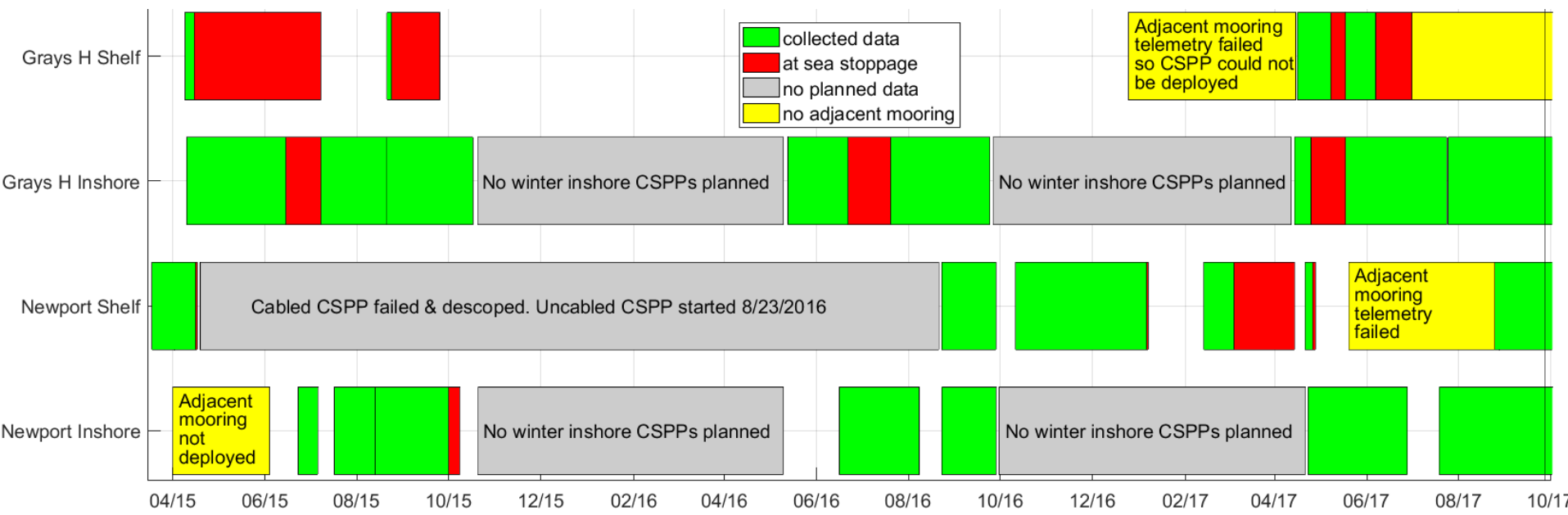
- Twice stronger stretch hose procured for Fall 2017 deployment to prevent buoy from parting again
- Oxygen sensor stopped working on deployed unit (June)
- Telemetry turned off to conserve power (July)
  - Will be upgraded with larger battery bay this winter
- Replacement unit received for lost unit (September)
  - Has larger battery bay, so it will be able to complete and telemeter 4 profiles a day for 7 months



# Coastal Surface Piercing Profiler (CSPP)

Since May 2017 meeting:

- Two full deployments completed
- Three units currently operating normally
- One deployment stopped early due to bad cable
  - Cable vendor acknowledged delivering a bad batch of cables due to redesign when attempting RoHS compliance
- No deployment at WA Shelf because solar panels on adjacent surface mooring failed, so it does not have the power to telemeter acoustically to a profiler
- Failed deployment at OR Shelf, then recovery delayed because anchor recovery system failed, then recovered with ROV, then deployment delayed for adjacent mooring telemetry troubleshooting



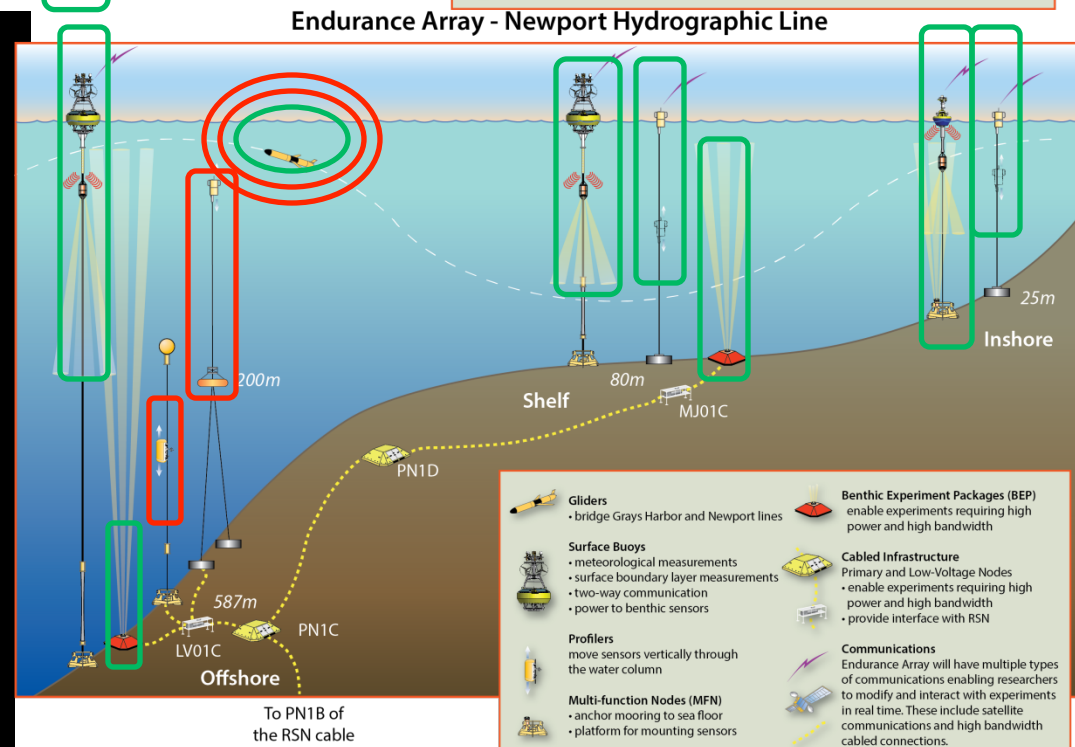
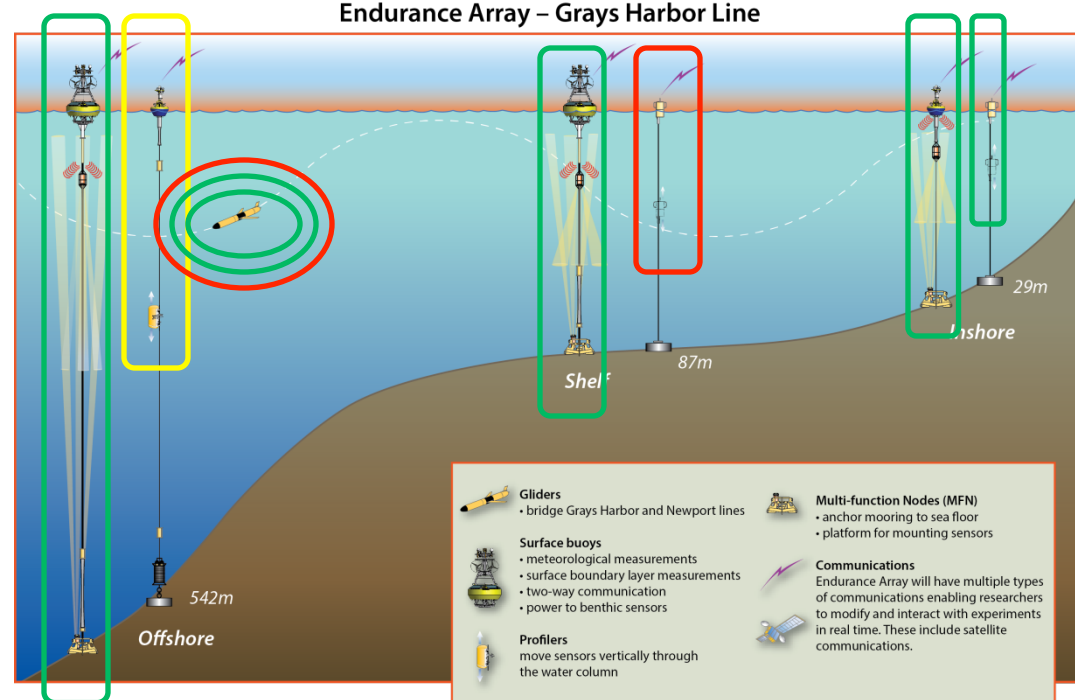
# Endurance Array Platform Status

**Operating**

**Not telemetering, but sampling**

**Not deployed or not working**

- All deployed platforms deployed with full complement of instruments.
- Of telemetering uncabled platforms, 12 of 166 instruments not working.



**Not telemetering, but sampling**

- CE01ISSM NUTNR, NSIF VELPT, ZPLSC, VEL3D, buoy CTD, FLORT, MFN ADCP, PCO2W, PHSEN, PRESF
- CE06ISSM buoy CTD, FLORT, ZPLSC, ADCP, PCO2W, PHSEN, PRESF, VEL3D

**Reduced sampling**

- CE09OSPM all
- CE07SHSM

**Deployed, failed**

- CE01ISSM MFN CTD
- CE02SHSM FDCHP, NUTNR
- CE04OSSM ADCP
- CE06ISSM VEL3D
- CE07SHSM NSIF ADCP, CAMDS
- CE09OSSM MFN PCO2W, CAMDS, OPTAA
- CE09OSPM DOFST

# Weekly Status Logging Started Spring 2017

## Since May meeting:

- CI is reporting status of what is getting through to the GUI (August)
- Monthly historic EA status delivered to OOIFB (July)
- Need OOI-wide agreement on status
- OOI-wide operator log should be in one searchable place

[illegible]

# Notable Technical Progress

- New stretch hose design deployed spring 2017
  - All currently deployed stretch hoses 100% operational
- Electronics with new titanium connectors & hardware recovered spring 2017.
  - No leaks.
- NUTNR: ISUS being replaced with SUNA V2 for all deployments starting spring 2018.
  - First article to be deployed fall 2017
- UV antifouling on DOSTA & CAMDS testing fall 2017
  - Will evaluate in November
- Spare electronics to be received fall 2017
  - More reliability, less schedule pressure
- Redesigned wind turbines to be installed this fall
- Station Papa cruise delayed and mobilization moved from Newport to Oakland
  - Cruise accomplished by WHOI and OSU successfully and under budget
- All telemetered data available on internal ERDDAP server
  - Will be utilized by OMS++

# Challenges

- Instruments
  - Continued CAMDS problems. Only one working.
  - OPTAA service continues to be slow. Will be three short this fall. SeaBird recently hired additional technicians.
  - Problems with other instruments mitigated or on path to resolution
- Heavy Lift Winch
  - Failed last spring. Will have to recover 3 anchors from last spring on this fall's cruise.
  - Electronics now powered separately from mechanical part of winch. Monitoring power supply.
  - Repaired. Spare parts procured.
- Attempted ROV recovery of three orphaned anchors deployed in 2015 and spring 2016 at Washington Inshore site. All buried in sand.
- Now that stretch hoses and electronics are working, we are now discovering power constraints. May need to adjust sampling.
- Transition
  - Need clarity on long-lead item & service purchases that cross transition time boundaries



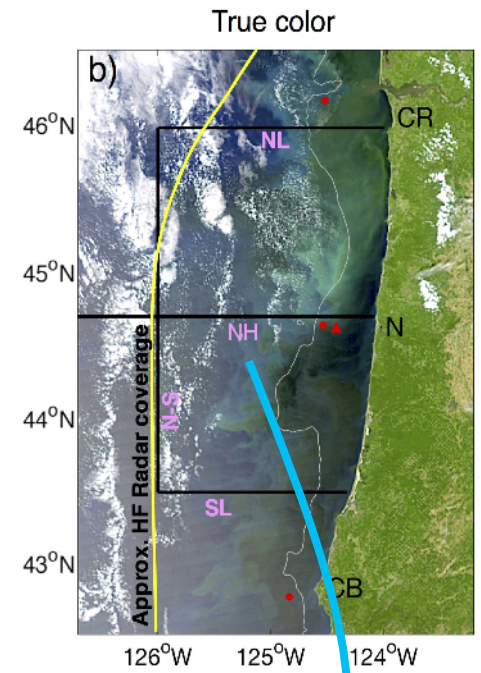
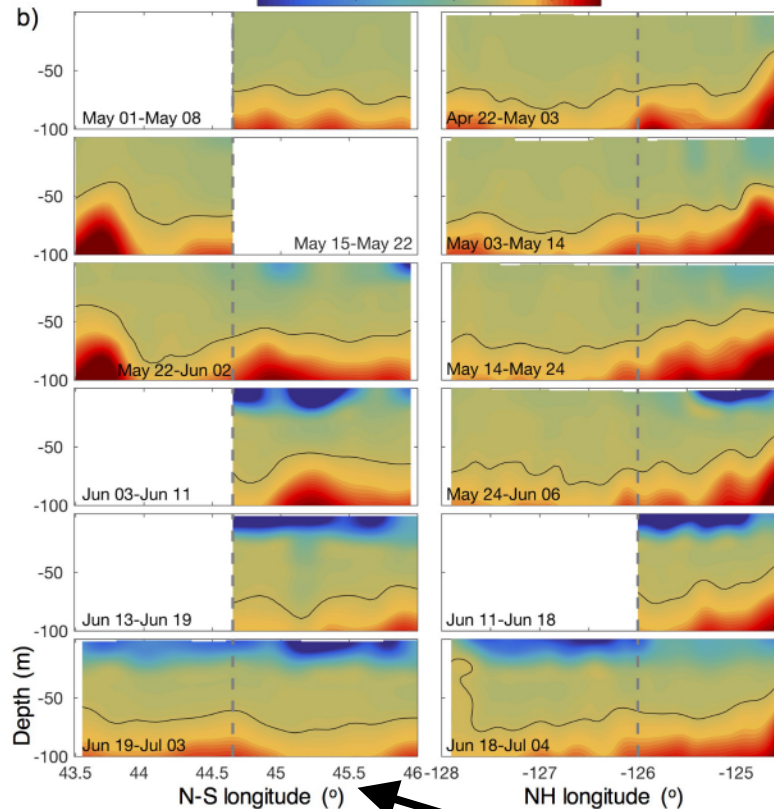
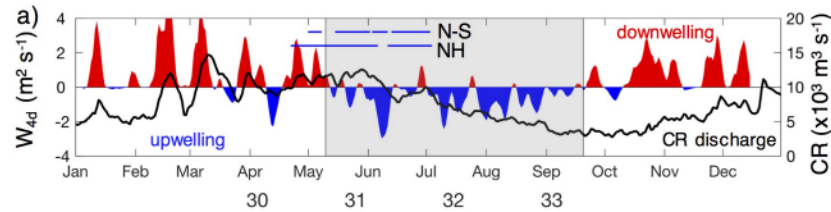
# Science Results

- Examples
  - OOI glider data used in study of Columbia River plume in PhD thesis of Gonzalo Saldias (OSU)
  - The Endurance array captured the August 21, 2017 eclipse; a lot of positive publicity
  - Oregon Department of Fish and Wildlife and Oregon State University scientists examining hypoxia and using OOI data
- Science Goals
  - The Endurance Array is meeting almost all of the OOI Science Requirements, but...
  - Data from this year are this month being ingested by Uframe for the first time, so EA data have been available only through NDBC & NANOOS

# "Structure and Variability of the Offshore Columbia River Plume"

Gonzalo Saldias (2017, OSU PhD thesis)

To be submitted to *Journal of Physical Oceanography*



Summer  
2014

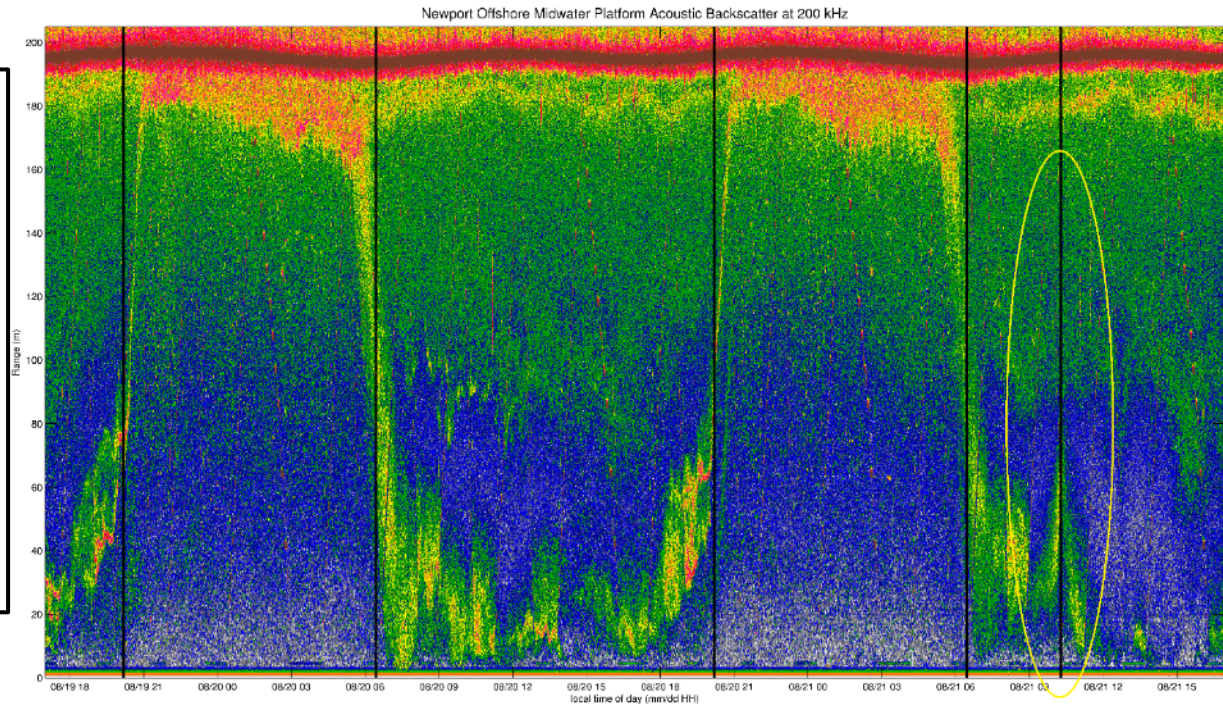
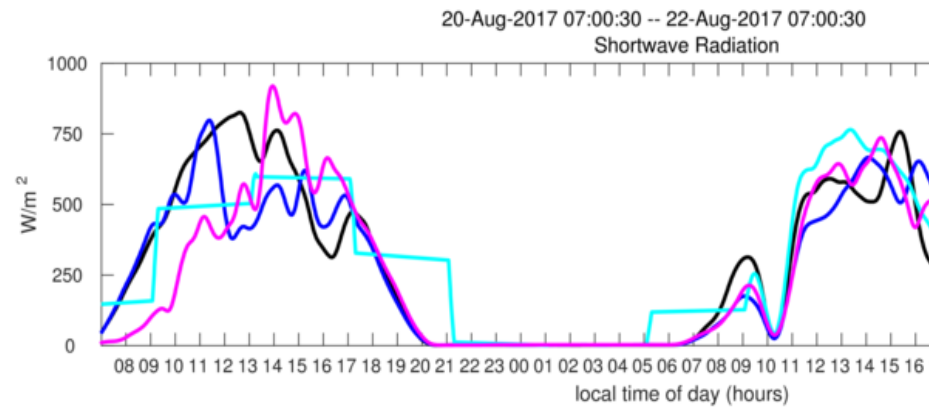
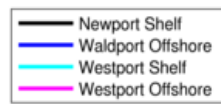
Salinity

Newport OOI  
glider line

alongshore OOI  
glider line

# August 21 2017 Eclipse

OOI's Engineering Change Request (ECR) process used to approve and execute the reprogramming of the Oregon Shelf and Offshore cabled bioacoustic sonars (CE02SHBP & CE04OSPS ZPLSCs) to run continuously before the recent eclipse



- Rich dataset for others to dig into: EA surface moorings and CSPPs increased sampling rates during the eclipse, a glider profiled adjacent CE02SHBP, four uncabled ZPLSCs operational
- Technical demonstration: CE01ISSP profiled during totality



# August 21, 2017 Eclipse



SUNNY 83° 55° 10:00 AM, 8:00 PM | SUNDAY, AUGUST 20, 2017 | gazettetimes.com



Jonathan Fram, assistant professor with the College of Earth, Ocean, and Atmospheric Sciences, stands near the body of a mooning similar to those Oregon State will let to gather data on how zooplankton act during an eclipse. It's just one of the many scientific experiments that will be carried out during the eclipse.

## The sun and the sea

Eclipse offers rich opportunity for scientific experiments

**JONATHAN FRAM**  
On July 26, 2017, Fram will be at the Oregon State University, where he will be carrying out his research on zooplankton and the effects of the eclipse on the ocean.

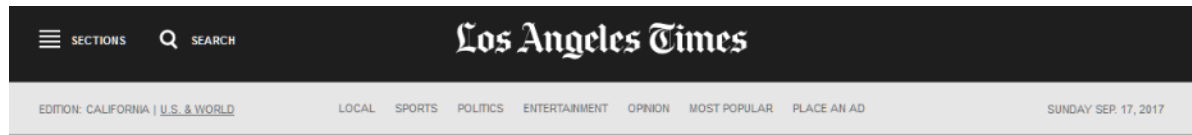
### INSIDE

Eclipse offers rich opportunity for scientific experiments. The eclipse will be at its peak at 10:00 a.m. on Monday, Aug. 21. The eclipse will be visible from the entire United States, including Oregon. The eclipse will be at its peak at 10:00 a.m. on Monday, Aug. 21. The eclipse will be visible from the entire United States, including Oregon.

is designed to reach heights of 80,000 feet and is one of the largest balloons in the world. It will be launched along the coast of the state by scientists from the University of Oregon. The balloon is intended to capture data on the effects of the eclipse on the ocean.

### COMING MONDAY

What is the first thing you will see when the eclipse begins? The first thing you will see is the sun. The sun will be visible through the clouds. The eclipse will be at its peak at 10:00 a.m. on Monday, Aug. 21. The eclipse will be visible from the entire United States, including Oregon.



Science / Science Now

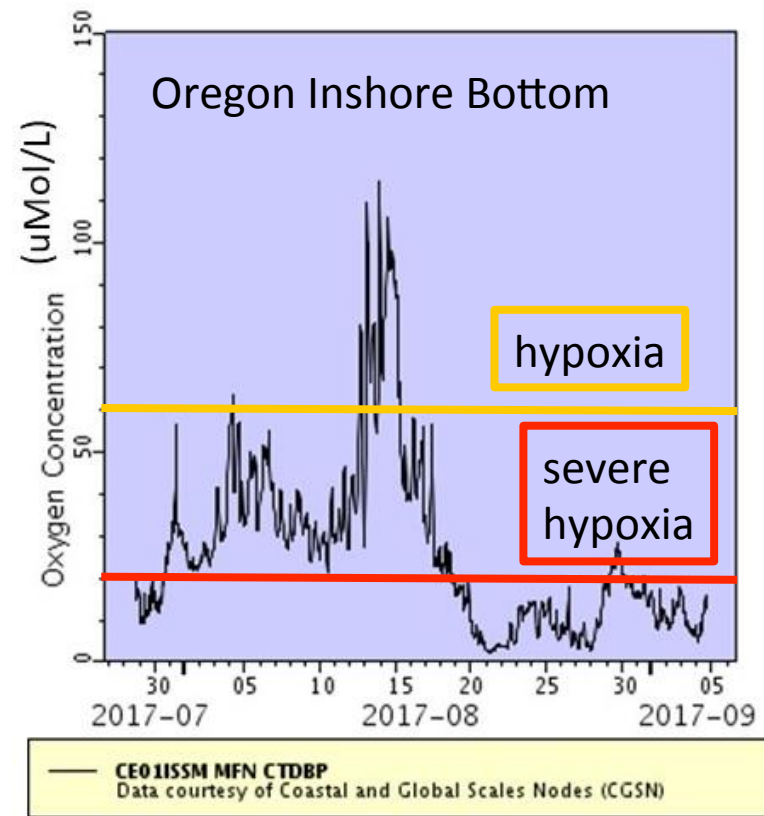
## Poor little zooplankton – they got totally punk'd by Monday's eclipse



In Case You Missed It

- Jon Fram's OOI talk for the OSU Eclipse Festival was picked up by media
  - Original reporting: LA Times, KLCC Oregon NPR, Corvallis Gazette Times, The Coastal Society, KXNU Eugene Country Radio, KEX Portland News Radio
- Same day results were picked up by the Associated Press, so this story appeared in many news outlets.

# HYPOXIA ON THE CENTRAL COAST



09.06.17

Towards the end of July, an oceanic buoy located in Cape Perpetua Marine Reserve showed a drop in ocean oxygen levels. Around the same time, about 20 miles north, ODFW Marine Program crab biologists pulled up a research crab pot filled dead crabs. The crab pot was equipped with a video camera and the biologists likely caught an oceanic phenomenon on camera – crabs succumbing to a low oxygen, or hypoxic, event. Hypoxia is when oxygen levels in the water drop below the level that can be fatal to many marine organisms, and occurs periodically off the Oregon coast.

