

NOAA FISHERIES

Pacific Northwest Ocean Observing: Current Successes, Future Challenges

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Two Weeks Ago - PSMFC Annual Meeting 2016

"What can we do to enhance our current survey capabilities?"

Challenges (Opportunities) – High Level

- Dealing with the "unexpected" (e.g., marine heat wave)
- Linking observations with process studies (e.g., Puget Sound coho in 2016 – we missed)
- Research to Operations (e.g., Salish Sea Marine Survival Project, Newport Line)
- Harnessing the power of 'omics' (e.g., eDNA)



Successes – High Level (not all)

- PNW HABs
- Ocean Acidification
- Telemetry
- Acoustics
- Partnership



Near-real time offshore monitoring data \rightarrow early warning of toxic HABs!



"Lab in a Can"

telebuoy electro-mechanical cable h parallel tube for pump system

ctic foam float (15 m)

The future is here!! (SBE MicroCat)

ESP (18 m)

stopper (20 m)

McLane profiler with CTD, DO, velocity, fluorescence, turbidity and SUNA nitrate sensors

telebuoy w/ cell modem ADCP

))))

buoy controller

inductive coupler (ICC)

stopper (85 m)

Benthos glass floats double ORE CART releases with recovery line canister

anchor

100 m



Ocean Acidification

- Effective, sustained collaboration
- 3 legged stool of Obs/Lab/Modeling
- Why effective the three Cs Communication, Coordination, Collaboration
- Leads to leveraging existing resources
- Synergism from the close interactions among science teams



Acoustic Telemetry – Fish Tags





Moore et al. (Mar. Ecol. Prog. Ser. 2015)



Acoustics – Seafloor Mounted

Acoustics on gliders



Greene, C.H., E.L. Meyer-Gutbrod, L.P. McGarry, L.C. Hufnagle Jr., D. Chu, S. McClatchie, A. Packer, J.-B. Jung, T. Acker, H. Dorn, and C. Pelkie. 2014. A wave glider approach to fisheries acoustics: Transforming how we monitor the nation's commercial fisheries in the 21st century. Oceanography 27(4):168–174, http://dx.doi.org/10.5670/oceanog.2014.82.





125°W

120°W

Models: forward projections can provide adaptive sampling (predicted "optimal habitat" using SST, ChI and SSH)

Northward shift/extension of habitat, surveys and sampling in 2015





'Omics – Biotech for Environmental Intelligence

- Understanding *how* organisms adapt under rapidly changing conditions .
 - ✓ Genetic code has the information
 - \checkmark 'Omics technologies are the tools





Why is 'Omics Rapidly Emerging



Bioinformatics and enhancement of IT capabilities underpins the success of 'omics



'Omics to Support Ecosystem Understanding

Analytical 'omics – plankton community



Current – chlorophyll





ORHAB – Partnership at Core And Challenges

- 10 years to get to a point could develop a operational HAB early warning system
- A source of funds for operations BUT not perfect
- Demonstrating power of ESP when coupled with NANOOS assets
- No clear path to operationalize ESP



WRAPPING UP



'Wicked' Challenges

- Perpetual challenge in moving from proof of concept to sustained operations
- Surmounting the barriers to sustained collaboration across agencies/entities
- 'Boring is bad' (real impact of flat budgets)
- Promise of Ecosystem Based Management challenge is there is no single entity



MY PERSEPECTIVE

- Technology is not the issue
- The research is not the issue, most of the time
- The age old issue putting the technology in place for sustained use/benefit
- Current fiscal conditions making harder?
- Is the shift permanent?

