



# Ocean Monitoring Service Award

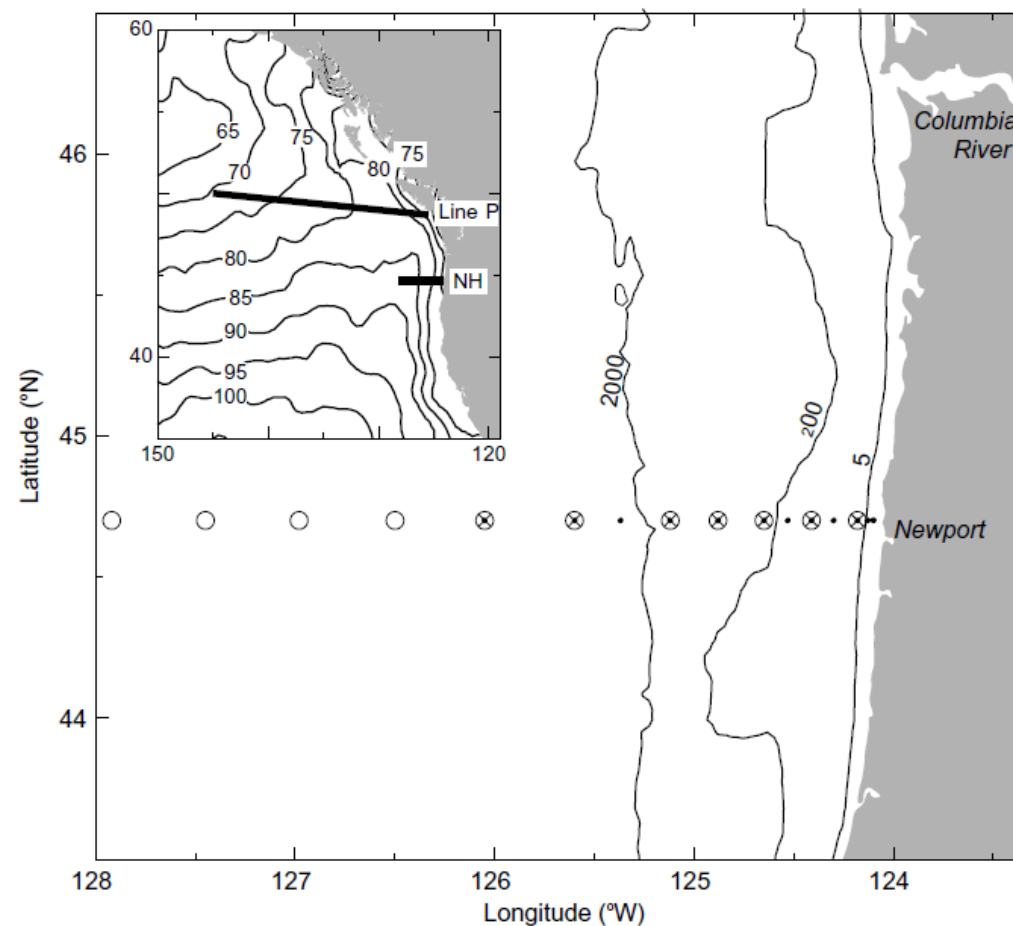
2017 POMA Award Recipient is:





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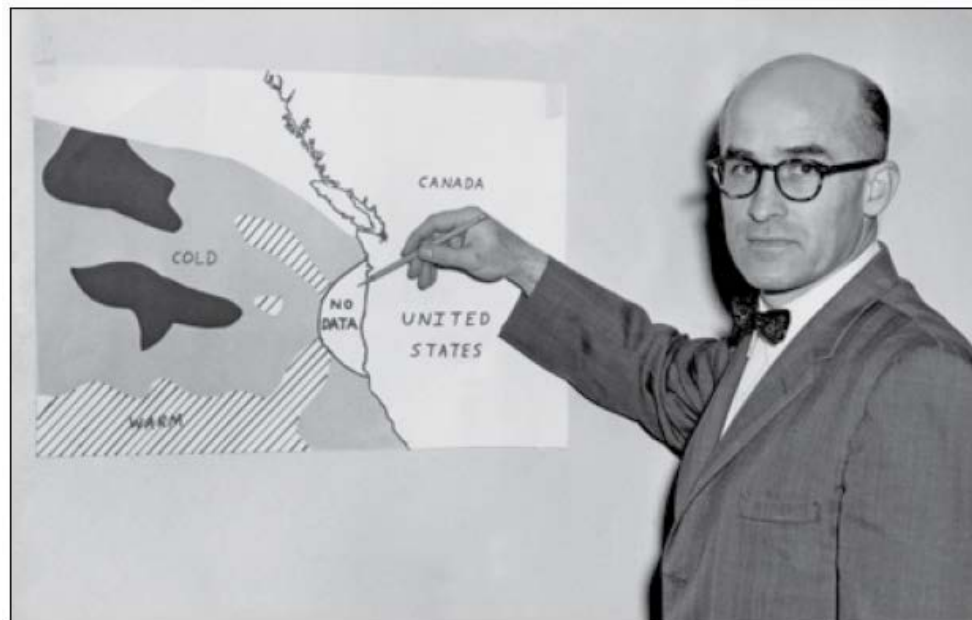
## Newport Hydrographic Line



Circles indicate TENOC stations (1961-1972); crosses and dots indicate LTOP CTD sampling and crosses indicate chlorophyll/nutrient rosette sampling.

## History of the Newport Hydrographic Line - 1

- The Newport Hydrographic (NH) Line sampling along latitude  $44^{\circ} 39.1'N$  can be divided into four time periods based on differences in sampling frequency, spatial extent, range of variables and measurement methods, and funding source



**Above: Wayne Burt, in 1958, with a chart of the Northeast Pacific Ocean, pointing out the absence of data off the Oregon coast.**

## History of the Newport Hydrographic Line - 2

- 1961-1972: “*The Next Ten Years of Oceanography*” (“TENOC”) era— bimonthly bottle sampling of temperature, salinity, and sometimes dissolved oxygen and nutrients out to 128W



**RV Acona at sea off Oregon, 1962.**  
*Courtesy OSU Ship Operations*



**Hanging a Nansen  
bottle from R/V  
Yaquina, 1967**  
*(D. Barstow Collection)*

## History of the Newport Hydrographic Line - 3

- 1972-1996: The “Process Study” era – strong seasonal info about upwelling made the NH line an ideal laboratory for the Coastal Upwelling Experiment and Coastal Upwelling Ecosystem Analysis programs (late 60’s to 70’s); the 1980s (except for 83) and early 1990s were very gappy on sampling



80 foot, R/V *Cayuse*  
(1968-)



Newport, with the historic  
Yaquina Bay Bridge in the  
background.  
*Courtesy OSU Ship Operations*

180 foot, 800-ton R/V *Yaquina*  
(1964-1976)

## History of the Newport Hydrographic Line - 4

- 1996-2004 The GLOBEC LTOP era (LTOP = “Long Term Observation Program”)—biweekly (spring through autumn) to monthly (winter) sampling along NH; station spacing was closer over the continental shelf; and many more variables were measured (targeting bacteria, phyto, micro, and zooplankton, forage fish, predatory fish, cetaceans and seabirds); ship obs supplemented by fixed moorings, CODAR, and satellite sensing)



177 foot, R/V *Wecoma*  
(1976-2012)

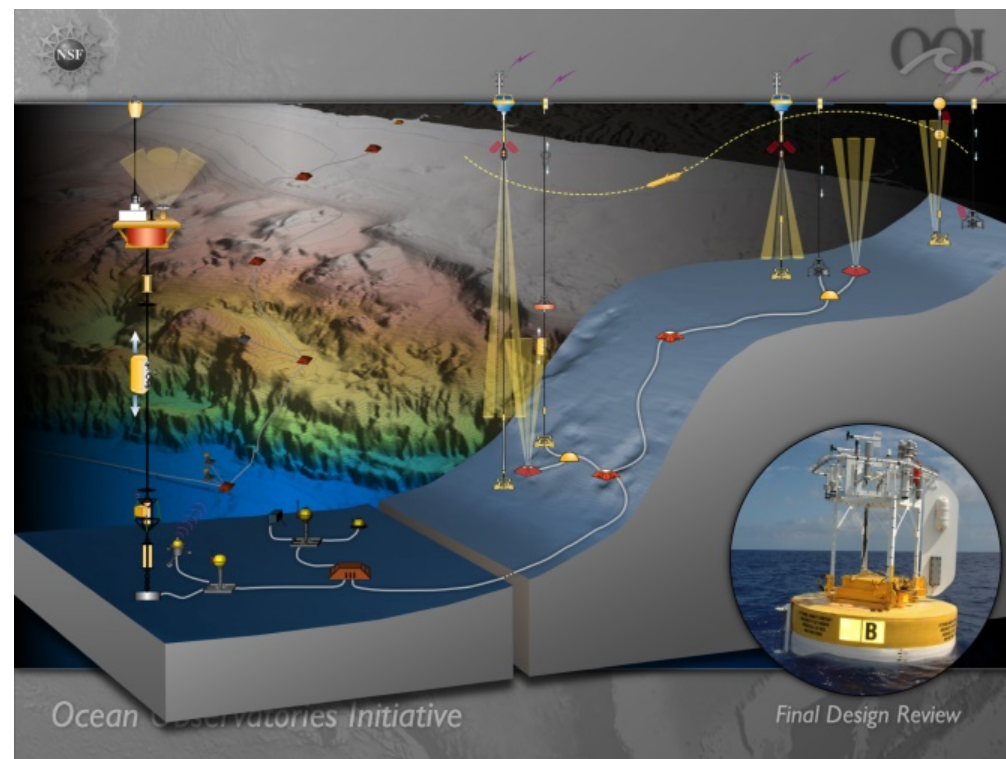




## History of the Newport Hydrographic Line

- 2004-present “Gliders and Ocean Observatories” era—the historical data from NH Line led to successful Ocean Observatories Initiative (OOI) along NH Line with multiple instrumented buoys, bottom platforms (connected to powered underwater cables); fleets of gliders, etc.

Time series of taxon resolved zooplankton and fish must still be done from vessels.







# Scientific Impact Highlights

## Location and Spacing

- **The NH Line fills a gap between three other longer established multi-disciplinary monitoring efforts:**
  - Line P/Stn P (1956- ) – off Southern Vancouver Island
  - Vancouver Island Continental Margin (1979- )
  - CalCOFI (1951- ) – Southern California Bight
- **NH Line is the only one providing high frequency (biweekly-monthly) sampling**
- NH Line provides data for analysis of:
  - Within year upwelling, El Nino/La Nina events, PDO decadal variability
- NH Line is in a region sensitive to the PDO variability



# Scientific Impact Highlights

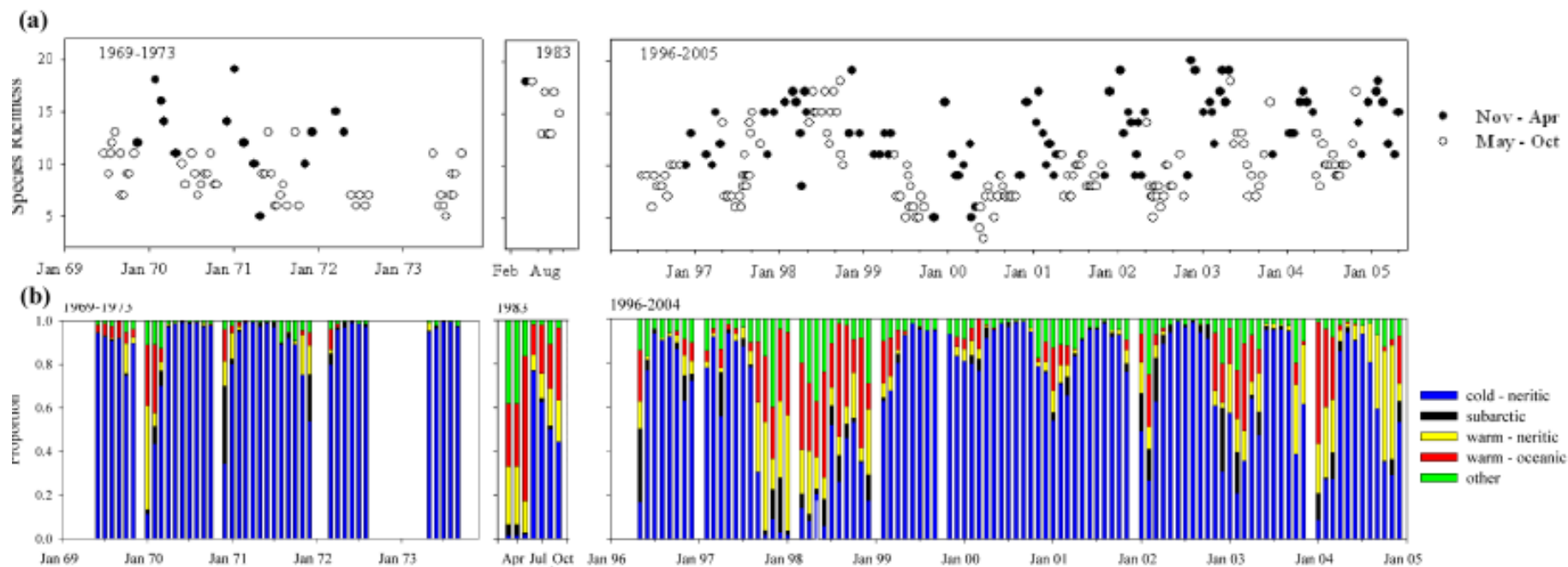
## Comparisons with Other Regions

- Between region comparisons within a single paper or book  
28+ published papers
- Analyses/descriptions of conditions off central Oregon, that with other regional papers, for journal Special Issues on cross-region comparisons 14+ published papers

In both of the above, the high spatial and temporal resolution of the NH Line enhanced their value in comparative studies.

# Scientific Impact Highlights

## NH Line Zooplankton Time Series (32+ papers)



*Time series of copepod species richness (top panel) and zoogeographic affinity (bottom panel) off Newport, showing winter (and warm year) dominance by southern taxa, summer (and cool year) dominance by northern taxa. Data shown is from NH5 (5 miles from shore). Adapted from Hooff and Peterson (2006).*



# Scientific Impact Highlights

## Applications to Prediction of Fish Recruitment (23+ papers)

Since 2006, the NWFSC has produced annual stoplight charts that characterize a suite of past years environments as good (green), neutral (yellow) or poor (red) and qualitatively forecast returns of coho (1 yr advance) and chinook (2 yr advance) salmon.

The basis of forecasts are easily communicated to managers and clients.

	Juvenile Migration Year				Adult Return Outlook	
	2013	2014	2015	2016	coho 2017	Chinook 2017
Large– scale ocean and atmospheric indicators						
<a href="#">PDO (May - Sept)</a>	■	■	■	■	●	●
<a href="#">ONI (Jan - Jun)</a>	■	■	■	■	●	●
Local and regional physical indicators						
<a href="#">Sea surface temperature</a>	■	■	■	■	●	●
<a href="#">Deep water temperature</a>	■	■	■	■	●	●
<a href="#">Deep water salinity</a>	■	■	■	■	●	●
Local biological indicators						
<a href="#">Copepod biodiversity</a>	■	■	■	■	●	●
<a href="#">Northern copepod anomalies</a>	■	■	■	■	●	●
<a href="#">Biological spring transition</a>	■	■	■	■	●	●
<a href="#">Winter ichthyoplankton biomass</a>	■	■	■	■	●	●
<a href="#">Winter ichthyoplankton community</a>	■	■	■	■	●	●
<a href="#">Juvenile Chinook salmon catch – June</a>	■	■	■	■	●	●
<a href="#">Juvenile coho salmon catch – June</a>	■	■	■	■	●	●

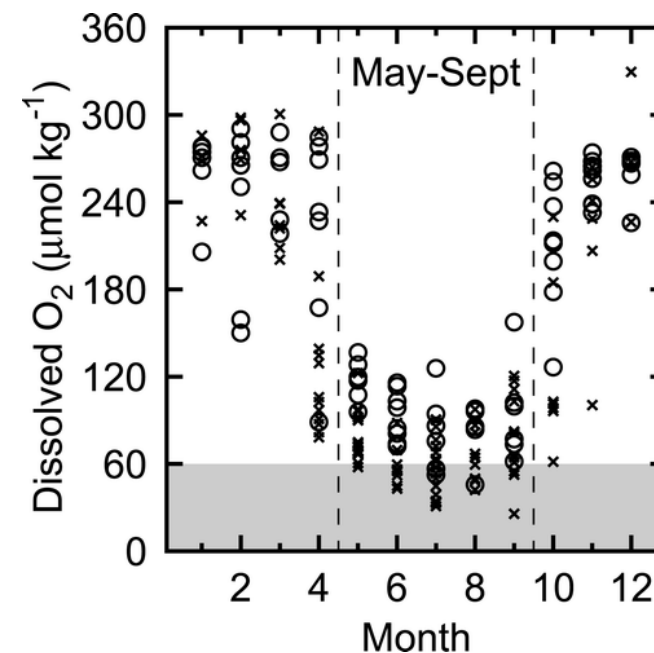
Key	■ good conditions for salmon	● good returns expected
	■ intermediate conditions for salmon	● intermediate returns expected
	■ poor conditions for salmon	● poor returns expected



# Scientific Impact Highlights

## Other Major Science Contributions

- Importance of seasonal phenology in upwelling system (13+ papers)
- Continental margin hypoxia and anoxia (8+ papers or book chapters)
- Providing time-series and derived climatologies for initializing, validating or constraining numerical models (8+ papers)
- Education and Mentoring—trained many OSU students, some who have contributed to time series elsewhere.



Monthly near-bottom oxygen at NH-5 from 1960–71 (open circles) and 1998–2009 (x's). Seasonality follows upwelling season. Gray shading indicates hypoxia. From Pierce et al. 2012



## Scientific Impact Highlights

Since 1967 and continuing to 2017, research conducted and data collected along the Newport Hydrographic line has been integral to >120 publications.





# A Few of the Participants Contributing to NH Line





**In memoriam**  
**William T. Peterson**  
**1942-2017**