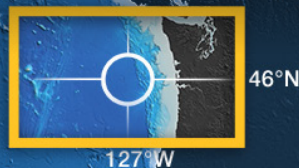


# OOI Coastal Endurance Array

Washington Line - 47°N, 128°W to coast  
Oregon Line - 44° 35'N, 128°W to coast  
Depth Range - 25-600 meters



## Scientific Motivation

Located in the Northeast Pacific Ocean off the coasts of Oregon and Washington, the Endurance Array is designed to capture inter-annual (e.g. El Niño-Southern Oscillation) and decadal (e.g. Pacific Decadal Oscillation) variability of ocean properties across a range of temporal and spatial scales. Its observations examine human and ocean health issues, including hypoxic and anoxic events, increasing ocean acidification, and harmful algal blooms.

Instrumented fixed and mobile platforms over the continental shelf and slope examine wind-driven upwelling and downwelling dynamics as well as the Columbia River plume. These Northeast Pacific waters are home to a diverse range of profitable fisheries that rely on nutrients upwelled into the euphotic zone to drive phytoplankton production.

## Design

The Endurance Array has two mooring lines, the Oregon Line, off the coast of Newport, Oregon and the Washington Line, off Grays Harbor, Washington. The site of the Oregon Line was selected for its proximity to the historic Newport Hydrographic Line that has been sampled regularly since 1961. The Washington Line was selected to provide a companion line to the north. Both areas are influenced by the nearby Columbia River plume, the largest source of freshwater to the US west coast.

Underwater glider observations (dashed lines) span 500 km from northern Washington (~48°N) to Coos Bay, Oregon (~43°N) as they sample along five east-west transects from 20 m isobaths to 126°W (out to 128°W on the transects off the Oregon and Washington Lines) and one north-south transect along 126°W.

*The Endurance Array is part of a broader regional observatory network that includes the OOI Cabled Array, the OOI Station Papa Array co-located with a NOAA Pacific Marine Environmental Laboratory (PMEL) Surface Buoy, and Ocean Networks Canada.*

### Oregon Line

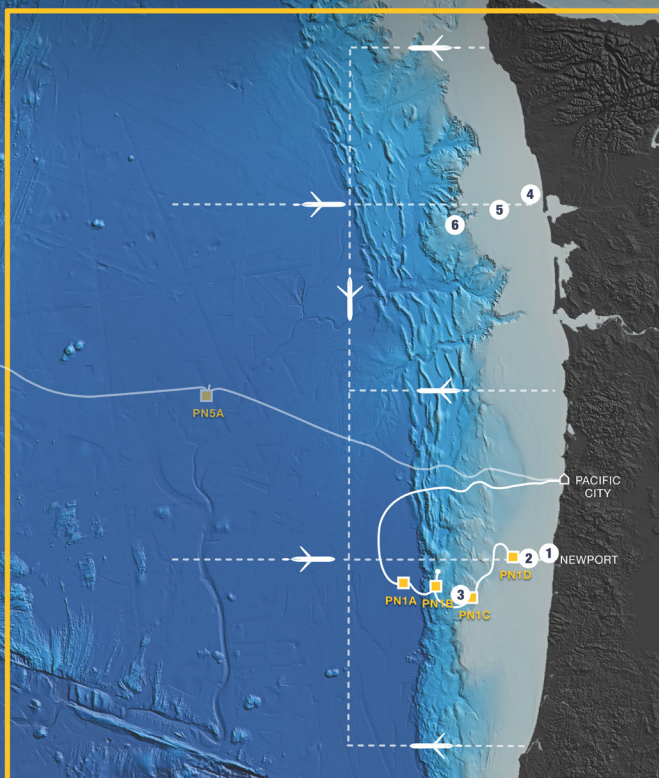
- 1 Oregon Inshore Surface Mooring  
Oregon Inshore Surface Piercing Profiler Mooring
- 2 Oregon Shelf Cabled Benthic Experiment Package  
Oregon Shelf Surface Mooring  
Oregon Shelf Surface Piercing Profiler Mooring
- 3 Oregon Offshore Cabled Benthic Experiment Package  
Oregon Offshore Cabled Deep Profiler Mooring  
Oregon Offshore Cabled Shallow Profiler Mooring  
Oregon Offshore Surface Mooring

### Washington Line

- 4 Washington Inshore Surface Mooring  
Washington Inshore Surface Piercing Profiler Mooring
- 5 Washington Shelf Surface Mooring  
Washington Shelf Surface Piercing Profiler Mooring
- 6 Washington Offshore Profiler Mooring  
Washington Offshore Surface Mooring

### Mobile Assets

■ Primary Node / Cable ▲ Shore Station



Each of the Endurance Array mooring lines have three sites (white circles) located in distinct regions:

“Inshore” on the inner shelf (1,4)

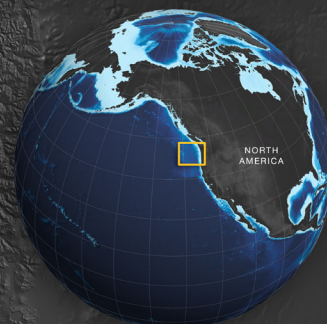
- (~25–30 m water depth
- 4–6 km from shore

“Shelf ” (2,5)

- ~80–90 m depth
- 20–30 km from shore

“Offshore” on the slope (3,6)

- ~500–600 m depth
- 60–65 km from shore



# Coastal Endurance Array Platforms & Instruments

## Coastal Gliders

Instrument	Data Products
CTD	Salinity, Temperature, Depth, Density
Dissolved Oxygen	Dissolved Oxygen Concentration
3-Wavelength Fluorometer	Chlorophyll, CDOM, Optical Backscatter
PAR	Photosynthetically Active Radiation
ADCP	Water Velocity Profile

## Cabled Deep Profiler Mooring

Instrument	Data Products
CTD	Salinity, Temperature, Depth, Density
Dissolved Oxygen	Dissolved Oxygen Concentration
2-Wavelength & CDOM Fluorometers	Chlorophyll, CDOM, Optical Backscatter
3-D Single Point Velocity Meter	Turbulent Point Water Velocity

## Cabled Shallow Profiler Mooring

Instrument	Data Products
Bio-acoustic Sonar	Multi-frequency Acoustic Backscatter
CTD	Salinity, Temperature, Depth, Density
Dissolved Oxygen	Dissolved Oxygen Concentration
3-Wavelength Fluorometer	Chlorophyll, CDOM, Optical Backscatter
Spectral Irradiance	Downwelling Irradiance
Nitrate	Nitrate Concentration
PAR Sensor	Photosynthetically Active Radiation
Seawater pCO <sub>2</sub>	Partial Pressure of CO <sub>2</sub>
Seawater pH	pH
Spectrophotometer	Optical Absorption & Attenuation
Single Point Velocity Meter	Mean Point Water Velocity

## Cabled Benthic Experiment Packages (BEPs)

Instrument	Data Products
Bio-acoustic Sonar*	Multi-frequency Acoustic Backscatter
CTD	Salinity, Temperature, Depth, Density
Digital Still Camera	Still Image
Dissolved Oxygen	Dissolved Oxygen Concentration
Broadband Hydrophone	Acoustics Pressure Waves & Frequency
Seawater pCO <sub>2</sub>	Partial Pressure of CO <sub>2</sub>
Seawater pH	pH
Spectrophotometer	Optical Absorption & Attenuation
ADCP	Water Velocity Profile
3-D Single Point Velocity Meter	Turbulent Point Water Velocity

\*only located on the Oregon Shelf BEP

## Coastal Surface-Piercing Profiler Moorings

Instrument	Data Products
CTD	Salinity, Temperature, Depth, Density
Dissolved Oxygen	Dissolved Oxygen Concentration
3-Wavelength Fluorometer	Chlorophyll, CDOM, Optical Backscatter
Spectral Irradiance	Downwelling Irradiance
Nitrate	Nitrate Concentration
PAR	Photosynthetically Active Radiation
Spectrophotometer	Optical Absorption & Attenuation
Single Point Velocity Meter	Mean Point Water Velocity

## Coastal Surface Moorings

Instrument	Data Products
Air-Sea Interface pCO <sub>2</sub> *	Partial Pressure of CO <sub>2</sub> in Atmosphere & Surface Seawater, Air-Sea CO <sub>2</sub> Flux
Bio-acoustic Sonar^	Multi-frequency Acoustic Backscatter
CTD	Salinity, Temperature, Depth, Density
Digital Still Camera^	Still Image
Dissolved Oxygen	Dissolved Oxygen Concentration
3-Wavelength Fluorometer	Chlorophyll, CDOM, Optical Backscatter
Spectral Irradiance	Downwelling Irradiance
Meteorological Instrument Package*	Water Temperature & Salinity, Precipitation, Atmospheric Pressure, Air-Sea Heat Flux, Wind Velocity, Humidity, Air Temperature, Downwelling Longwave & Shortwave Irradiance
Nitrate	Nitrate Concentration
Direct Covariance Flux%	Air-Sea Heat Flux, Wind Velocity, Air Temperature
Seafloor Pressure^	Seafloor Pressure
Seawater pCO <sub>2</sub> ^	Partial Pressure of CO <sub>2</sub>
Seawater pH	pH
Surface Wave Spectra*	Wave Properties
Spectrophotometer	Optical Absorption & Attenuation
ADCP	Water Velocity Profile
Single Point Velocity Meter	Mean Point Water Velocity
3-D Single Point Velocity Meter^	Turbulent Point Water Velocity

^only on WA Inshore, Shelf, & Offshore and OR Inshore

\*only on WA Shelf & Offshore and OR Shelf & Offshore

% only on OR Shelf

## Coastal Profiler Mooring

Instrument	Data Products
CTD	Salinity, Temperature, Depth, Density
Dissolved Oxygen	Dissolved Oxygen Concentration
3-Wavelength Fluorometer	Chlorophyll, CDOM, Optical Backscatter
PAR Sensor	Photosynthetically Active Radiation
3-D Single Point Velocity Meter	Turbulent Point Water Velocity