Evaluating Ocean Acidification and Hypoxia in Oregon under the Clean Water Act

Lesley Merrick
Oregon Department of Environmental Quality
NOAA Science Advisory Board Meeting - Case Study 1: Ocean Acidification and Hypoxia
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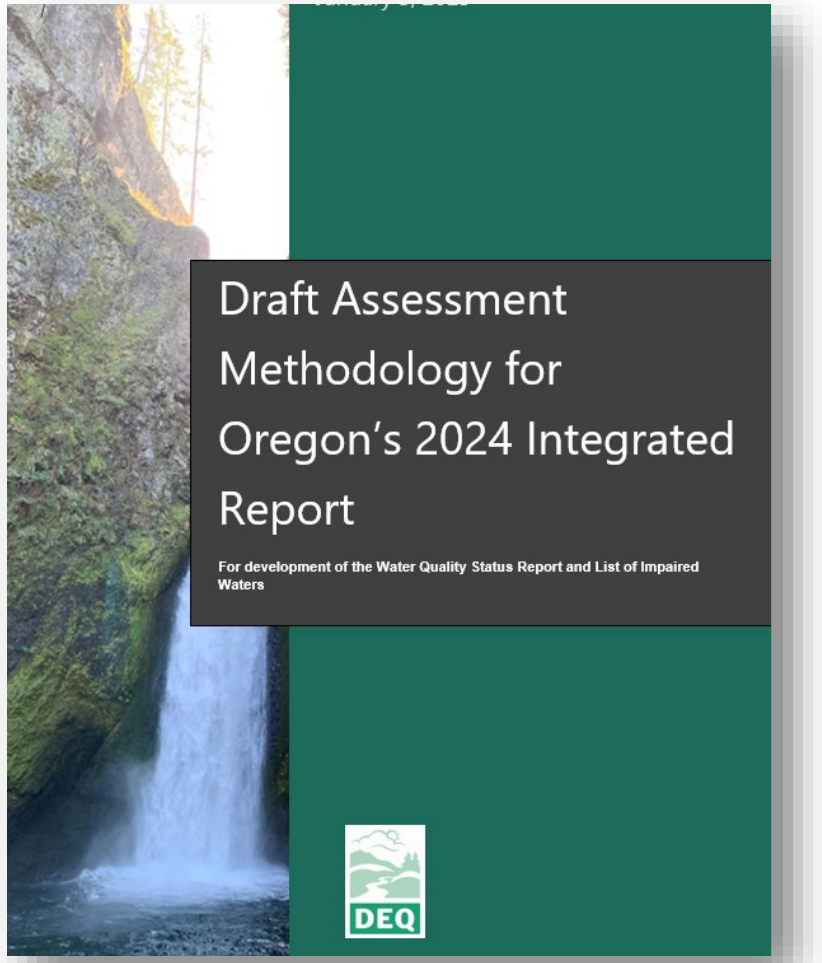
Translating science to policy

- Identification of impaired waters (303(d) list)
  - Require a plan to address the pollution
- Water Quality Assessment
  - Assessment Methodology
  - Assembly all readily available data
  - Report to U.S. EPA every 2 years
- Scientifically and technologically robust and defensible



2024 OAH Assessment Methodology

Our goal: Assess aquatic life beneficial use support within state waters (0-3 nautical miles)

Technical Workgroup assistance:

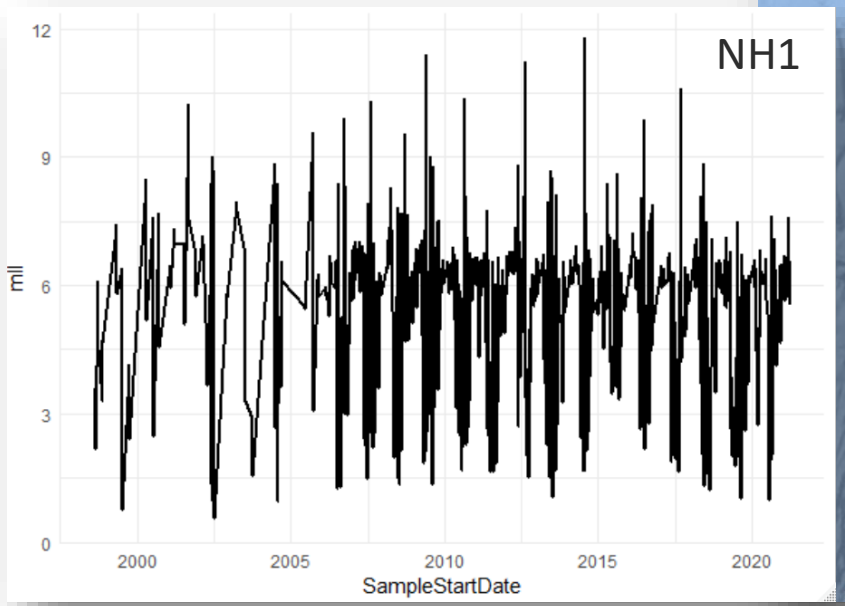
- Approach to incorporate multiple lines of evidence
- Identify suitable indicators of biological impact
- Recommend ecologically relevant assessment benchmarks
- Identify approaches to incorporate natural background condition

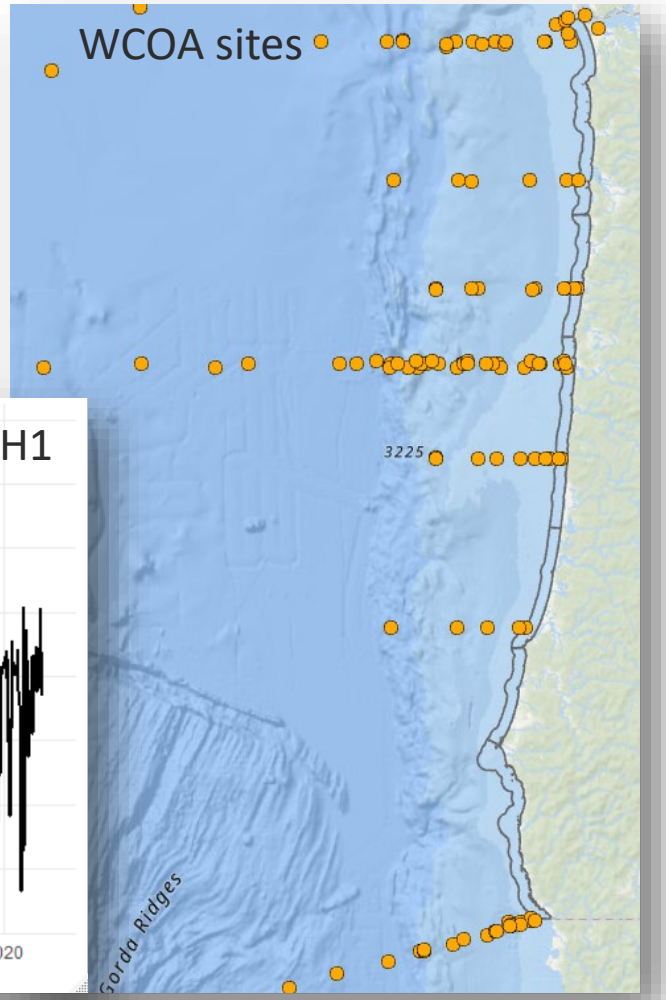
Released for public comment May 2023 – closed July 7, 2023

NOAA contributions to this effort

NOAA observational data

- Newport Hydrographic Line
  - Hypoxia assessment
  - decadal scale
- West Coast Ocean Acidification cruises
  - chemical
  - biological





NOAA research – Ocean Acidification

- Multiple lines of evidence approach
  - shell dissolution vs. Ω_{ar}
- Biologically relevant assessment benchmarks
- Natural background condition
  - pre-industrial estimations of carbonate chemistry

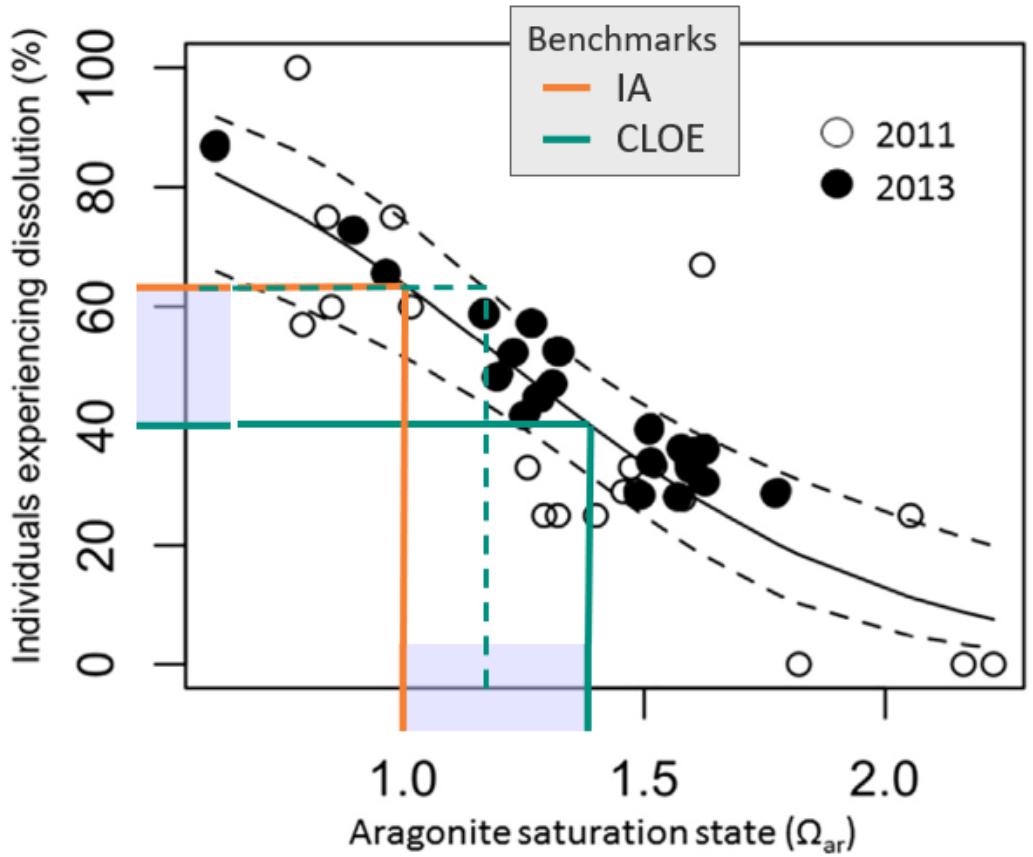


Figure adapted from Feely et al., 2016, modified to include assessment benchmarks

NOAA staff time

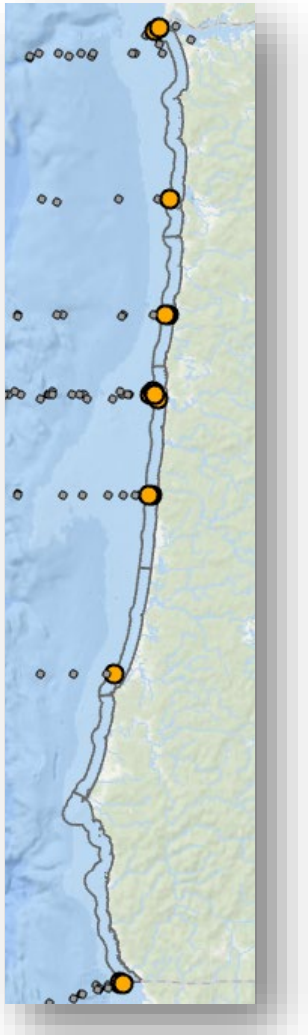
- Attended and participated in 12 meetings of DEQ's OAH technical workgroup
- Provided high quality detailed presentations on the state of the science and research findings
- Individual phone calls to answer specific technical questions
- Detailed review of the assessment methodologies and technical support document
- Agreed to continue to support DEQ efforts on OAH assessment

Recommendations for future efforts from a state perspective

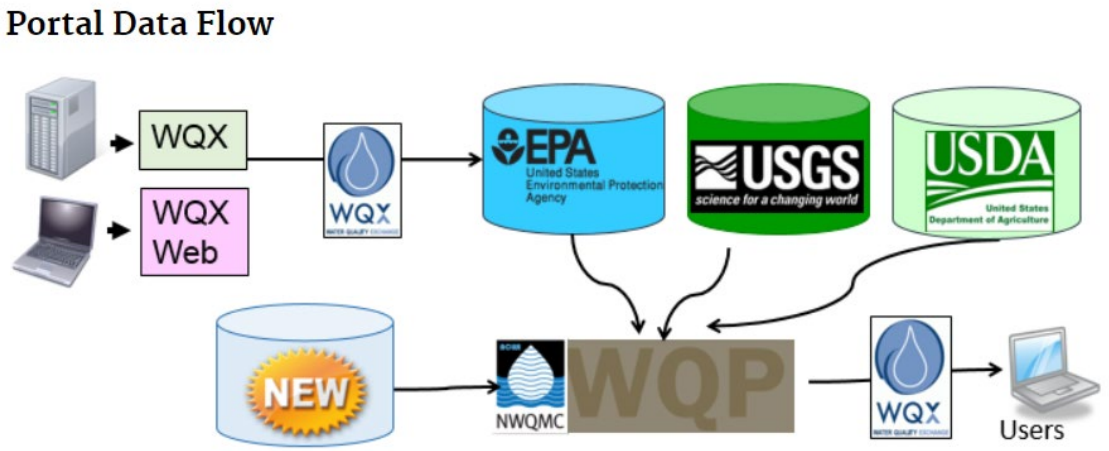
Data collection and accessibility

- Increase sampling (chemical and biological) in state waters

- Benefit to states
  - Greater confidence in the application of methodologies to state waters and characterization of conditions



- Data portal
  - Consistent format
- Benefit to states
  - Save time in data assembly and processing

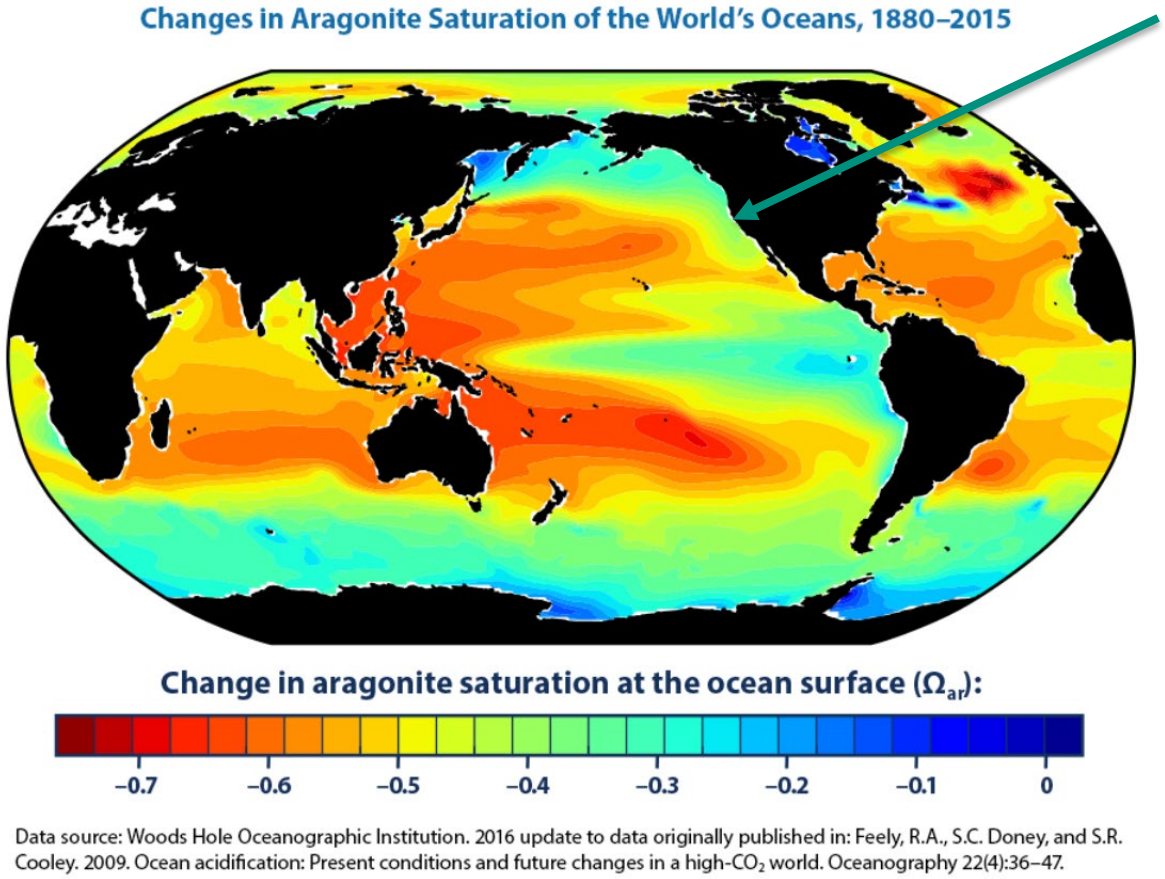


https://19january2017snapshot.epa.gov/waterdata/storage-and-retrieval-and-water-quality-exchange_.html

Extrapolation of regional estimates

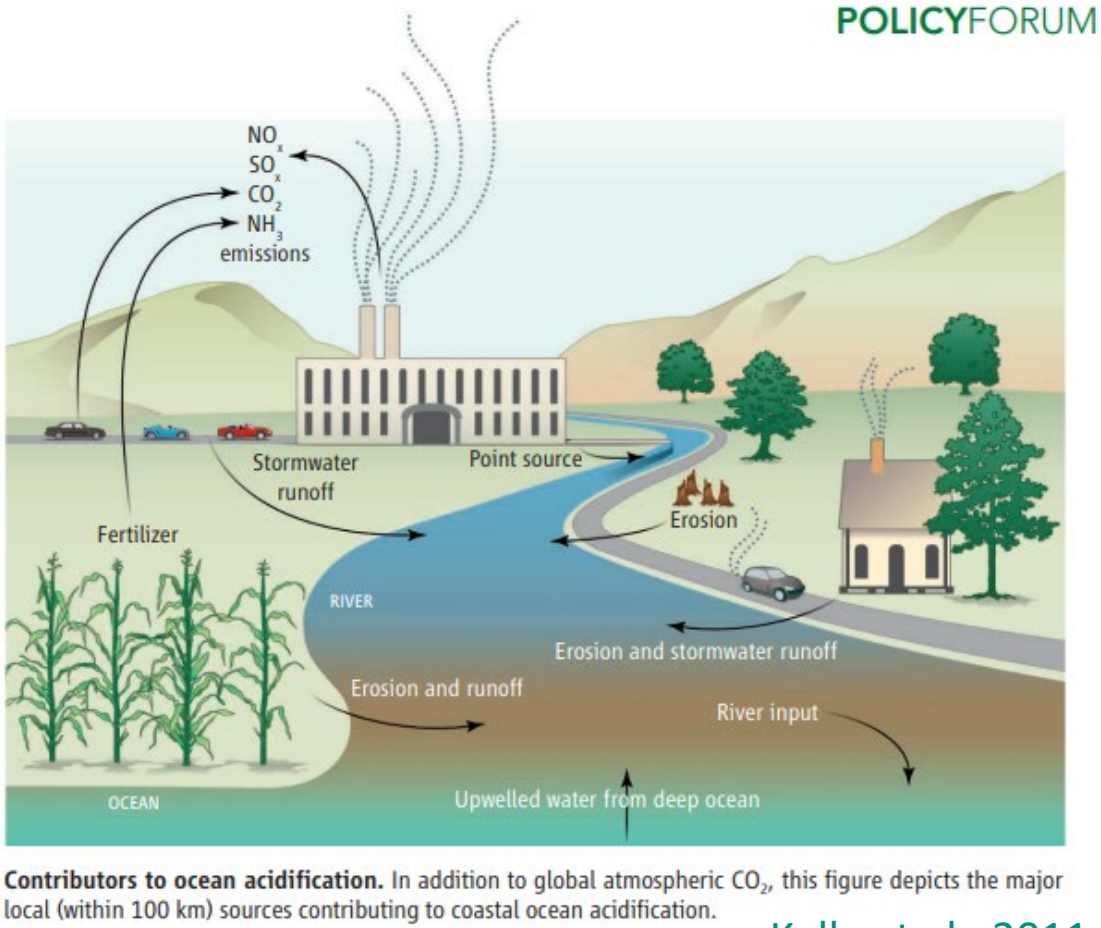
- Tools to apply regional estimates of pre-industrial conditions or natural background conditions at a local scale

- Benefit to states
  - Understanding of degree of change at a local level
  - Greater confidence in assessment conclusions



Source contribution – Stressor Identification

- Tools to identify relative source contribution for impaired marine waters
  - Global vs. local
- Benefit to states
  - Better management of local contributions to changing ocean conditions



Contributors to ocean acidification. In addition to global atmospheric CO_2, this figure depicts the major local (within 100 km) sources contributing to coastal ocean acidification.

Kelly et al., 2011

Thank you

- Contacts
  - Lesley Merrick
  - Kaegan Scully-Engelmeyer

- DEQ Water Quality Assessment Program
  https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx