



Pacific Northwest Harmful Algal Blooms Bulletin

Nov 6, 2023 HAB risk =

HAB risk key:

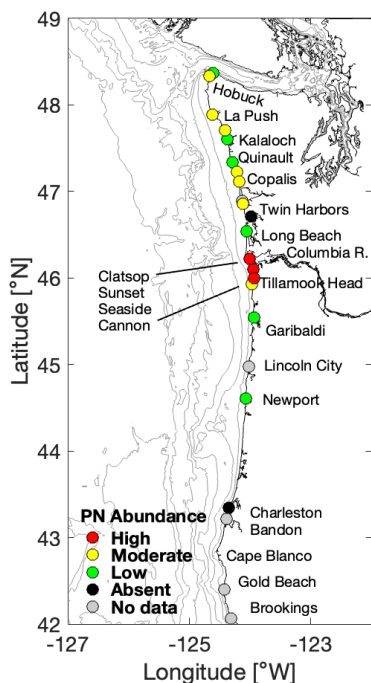
- = low
- = medium
- = high



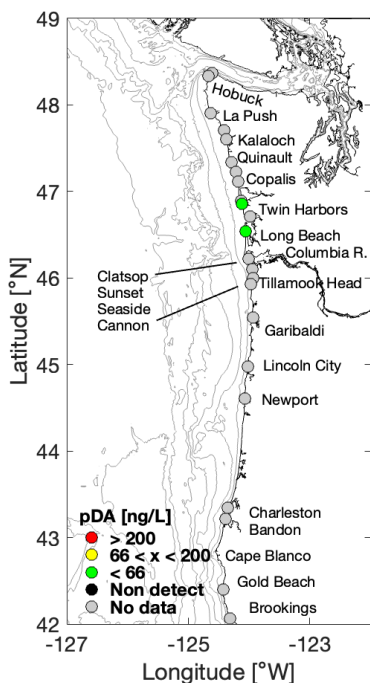
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

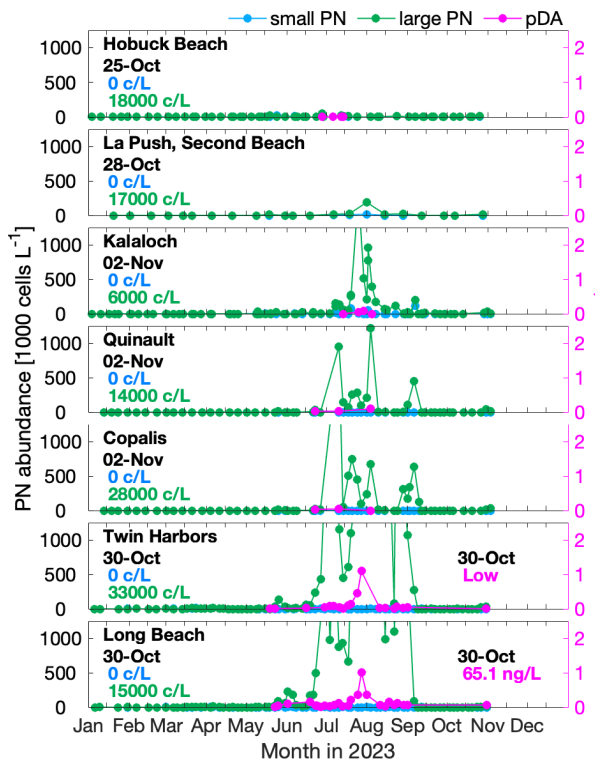
(*Pseudo-nitzschia*)



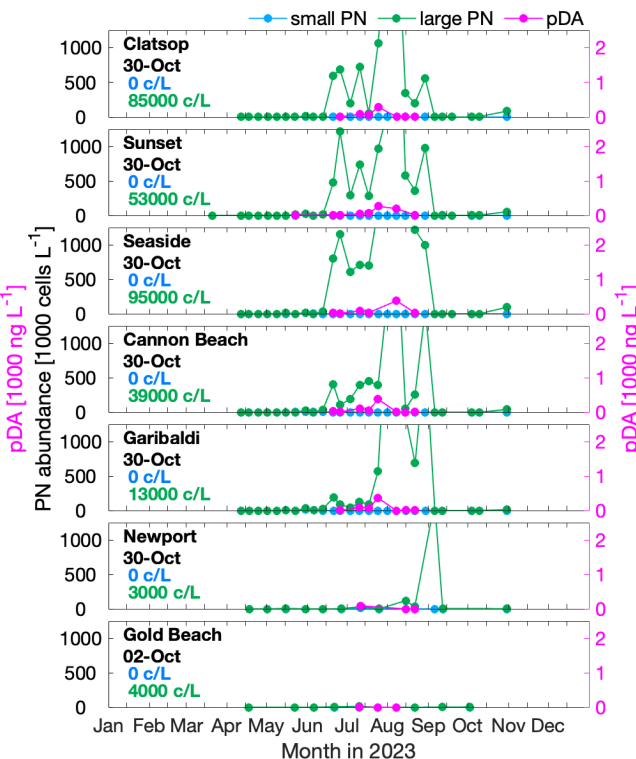
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

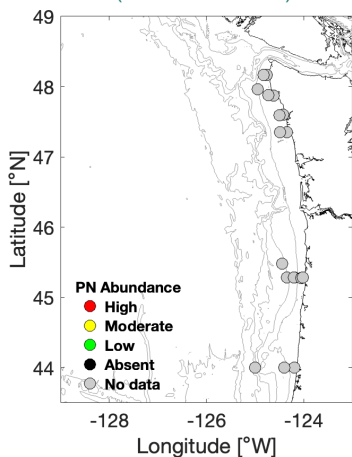


OR *Pseudo-nitzschia* & Domoic Acid

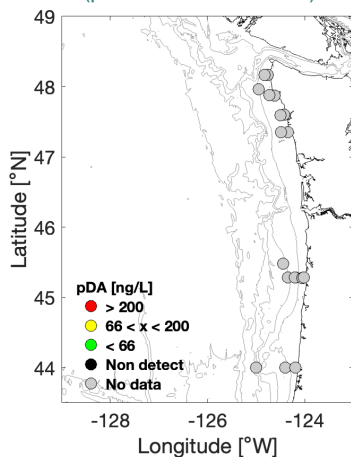


Offshore Sampling

(*Pseudo-nitzschia*)



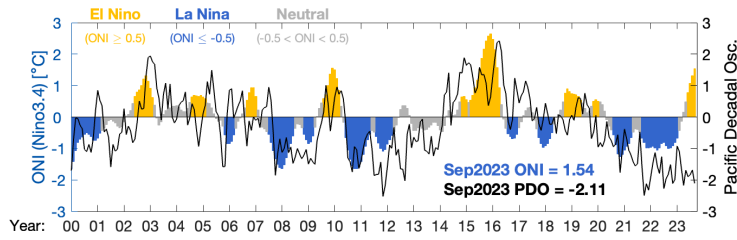
(particulate domoic acid)



Pseudo-nitzschia (PN) abundances are quantified for large and small cell morphologies using light microscopy. Threshold values: 50,000 cells/L for large PN; 1,000,000 cells/L for small PN; which trigger additional testing for seawater particulate domoic acid (pDA). Seawater pDA values >200 ng/L lead to toxin accumulation in shellfish such as razor clams. Sampling sites, colored by relative PN abundance (*high*: > threshold value for either cell morphology; *moderate*: > 1/3 threshold; *low*: < 1/3 threshold) and pDA, are shown in the upper left two panels. "No data" indicates that there were no data within the previous 15 days. Time series of PN abundance (cells per liter = c/L) and pDA at select beaches are shown in the upper right main two panels. Offshore samples (lower left) are collected and analyzed at ~2 week intervals during late summer/early fall. Additional samples are collected by a remotely operated Environmental Sample Processor (ESP) that is moored off La Push, WA, in late spring and late summer.

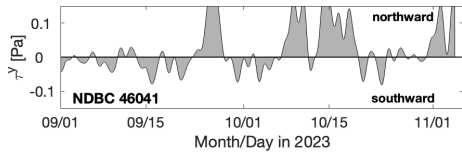
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information presented here. However, the information presented here aids coastal managers in better understanding and predicting the onset, duration, and magnitude of toxin outbreaks as well as their impacts.

Pacific Ocean Indices



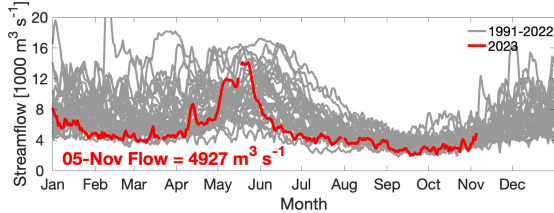
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south Wind Stress



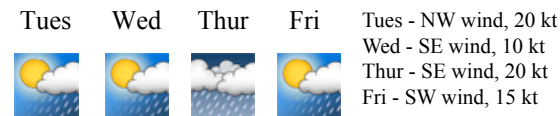
Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cumulative upwelling index (i.e. during years with fluctuating winds) rather than in years with sustained upwelling or downwelling winds.

Columbia River Discharge



The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

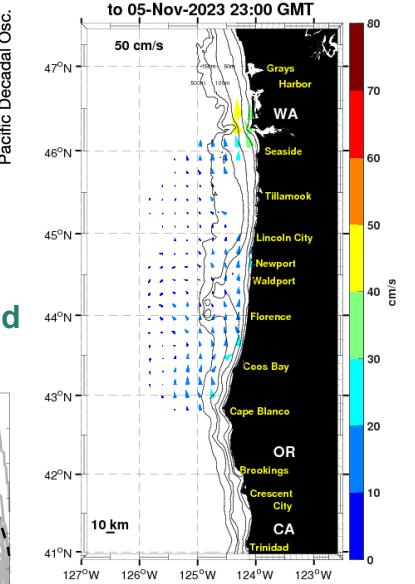
Marine Weather Forecast



Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

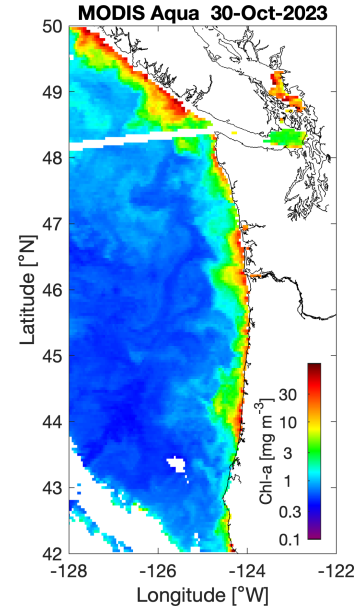
Ocean Surface Currents

AllSites Totals 25hr mean: From 04-Nov-2023 23:00 to 05-Nov-2023 23:00 GMT



Primary currents flow north and south in winter and summer, respectively, except within ~10 km of shore, where fluctuations follow changes in wind direction.

Satellite Chlorophyll-a

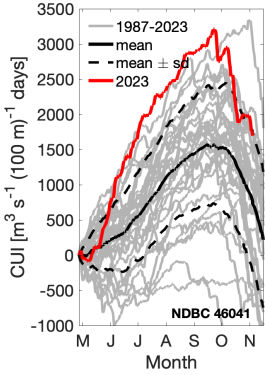


Clouds often obstruct satellite views, but the extent of phytoplankton blooms can at times be seen from space. Blooms do not necessarily reflect the presence of toxins.

Summary - Variable but weak along-shelf coastal winds were prominent over the past two weeks. This led to weak along-shelf currents and increased the potential for toxin production by *Pseudo-nitzschia* (*PN*) cells. Columbia River outflow has started to increase. Available satellite imagery indicates that elevated chlorophyll-a concentrations existed in a nearshore band spanning northern WA to central OR from 28-Oct through at least 30-Oct. Large morphology *PN* cells reemerged at beaches during this period. Highest values in WA were 38,000 cells/L at Quinalt and 33,000 cells/L at Twin Harbors on 30-Oct, but *PN* were present all along the WA coast. *PN* were much higher in abundance in OR: 95,000 cells/L at Seaside on 30-Oct, and present as far south as Newport. Seawater particulate domoic acid (pDA) was detected at Long Beach, WA (65 ng/L), and Twin Harbors, WA, on 30-Oct. Particulate DA values at other locations and times are not yet available. The highest recent DA values in WA razor clams was 12 ppm at Mocrocks on 23-Oct, notably before the reemergence of *PN* cells at beaches. In OR, Gold Beach razor clams contained 54 ppm DA as of 3-Nov, but it was not clear when those concentrations were obtained – the prior razor clam samples from there contained 10 ppm on 4-Aug, and DA has not been detected in mussel samples since July. Farther north, razor clams contained 13 ppm DA at Sunset Beach (identical to values from 20-Oct), and 15 ppm at Newport Agate Beach as of 3-Nov.

Forecast - El Niño conditions continue, are likely to be strong during the winter months, and are expected to persist through spring. The PDO remains strongly negative. A fast-moving storm arrived mid last week, and additional strong storm fronts arrived over the weekend, bringing coastal seas in the 14–18 ft range. Weather forecasts suggest primarily onshore winds Tuesday that will turn northward Wednesday as another storm arrives on Thursday. Winds look to remain northward through the weekend; uncertainty exists beyond. The recent northward winds and high seas, and those expected this week, should help to dissipate the *PN* bloom at the coast. The open questions are the extent of DA accumulation in razor clams during the past week and whether or not toxic *PN* cells remain nearshore. The 3-Nov OR razor clam data indicate potentially little DA accumulation in razor clams. Seawater pDA from samples collected last week will be informative, as will continued close monitoring this week. Caution is advised.

Cumulative Wind Stress



Model predicted sea surface salinity with particles released near the Juan de Fuca eddy and Heceta Bank and tracked three days into the future. Red dots indicate particle end points.

LiveOcean Forecast Model

