Pacific Northwest Harmful Algal Blooms Bulletin

Oct 9, 2024 HAB risk = ⚠

HAB risk key:

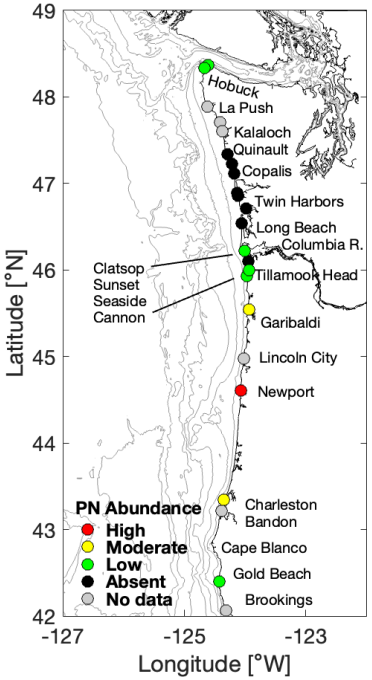
- ✓ = *low*
- ⚠ = *medium*
- ✗ = *high*

Cooperative Institute for CLIMATE, OCEAN & ECOSYSTEM STUDIES

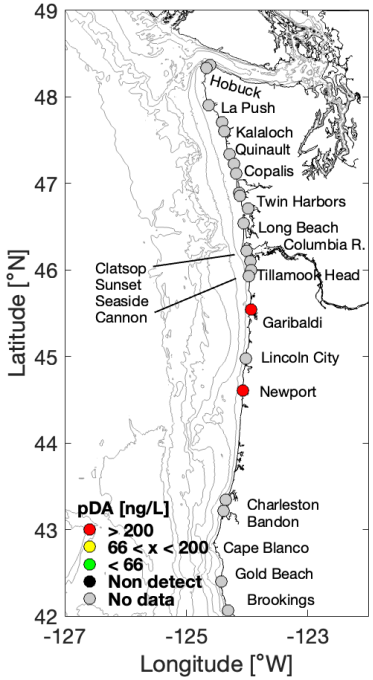
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

(*Pseudo-nitzschia*)

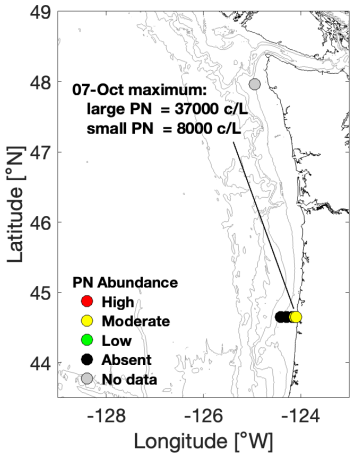


(particulate domoic acid)

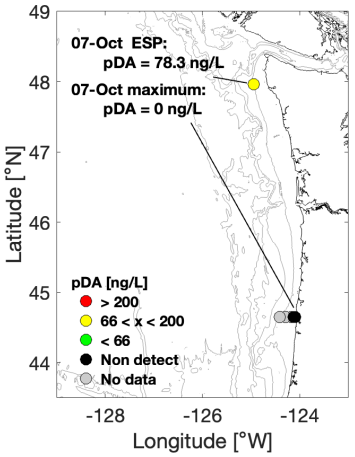


Offshore Sampling

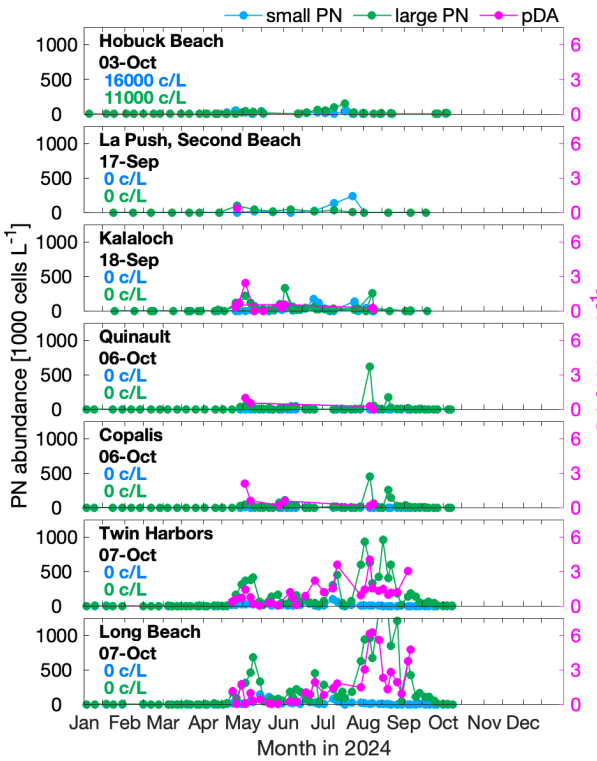
(*Pseudo-nitzschia*)



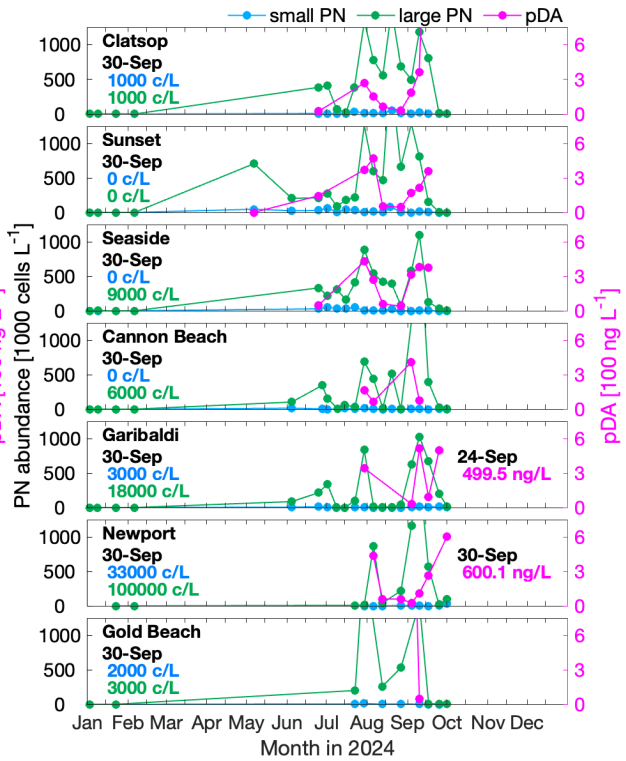
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid



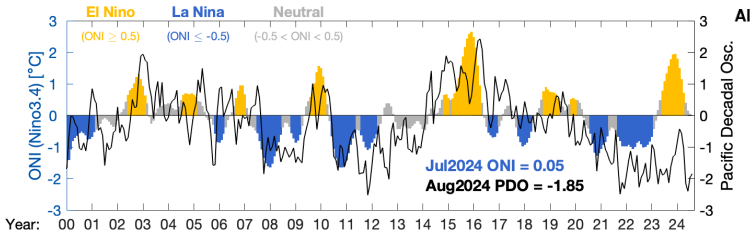
OR *Pseudo-nitzschia* & Domoic Acid



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.

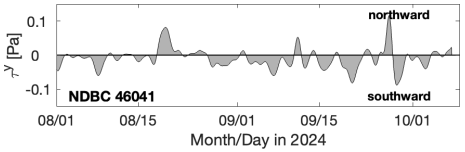
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA link; OR link), and not from the information presented 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



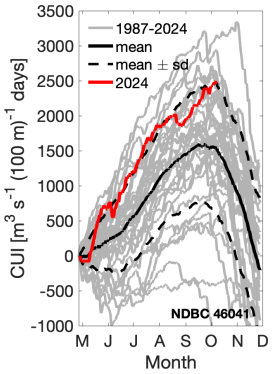
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south Wind Stress

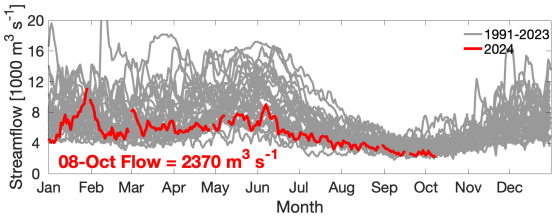


Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cummulative upwelling index (i.e. during years with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

Cumulative Wind Stress



Columbia River Discharge



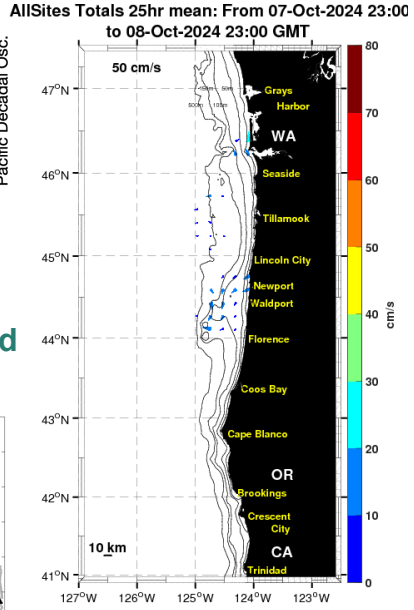
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast

Thur - NE wind, 10 kt
Fri - SE wind, 5 kt
Sat - S wind, 5 kt
Sun - S wind, 10 kt

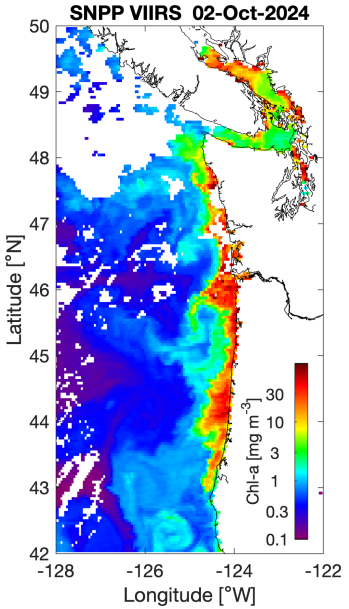
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

Ocean Surface Currents



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

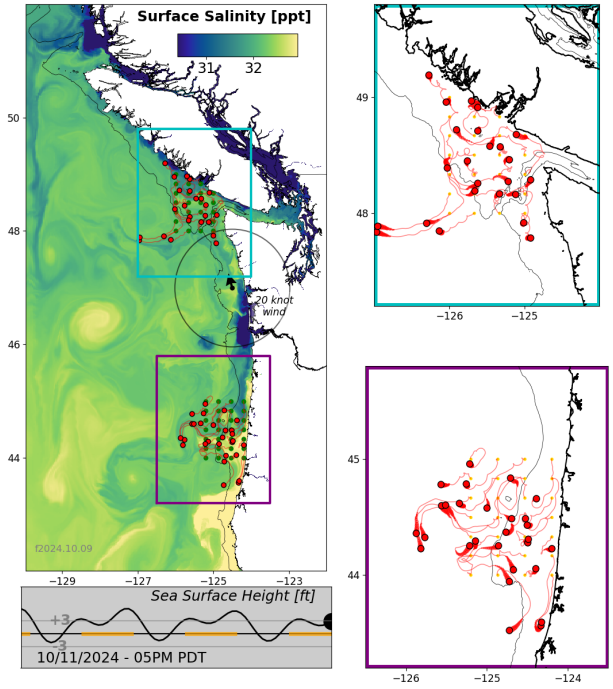
Satellite Chlorophyll-*a*



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.

LiveOcean Forecast Model

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.



Summary - Predominantly upwelling-favorable conditions continued over the past month. Winds recently relaxed, however, and are now weaker and more variable in direction. Surface ocean currents are also weak with little net along-shelf transport. Satellite imagery shows high chlorophyll-a spanning the shelf waters of WA and most of OR. Despite the elevated satellite signal, *Pseudo-nitzschia* (*PN*) cell concentrations at beaches have dropped steadily since mid-September. In WA, the highest concentrations were 13,000 cells/L of large morphology *PN* at Hobuck Beach on 2-Oct; *PN* were ≤2,000 cell/L at southern and central WA beaches. *PN* concentrations also dropped at northern OR beaches, with highest values (18,000 cells/L large *PN*) at Cape Meares on 30-Sep. A sample from Newport, OR, however, contained 100,000 cells/L large *PN*, and a sample from Charleston contained 30,000 cells/L large *PN* on that same date. Given the low cell concentrations, few seawater particulate domoic acid (pDA) samples have been analyzed. The exception was the 30-Sep Newport sample which contained high pDA (600 ng/L). The ESP mooring off northern WA also recorded an uptick in pDA on 6-Oct to 78.3 ng/L, the highest value observed there since early August. Samples collected offshore of Newport on 7-Oct contained up to 37,000 cells/L large *PN* only 1 nm from shore, but no pDA was detected. Razor clam DA concentrations in WA remain low: clams from central WA beaches were ≤2 ppm as of 1-Oct while Twin Harbors and Long Beach clams were ≤5 ppm as of 24-Sep. In OR, razor clam DA increased from ~7 ppm on 6-Sep to 14 ppm at both Sunset and Newport beaches as of 20-Sep, while Gold Beach clams increased from 430 to 480 ppm over the same period.

Forecast - Conditions are currently ENSO-neutral. La Niña is favored to develop within the next two months. The PDO remains strongly negative. Variable winds are expected through Friday. By Friday evening, weak winds will turn northward and that pattern will persist for at least a couple of days. Northward winds strengthen late Monday as a front passes. Particulate DA is high off central OR, and has increased off northern WA, suggesting that hotspots with elevated toxins could exist offshore. Given this, and the weak but persistent northward winds, risk appears moderate. Diligent monitoring throughout and beyond the period of northward winds is recommended since *PN* cells and any toxins could get pushed north and onshore.