Pacific Northwest Harmful Algal Blooms Bulletin

Aug 16, 2024 HAB risk = ✖

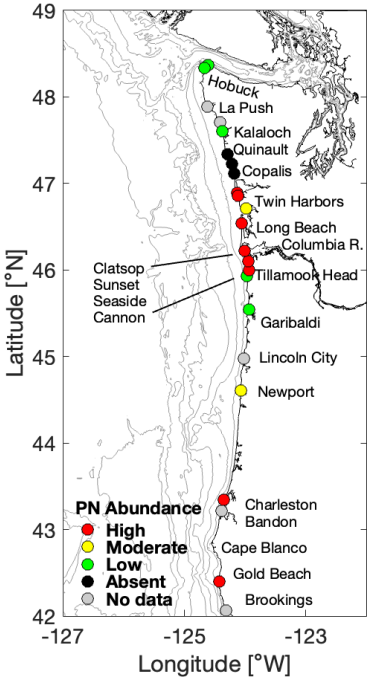
HAB risk key:
- ✔ = *low*
- ⚠ = *medium*
- ✖ = *high*

Cooperative Institute for CLIMATE, OCEAN & ECOSYSTEM STUDIES

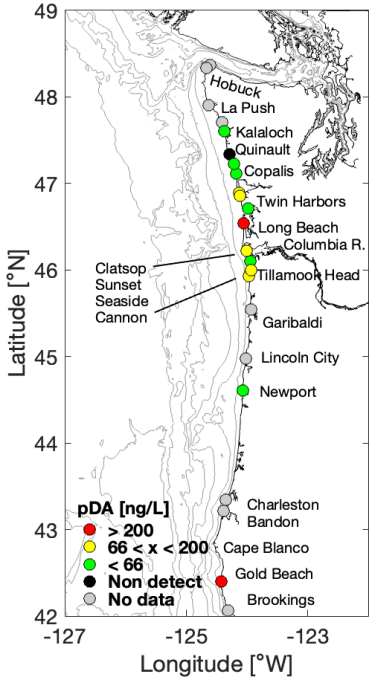
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

(*Pseudo-nitzschia*)

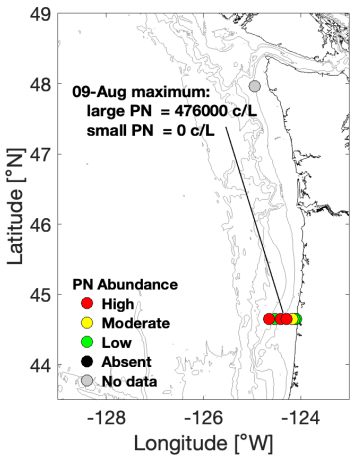


(particulate domoic acid)

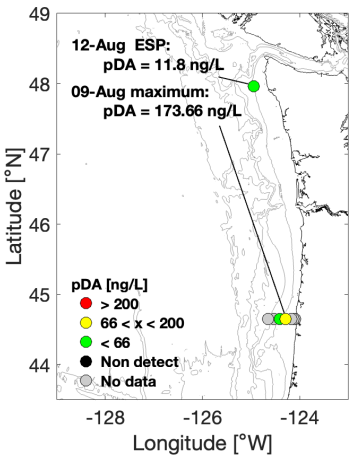


Offshore Sampling

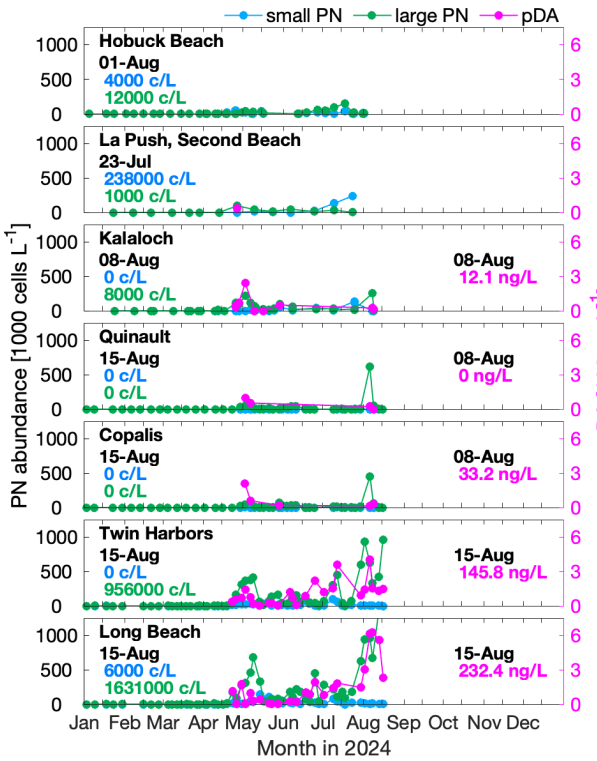
(*Pseudo-nitzschia*)



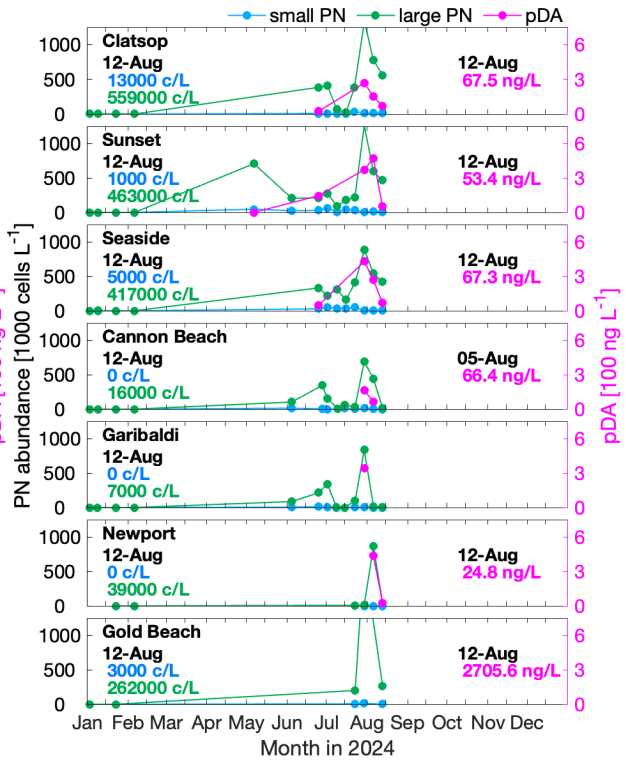
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid



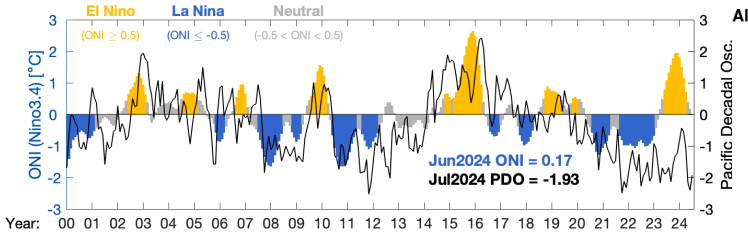
OR *Pseudo-nitzschia* & Domoic Acid



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.

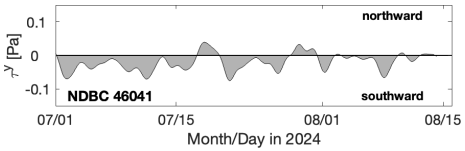
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA link; OR link), and not from the information presented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



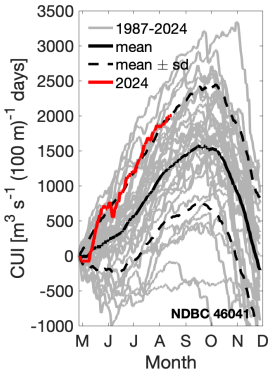
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south Wind Stress

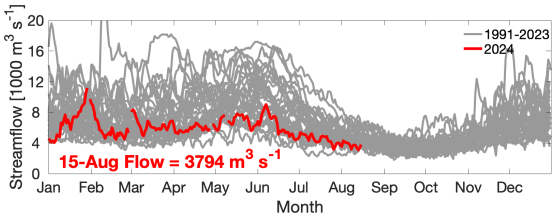


Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cummulative upwelling index (i.e. during years with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

Cumulative Wind Stress



Columbia River Discharge



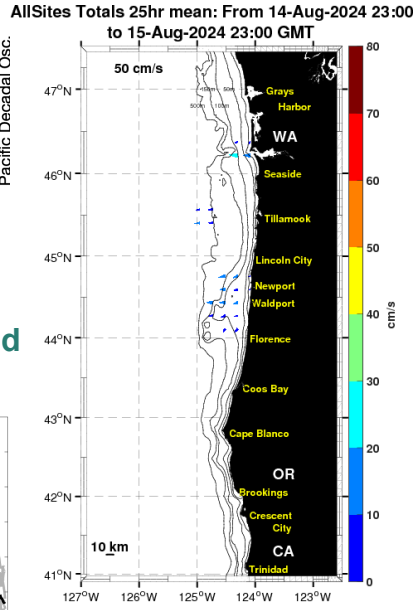
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast

Sat - NW wind, 10 kt
Sun - S wind, 10 kt
Mon - S wind, 5 kt
Tues - S wind, 5 kt

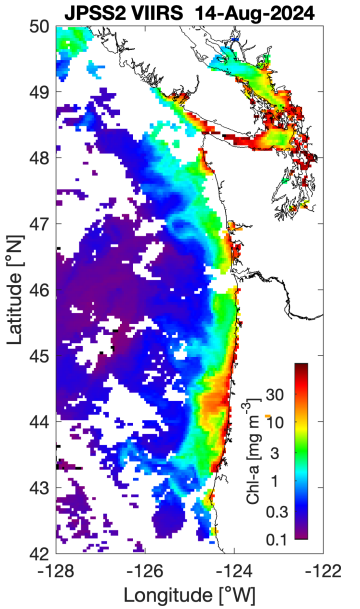
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

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.

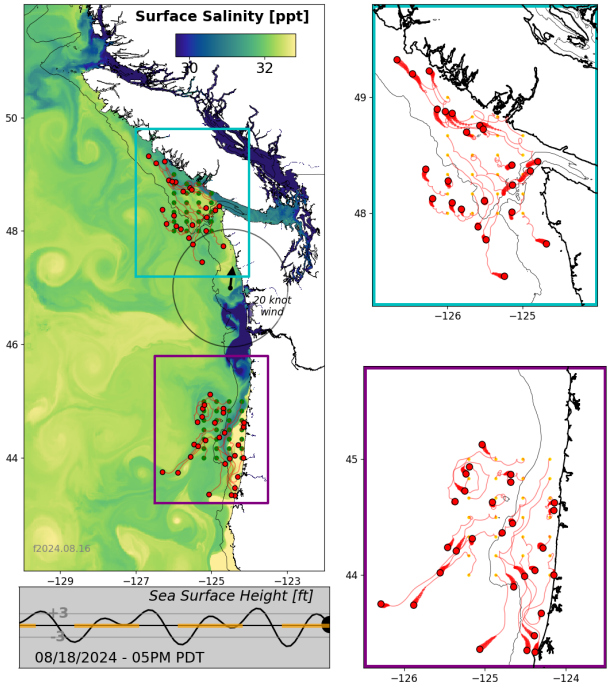
Satellite Chlorophyll-*a*



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 - Weak variable-direction winds replaced strong upwelling over the past two weeks. Shelf bottom temperatures remain cold, but along-shelf surface currents appear weak. As a result of the recent winds and currents, Columbia River plume water has moved shoreward and northward to northern OR and southern WA. Satellite imagery has been sparse, but recent images show elevated chlorophyll spanning both the WA and OR coasts. *Pseudo-nitzschia* (*PN*) concentrations increased at beaches in late July/early August with the change in winds, and remain high. On 12-Aug, large *PN* exceeded 400,000 cells/L at northern OR beaches, while samples from Long Beach, WA, had >1,600,000 cells/L on 15-Aug. Small *PN* were abundant (>100,000 cells/L) north of Kalaloch, WA in late July. Seawater particulate domoic acid (pDA) concentrations have also been elevated: >400 ng/L at Twin Harbors, Sunset, and Newport on 5-Aug, and >600 ng/L at Long Beach on 7-Aug. OR pDA samples collected 12-Aug had decreased to <100 ng/L; the exception was a Gold Beach sample containing ~2700 ng/L pDA. Samples collected offshore of Newport, OR, on 8-Aug contained up to 476,000 cells/L large *PN* and 174 ng/L pDA ~10–15 nm offshore. The ESP mooring off northern WA has been intermittently detecting low to moderate pDA. As of 9-Aug, regulatory DA limits were exceeded at Gold Beach, OR, by razor clams (110 ppm) and even mussels (24 ppm). Newport, OR, razor clams contained 19 ppm DA, and those harvested from Sunset Beach contained 9.9 ppm DA on 9-Aug. WA razor clams from Long Beach, Twin Harbors, Copalis, Mocrocks, and Quinault all contained ≤4 ppm DA as of 14-Aug.

Forecast - Conditions are currently ENSO-neutral. La Niña is favored to develop before the year's end. The PDO remains strongly negative. Stable low-pressure will build off the coast and the associated light but northward and onshore winds are expected to continue. Sunday appears to have more northward directed winds that are somewhat stronger; that pattern could last through the middle of next week. Northward winds continue through the following weekend in longer-term forecasts. The pre-existing high pDA at OR and southern WA beaches, coupled with the expected weak and northward winds, which will tend to move water shoreward and northward, suggest that risk is quite high. Managers should carefully scrutinize *PN*, pDA, and shellfish toxin concentrations prior to and during any planned harvests.