



Pacific Northwest Harmful Algal Blooms Bulletin

Oct 3, 2022 **HAB risk =**

HAB risk key:

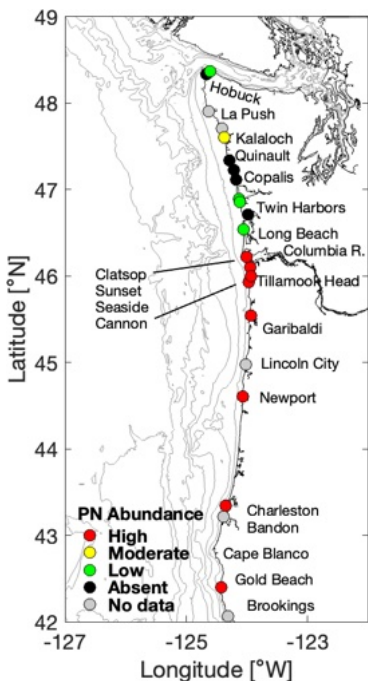
- = low
- = medium
- = high



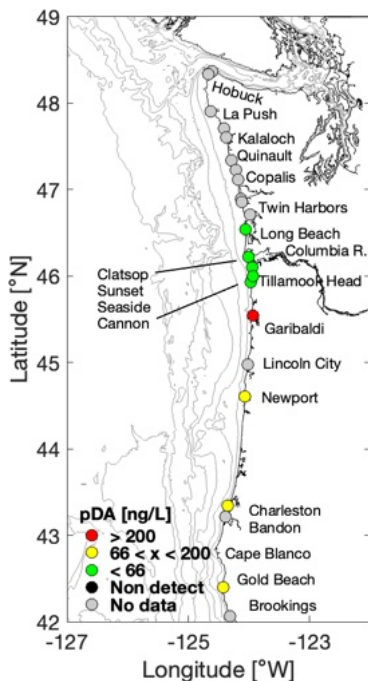
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

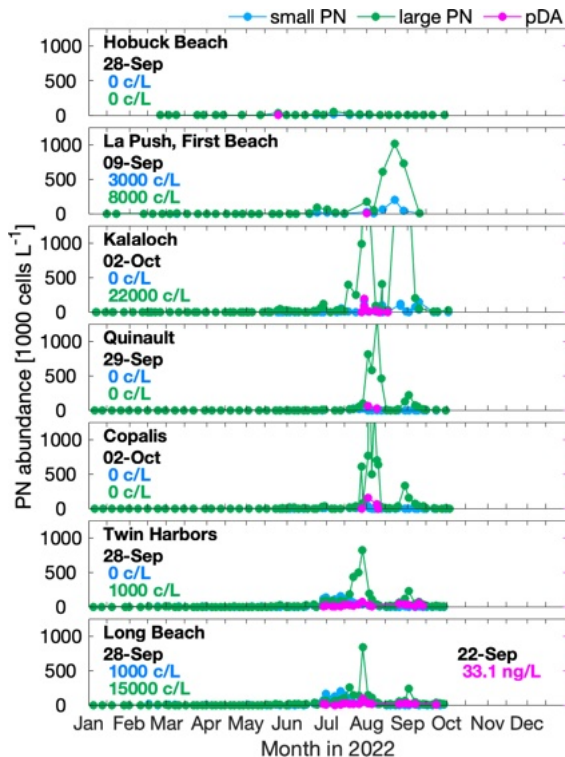
(*Pseudo-nitzschia*)



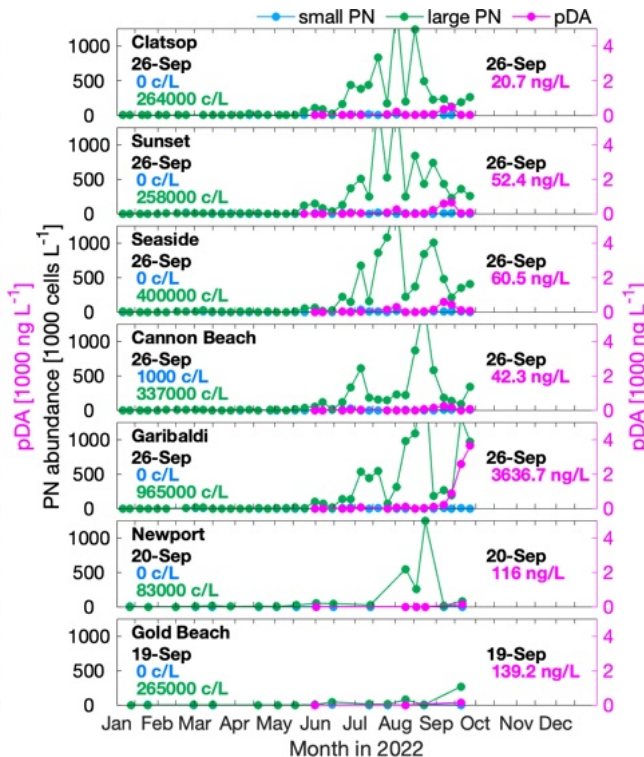
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

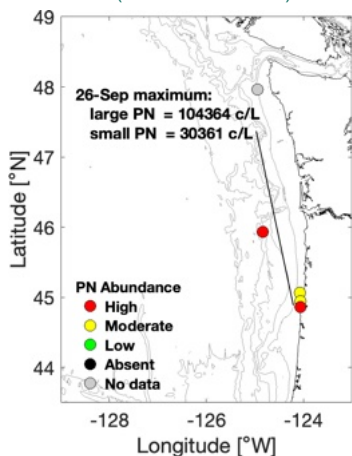


OR *Pseudo-nitzschia* & Domoic Acid

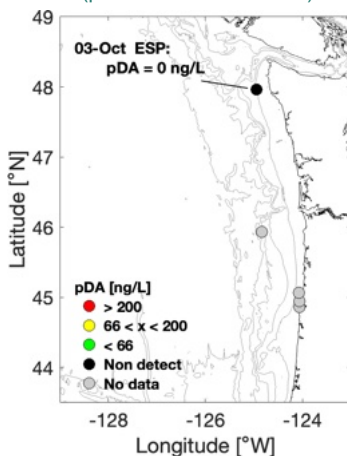


Offshore Sampling

(*Pseudo-nitzschia*)



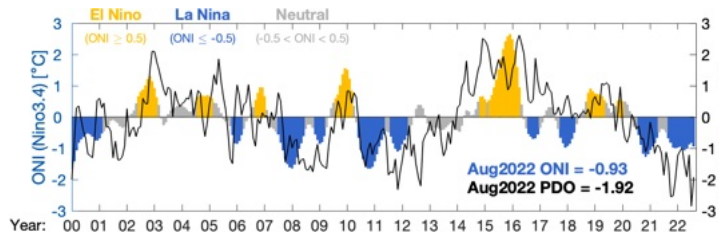
(particulate domoic acid)



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.

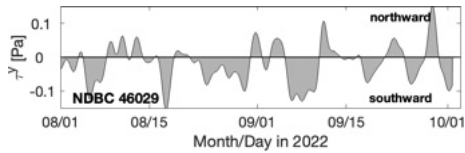
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



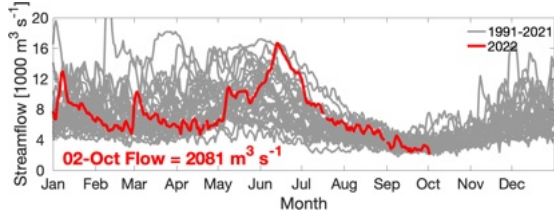
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south Wind Stress



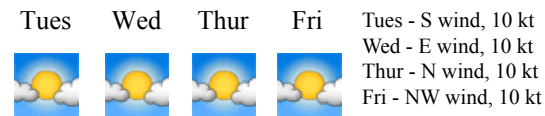
Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cumulative upwelling index (i.e. during years with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

Columbia River Discharge



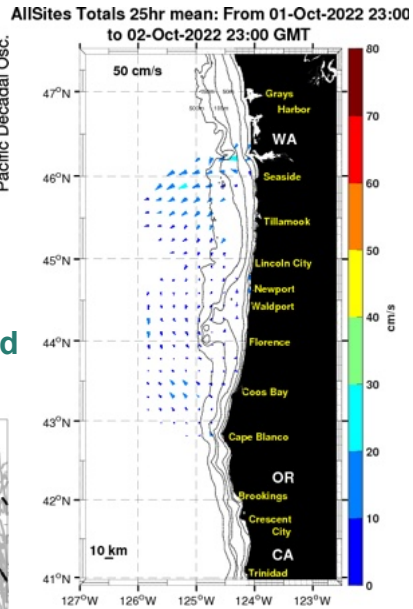
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



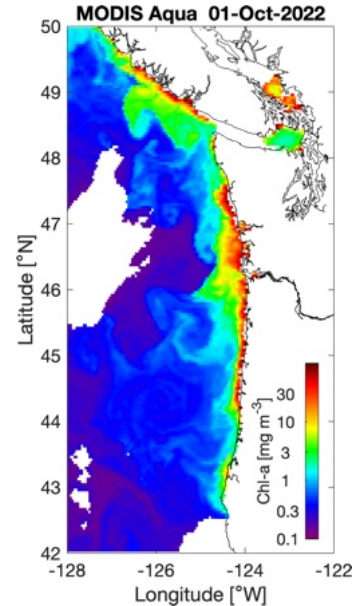
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

Ocean Surface Currents



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

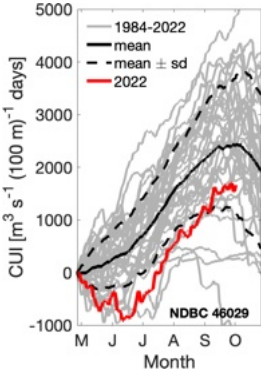


Clouds often obstruct satellite views, but the extent of phytoplankton blooms can at times be seen from space. Blooms do not necessarily reflect the presence of toxins.

Summary - Coastal winds have continued to fluctuate over the past two weeks, and ocean currents still appear relatively weak. Recent satellite images show a narrow band of elevated chlorophyll-a close to shore all along the coast. *Pseudo-nitzschia* (PN) concentrations at WA beaches have recently waned. Large morphology cells continue to dominate the PN community. Highest recent abundances in WA were at Long Beach (35,000 cell/L) on 22-Sep. In OR, large-size PN cells have maintained high abundances >250,000 cells/L at northern beaches, with highest values (965,000 cells/L) at Garibaldi on 26-Sep. Recent seawater particulate domoic acid (pDA) concentrations were low (33 ng/L) at southern WA beaches on 22-Sep. Samples from northern OR beaches on 26-Sep also contained low pDA (21–61 ng/L). A sample from Garibaldi, however, had exceptionally high pDA (3637 ng/L) on that same date. Seawater samples collected from central and southern OR beaches the week prior had pDA concentrations approaching 200 ng/L. Samples collected offshore of Newport and Garibaldi, OR, from 23–26 Sep, found large PN abundant from 5–15 nm offshore. On average, razor clam DA concentrations in WA had not appreciably changed over the 11 days between recent sample collections. As of 25-Sep, Copalis, Mocrocks, and Quinalt area beaches had values as high as 18–23 ppm. Twin Harbors and Long Beach had razor clam DA values in the 6–8 ppm range. Razor clam samples from OR beaches were all >20 ppm on 30-Sep, with highest values (93 ppm) at Newport.

Forecast - The current La Niña conditions are expected to continue through the winter months. The most recent PDO value is strongly negative. Northward winds are expected through Wednesday, but a stable ridge of high pressure will give rise to generally upwelling-favorable conditions later this week. The longer-term forecast suggests that such conditions should be maintained at least through the weekend. Given the recent elevated large PN cell abundances, pDA, and clam DA observations, risk is clearly high in OR. Risk at southern WA beaches is at least moderate. Any significant northward wind event, such as those through Wednesday, could push toxins in OR northward to southern WA beaches. The PN community could also resurge, as has occurred twice already. We recommend scrutinizing additional beach cell and pDA observations and monitoring any wind shifts prior to and during the pending harvests in WA.

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

