



Pacific Northwest Harmful Algal Blooms Bulletin

Sep 12, 2021 HAB risk =

HAB risk key:

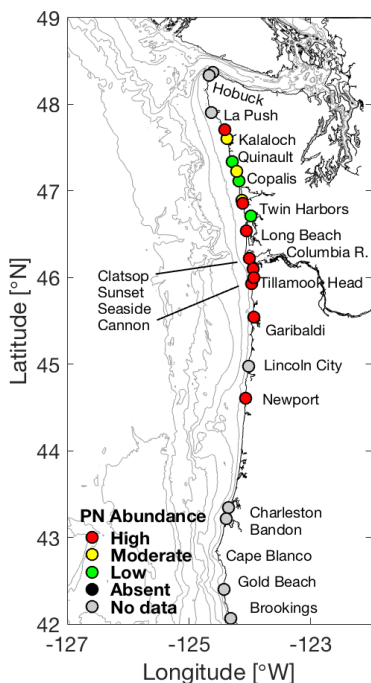
- = low
- = medium
- = high



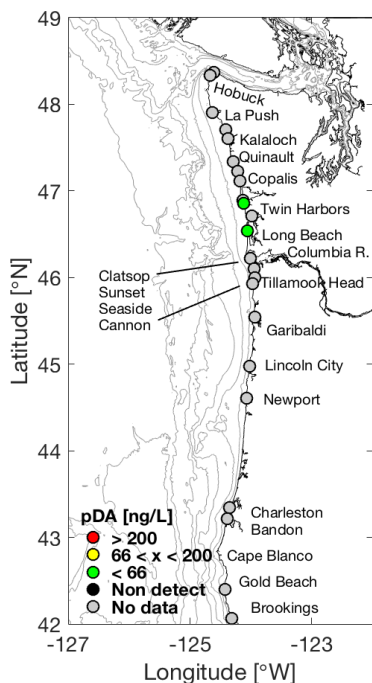
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

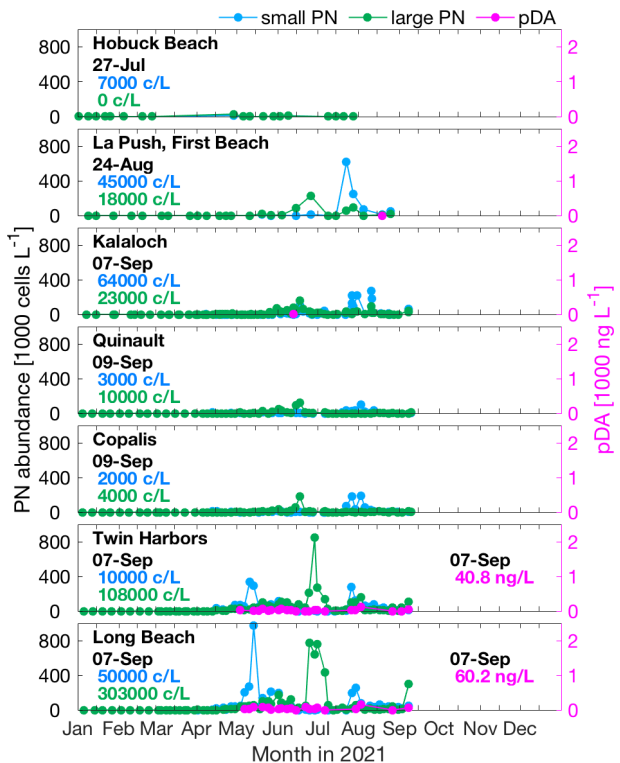
(*Pseudo-nitzschia*)



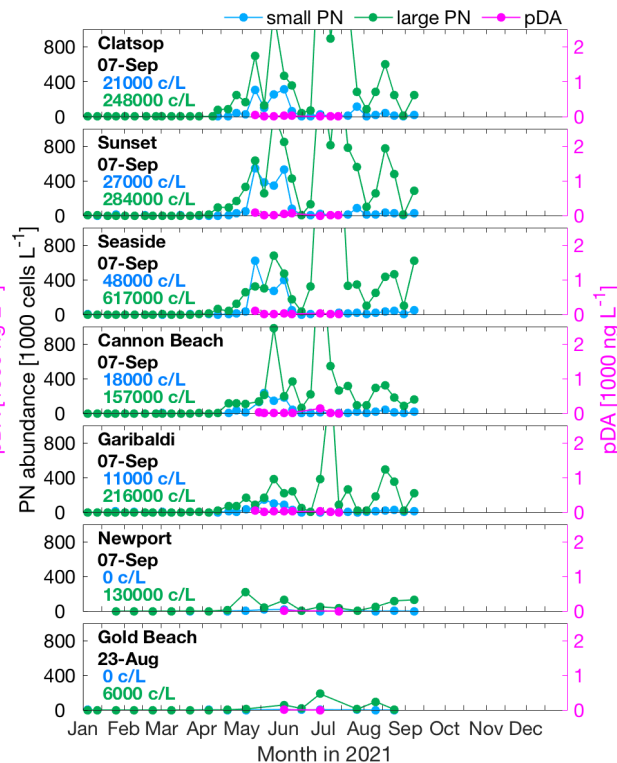
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

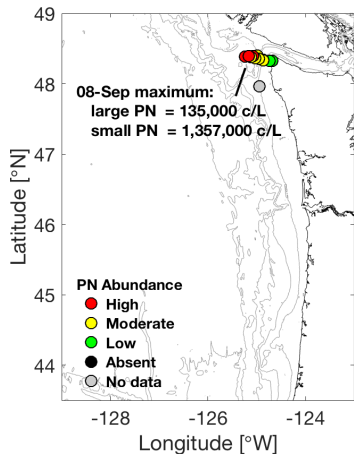


OR *Pseudo-nitzschia* & Domoic Acid

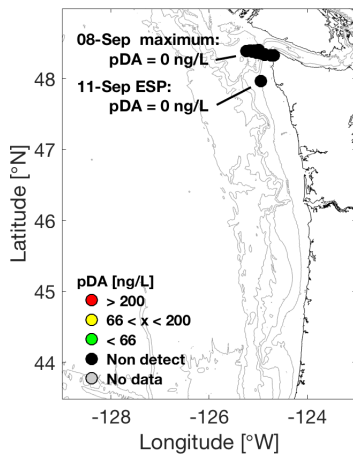


Offshore Sampling

(*Pseudo-nitzschia*)



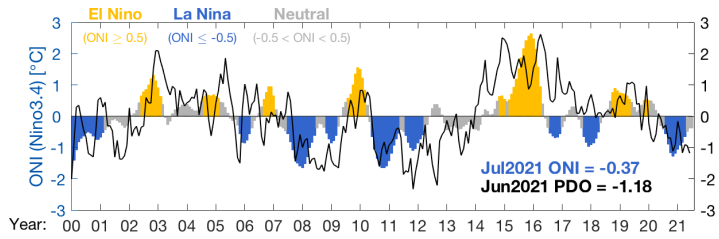
(particulate domoic acid)



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.

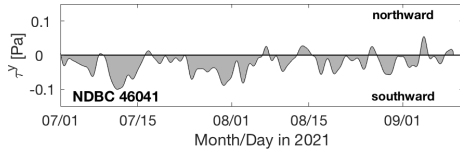
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



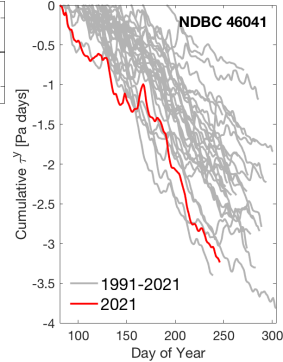
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south Wind Stress

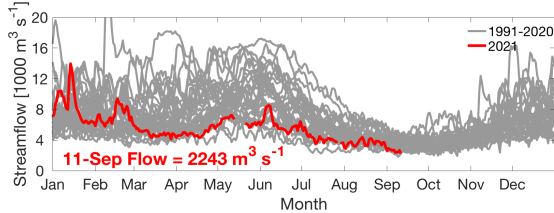


Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cumulative upwelling index (i.e. during years with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

Cumulative Wind Stress

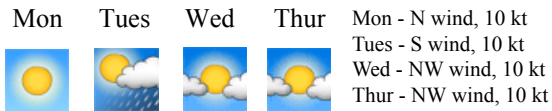


Columbia River Discharge



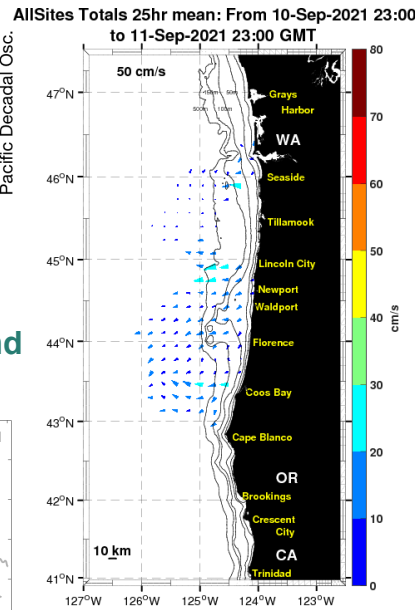
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



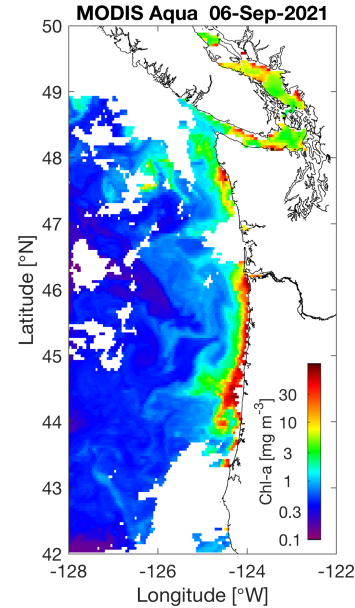
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

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 - Over the last few weeks, coastal winds have declined somewhat in strength and short periods of northward reversals have occurred. This has led to weaker, though still southward, coastal ocean currents. Recent satellite images continue to show elevated chlorophyll-*a* near the coast, particularly near La Push, WA, and throughout the northern half of OR. Large and small morphology *Pseudo-nitzschia* (*PN*) cells are present at most beaches; abundances increased this week after a northward wind event. Samples from southern WA beaches indicate a predominance of large size *PN*, with highest abundances at Long Beach: 303,000 cells/L on 7-Sep. To the north, Ruby Beach also had elevated *PN* abundances on 7-Sep (large: 141,000 cells/L; small: 271,000 cells/L). Large *PN* cells increased at northern OR beaches with abundances ranging from 130,000 cells/L at Newport to 617,000 cells/L at Seaside on 7-Sep. Seawater particulate domoic acid (pDA) was ≤60 ng/L at Long Beach and Twin Harbors, WA, on 7-Sep, and pDA concentrations have fluctuated at the ESP site off La Push, WA, with a high value of 90 ng/L on 3-Sep. Samples collected by ship on 8-Sep offshore of northern WA contained high abundances of both large (>100,000 cells/L) and small (>1,000,000 cells/L) *PN*, but pDA was not detected. As of 7-Sep, WA razor clam DA was ≤12 ppm at all sites sampled. In OR, razor clams from Sunset Beach were 11 ppm, and samples from Newport were 6.5 ppm on 10-Sep. A 10-Sep mussel sample from Gold Beach had 6.9 ppm DA, suggesting active DA accumulation there.

Forecast - Neutral ENSO conditions will continue, and are likely to transition to a weak La Niña this winter. The PDO index remains negative. The short-term weather forecast suggests a continuation of weak upwelling-favorable winds with another short duration northward reversal on Tuesday. A much stronger storm is forecast to arrive on Friday 17-Sep. Southward coastal currents and upwelling should weaken in response to the forecast northward wind reversals. Such seasonal transitions, with weak upwelling and fluctuating winds, are often associated with coastal DA events. Since large-celled *PN* are present at OR and WA beaches, we recommend caution with enhanced scrutiny of upcoming strong, longer-lived northward wind events such as at the end of the week. Risk is higher in southern OR, given the recent mussel sample. Continued monitoring of seawater toxin concentrations will remain highly valued as upwelling conditions seasonally wind down.

LiveOcean Forecast Model

