



Pacific Northwest Harmful Algal Blooms Bulletin

Sep 27, 2021 HAB risk =

HAB risk key:

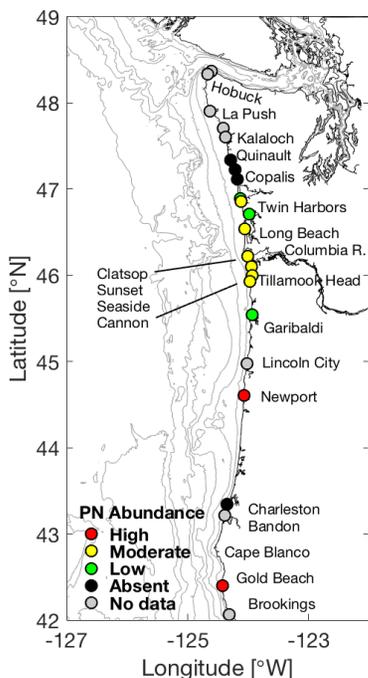
- = low
- = medium
- = high



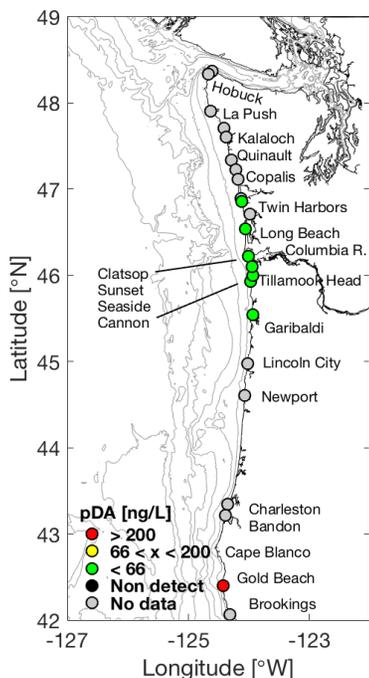
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

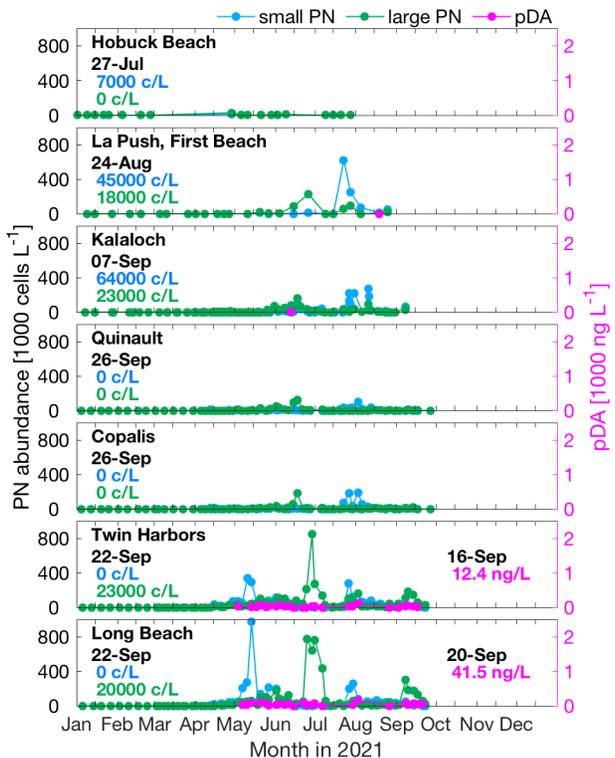
(*Pseudo-nitzschia*)



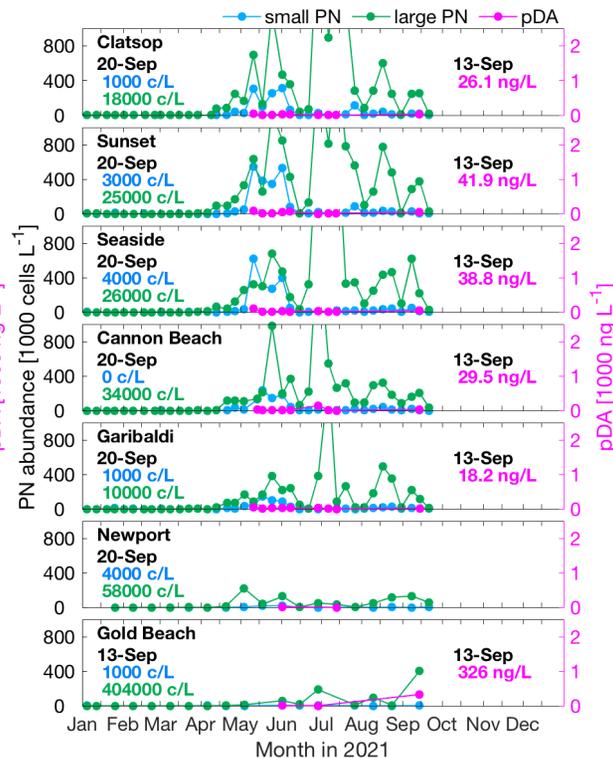
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

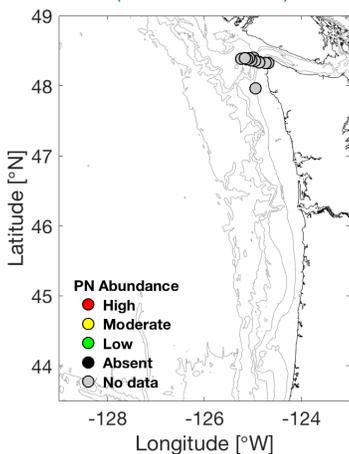


OR *Pseudo-nitzschia* & Domoic Acid

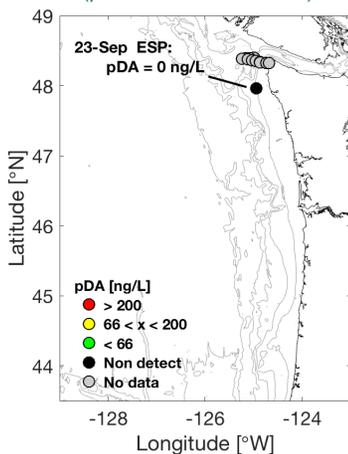


Offshore Sampling

(*Pseudo-nitzschia*)



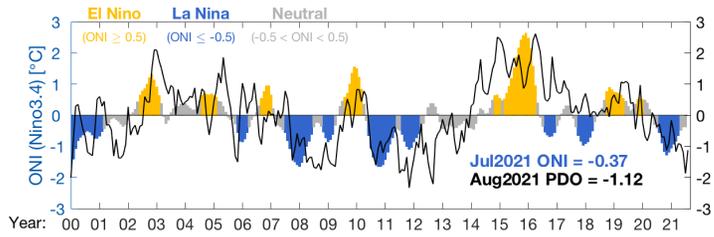
(particulate domoic acid)



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. 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.

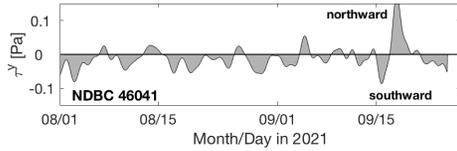
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



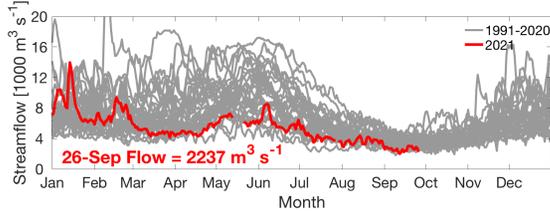
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

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



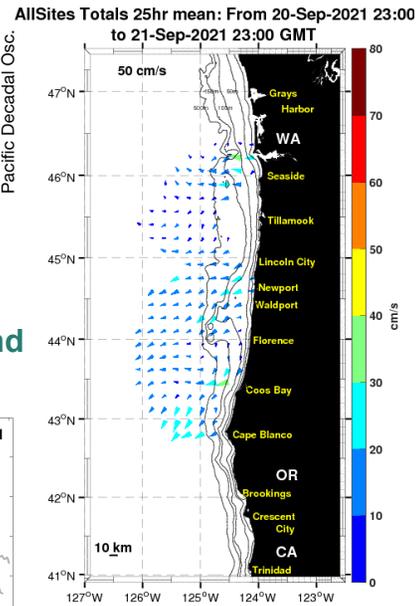
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



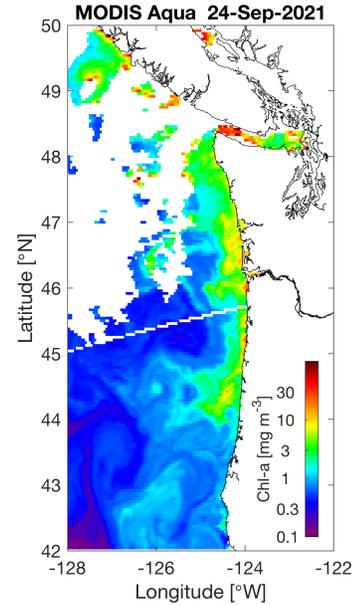
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

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

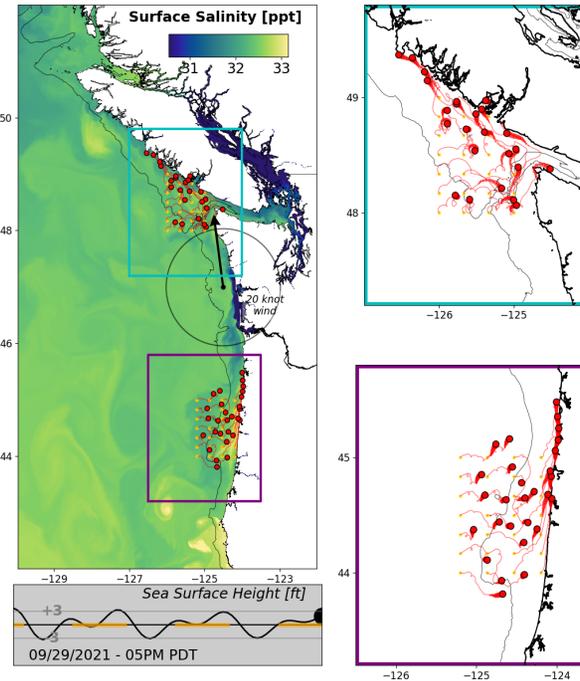


Clouds often obstruct satellite views, but the extent of phytoplankton blooms can at times be seen from space. Blooms do not necessarily reflect the presence of toxins.

Summary - Coastal winds have continued to fluctuate over the last couple of weeks and stronger storms have started to inundate the region. Ocean currents presently appear weak. Satellite images taken after a recent storm indicated a weakened chlorophyll-*a* signal near the coast, consistent with beach samples. More recent satellite images collected 21–24 Sep suggest that chlorophyll-*a* concentrations have rebounded somewhat with the highest values found throughout WA and northern OR. Large morphology *Pseudo-nitzschia* (*PN*) cells remain present at most beaches, with very low abundances of small-celled *PN*. The highest recent *PN* concentrations in WA were at Long Beach and Twin Harbors on 22-Sep, with <25,000 cells/L of large *PN*. Similar findings were reported in northern OR, with highest abundances of 34,000 cells/L at Cannon Beach on 20-Sep. A 20-Sep sample from Newport, OR, contained 58,000 cells/L large *PN*. Seawater particulate domoic acid (pDA) has generally remained low (<45 ng/L) where analyzed in both WA and OR as of 20-Sep. The exception was a sample from Gold Beach, OR, on 13-Sep that contained 326 ng/L pDA. Particulate DA concentrations have continued to fluctuate at the ESP mooring site off La Push, WA, with highest values of ~83 ng/L on 14-Sep. As of 21-Sep, WA razor clam DA was ≤6 ppm at Copalis, Mocrocks, and Quinalt Beaches. In OR, razor clams contained <10 ppm DA at Sunset and Newport, and DA was not detected in mussel samples from Gold Beach on 24-Sep.

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 indicates that strong northward winds will continue throughout most of the week. These winds will force plankton and any toxins northward and onshore (see LiveOcean). Longer-term forecasts suggest a return to southward, upwelling-favorable winds by Friday, with those conditions persisting for the foreseeable future. Those longer-term predictions are quite uncertain, however. Although pDA has generally remained low where measured, we still recommend caution and continued testing of pDA prior to and during upcoming harvests. The recent elevated DA concentrations in a southern OR mussel sample, coupled with the forecast strength and extended duration of downwelling-favorable winds this week, suggest the continued possibility of an active southern OR / northern CA source of DA that could be forced northward.

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.