



Pacific Northwest Harmful Algal Blooms Bulletin

Aug 20, 2021 HAB risk =

HAB risk key:

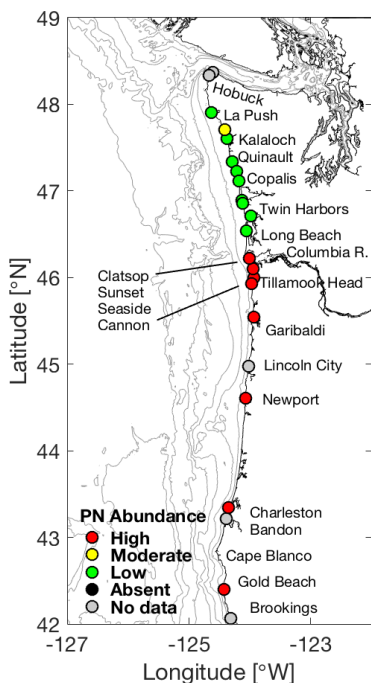
- = low
- = medium
- = high



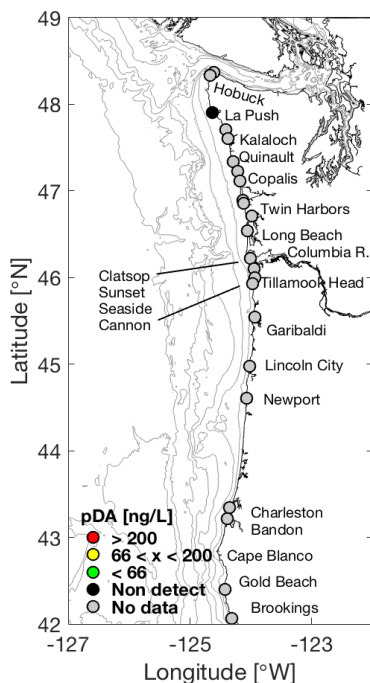
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

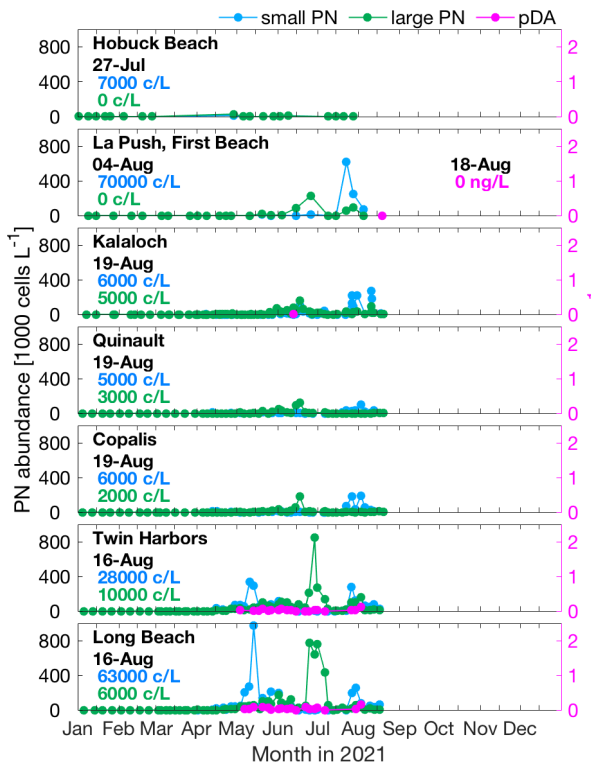
(*Pseudo-nitzschia*)



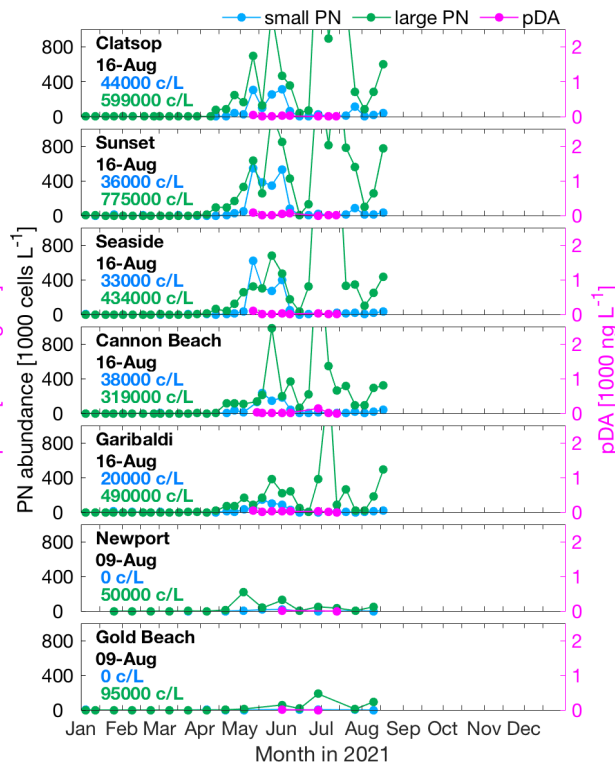
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

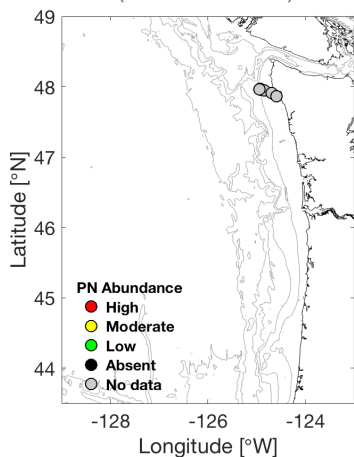


OR *Pseudo-nitzschia* & Domoic Acid

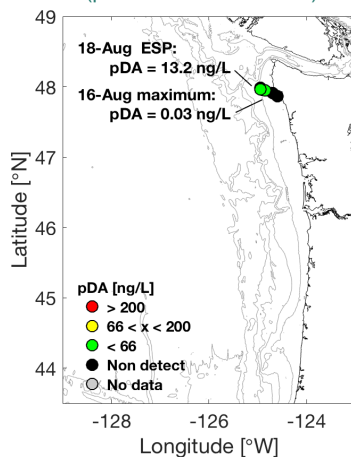


Offshore Sampling

(*Pseudo-nitzschia*)



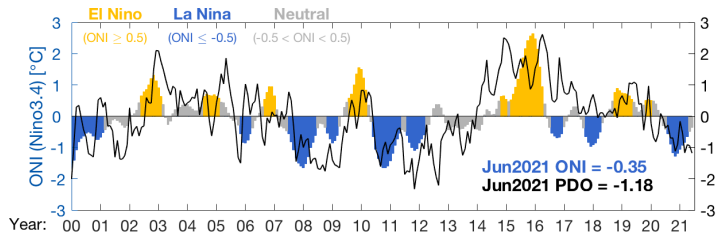
(particulate domoic acid)



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.

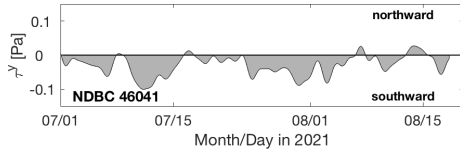
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



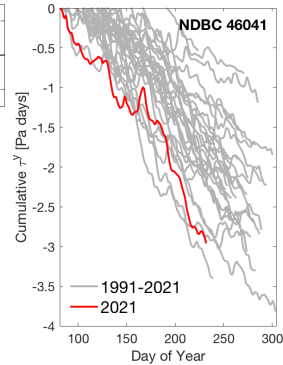
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south Wind Stress

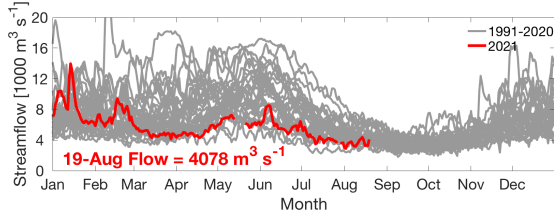


Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cumulative upwelling index (i.e. during years with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

Cumulative Wind Stress



Columbia River Discharge



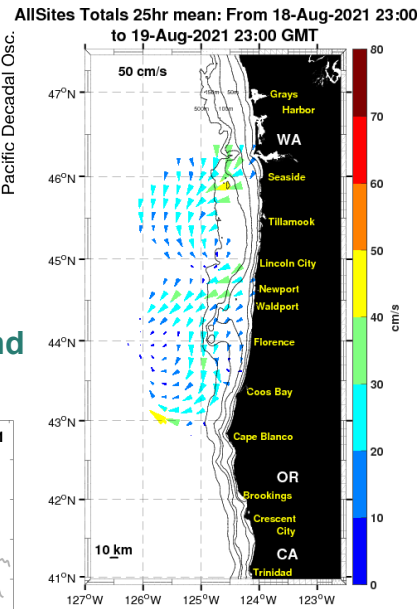
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



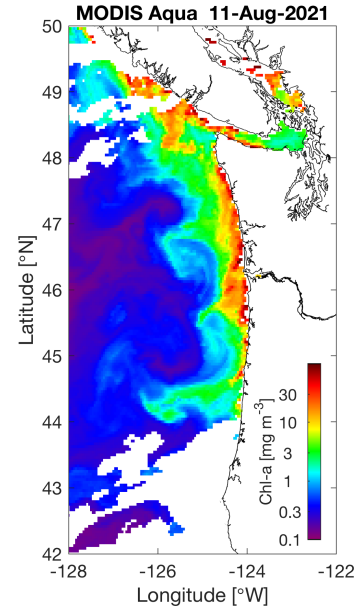
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

Ocean Surface Currents



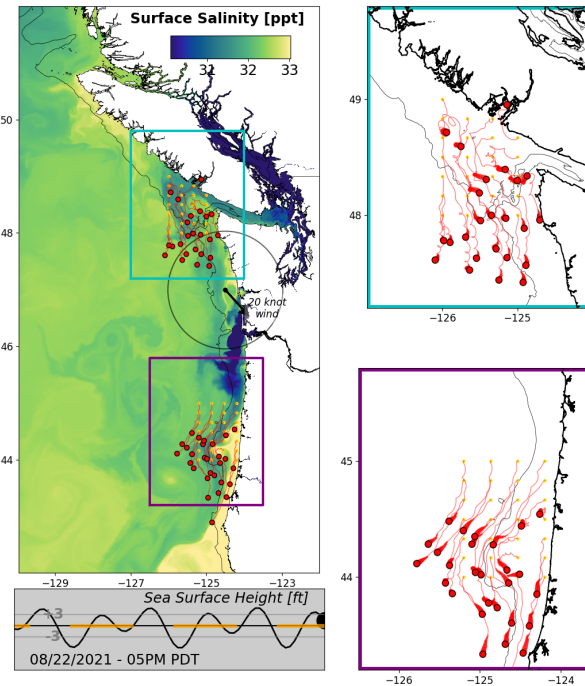
Primary currents flow north and south in winter and summer, respectively, except within ~10 km of shore, where fluctuations follow changes in wind direction.

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.

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 - Coastal winds were persistently upwelling-favorable through July and only recently turned weakly northward for a few days in August. Satellite images show elevated chlorophyll-a near the coast throughout the region, particularly north of Cape Blanco, OR, consistent with upwelling. Both large and small morphology *Pseudo-nitzschia* (*PN*) cells are present at most beaches. Interestingly, there is a clear divide at the Columbia River; recent samples from WA beaches contain predominantly small morphology *PN* cells, whereas the *PN* assemblage at OR beaches is dominated by large cells. Northern WA beaches have had the highest abundances of small *PN* (100,000–300,000 cells/L at Kalaloch, Ruby, and La Push as of 9-Aug); southern WA beaches have had fewer cells (15,000–80,000 cells/L as of 9-Aug). The highest recent abundances in OR were at northern beaches (300,000–800,000 cells/L of large *PN* on 16-Aug), but even a sample from Charleston contained 247,000 cells/L large *PN* on 9-Aug. Seawater particulate domoic acid (pDA) has remained relatively low where sampled (typically <100 ng/L). The highest recent values were from samples collected at Long Beach (155 ng/L) and Twin Harbors, WA (120 ng/L) on 2-Aug; no pDA was detected at La Push on 18-Aug. The Environmental Sample Processor moored offshore of La Push recorded low seawater pDA (13–23 ng/L) this week. Ship samples collected 16-Aug offshore of La Push also contained low or no pDA. The *PN* species composition remains unknown. Razor clam DA concentrations continue to decrease. As of 18-Aug, WA razor clam DA was ≤10 ppm at Kalaloch, Quinalt, Mocrocks, and Copalis. In OR, razor clams from Sunset Beach were 13 ppm, and samples from Newport were 7.5 ppm on 13-Aug.

Forecast - Neutral ENSO conditions will continue this summer, but are forecast to transition to a weak La Niña this winter. The PDO index remains negative. The short-term weather forecast suggests weaker upwelling-favorable winds this weekend. Somewhat stronger southward winds are expected to resume Monday and should continue through most of the week. Given the continuation of upwelling conditions, along with the relatively low seawater toxin concentrations, the likelihood of a large toxic *PN* event appears low for next week, particularly at central WA beaches. As the bulk of the razor clam season approaches, continued monitoring of changes in the plankton assemblage and additional updated seawater toxin concentrations will provide valuable guidance for managers.