



Pacific Northwest Harmful Algal Blooms Bulletin

May 20, 2021 HAB risk =

HAB risk key:

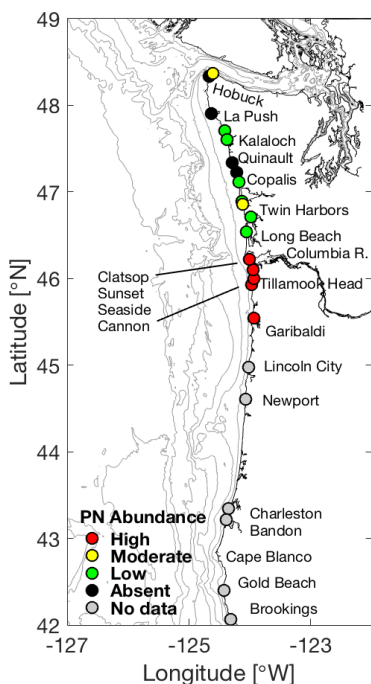
- = low
- = medium
- = high



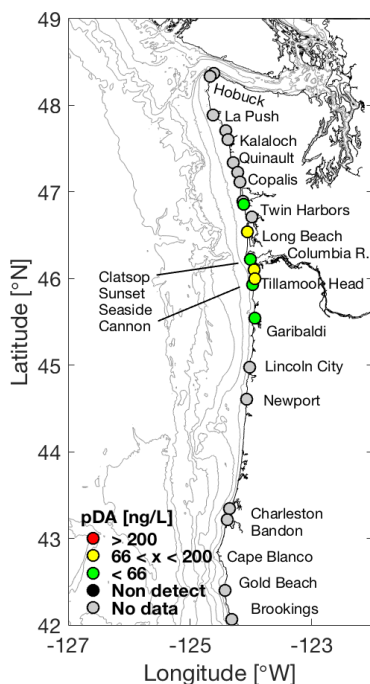
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

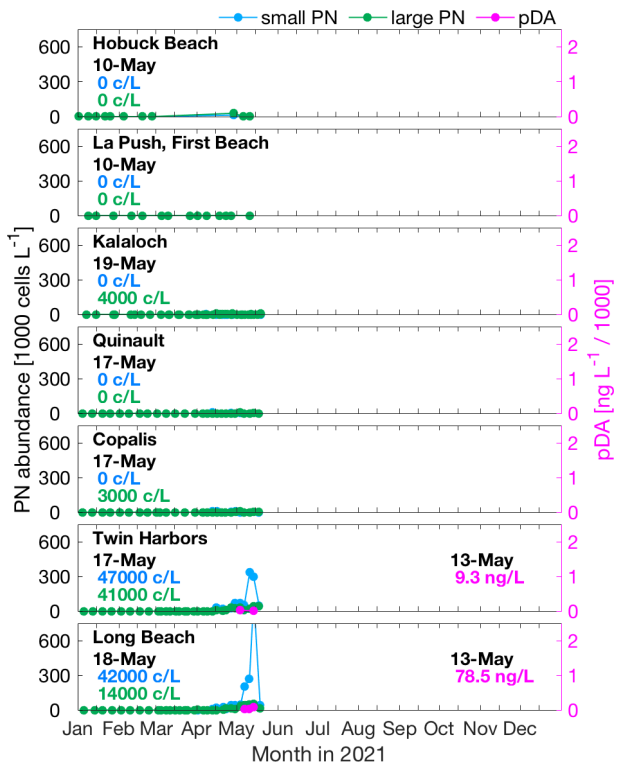
(*Pseudo-nitzschia*)



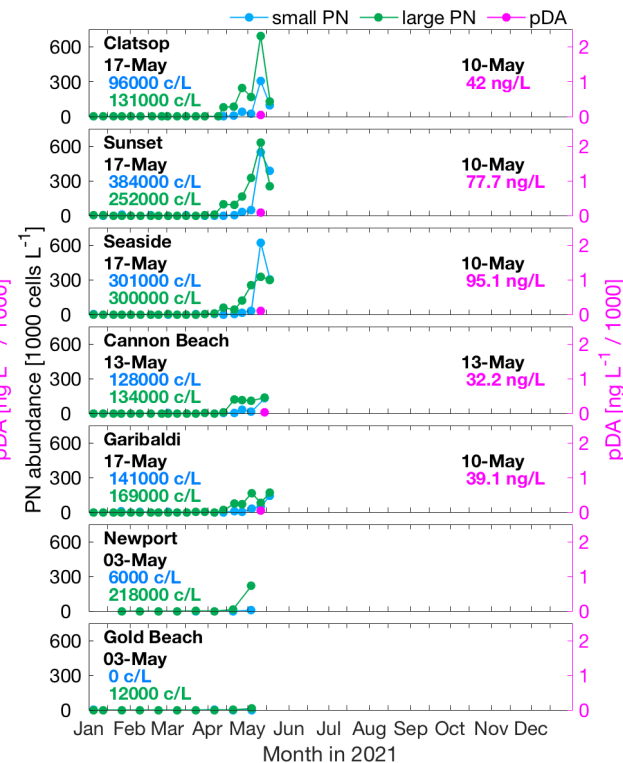
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

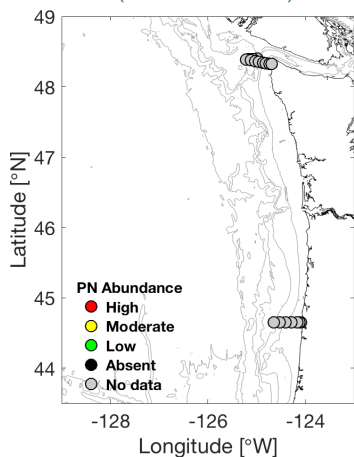


OR *Pseudo-nitzschia* & Domoic Acid

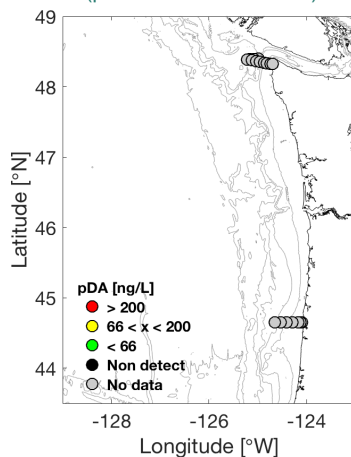


Offshore Sampling

(*Pseudo-nitzschia*)



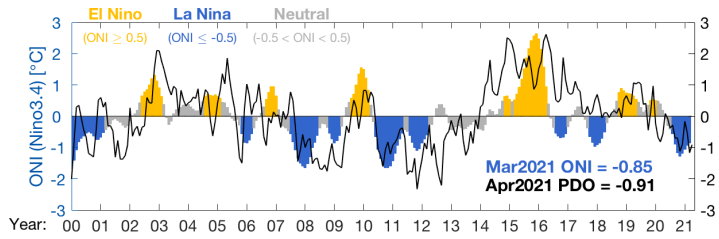
(particulate domoic acid)



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.

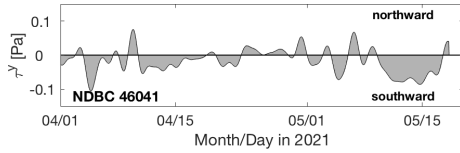
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



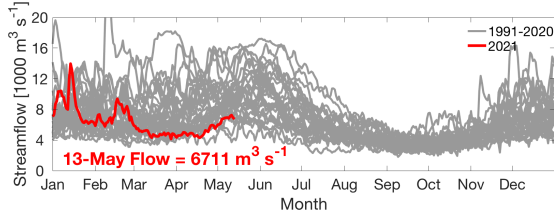
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

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.

Columbia River Discharge



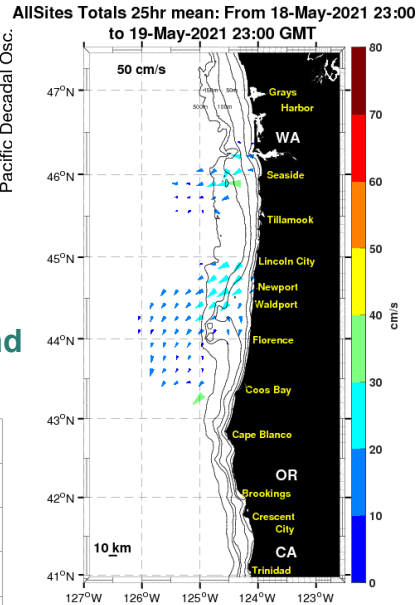
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



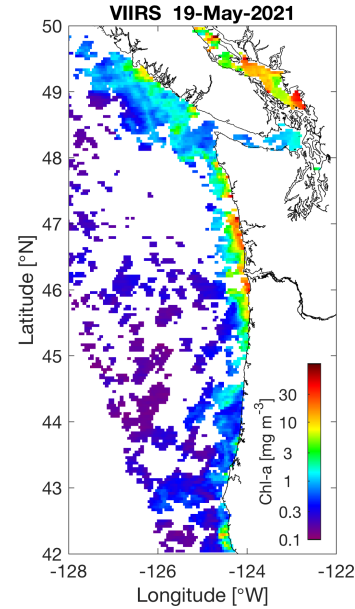
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

Ocean Surface Currents



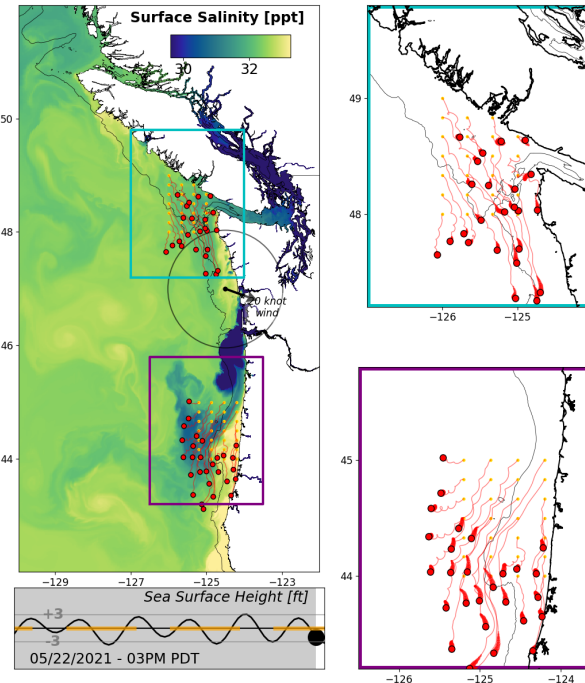
Primary currents flow north and south in winter and summer, respectively, except within ~10 km of shore, where fluctuations follow changes in wind direction.

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 have been primarily upwelling-favorable over the last two weeks, but clouds have obscured satellite images. Available images suggest chlorophyll-*a* is highest in WA and northern OR near the Columbia River, and south of Cape Blanco, OR. *Pseudo-nitzschia* (*PN*) cells are in high abundance at many sites. Monitoring in WA confirms that most *PN* are at southern WA beaches, with small morphology cells greatly outnumbering those in the large size class. Highest recent abundances were at Long Beach, WA, on 13-May (977,000 cells/L small *PN*). Large *PN* have also been increasing (e.g., 40,000–55,000 cells/L at Long Beach and Twin Harbors as of 13-May). In OR, small *PN* cells increased substantially on 10-May, so that both size classes are present in high abundance. Highest *PN* concentrations were at Columbia River South Jetty (694,000 cells/L large cells on 10-May) and at Seaside (622,000 cells/L small cells on 10-May). Seawater particulate domoic acid (pDA) has been relatively low at southern WA beaches (<80 ng/L as of 13-May) and at northern OR beaches (<100 ng/L as of 10-May), despite the high *PN* abundances. No recent offshore samples have been analyzed and the *PN* species composition is unknown. Razor clam DA concentrations at WA beaches continue to slowly decrease. As of 11-May, razor clam DA was ≤ 17 ppm at Kalaloch, Quinalt, and Mocrocks and was 19–24 ppm at WA beaches south of these sites. In OR, razor clams from Sunset Beach fell to 32 ppm on 14-May. Razor clams collected from Newport were at 20 ppm on 14-May, while samples collected at Sparrow Park (near Florence) were at 12 ppm. Both of those samples had increased by 2–3 ppm from samples collected on 30-Apr.

Forecast - ENSO conditions are in a neutral state that is expected to persist through summer. The PDO index remains negative. Northward winds are forecast for late this weekend and Monday. This will likely force plankton and any toxins toward shore. Beyond Monday the longer term forecast indicates a return to upwelling-favorable conditions, but at present, there appears to be some uncertainty in that prediction. With the relatively low pDA in southern WA and northern OR the risk of a large DA event is likely low at central WA beaches over the next few days. However, it is unclear if the slight increases in razor clam DA at central OR beaches are due to inherent variability, or potentially from toxic *PN* in that area. Thus, we recommend diligent sampling with an emphasis on pDA where warranted, and overall caution.