



Pacific Northwest Harmful Algal Blooms Bulletin

May 13, 2022 HAB risk =

HAB risk key:

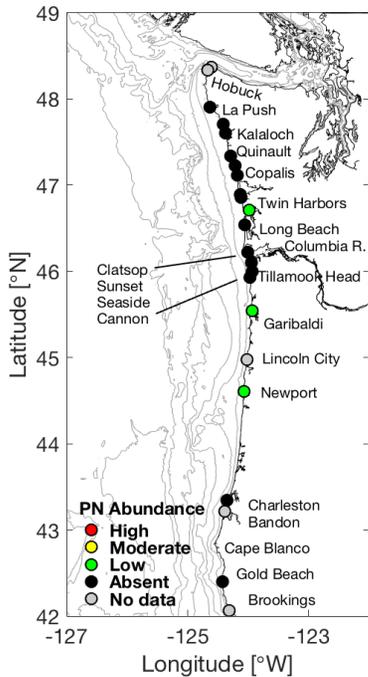
- = low
- = medium
- = high



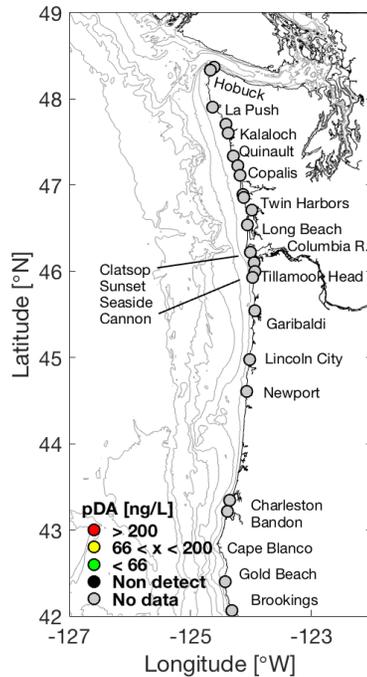
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

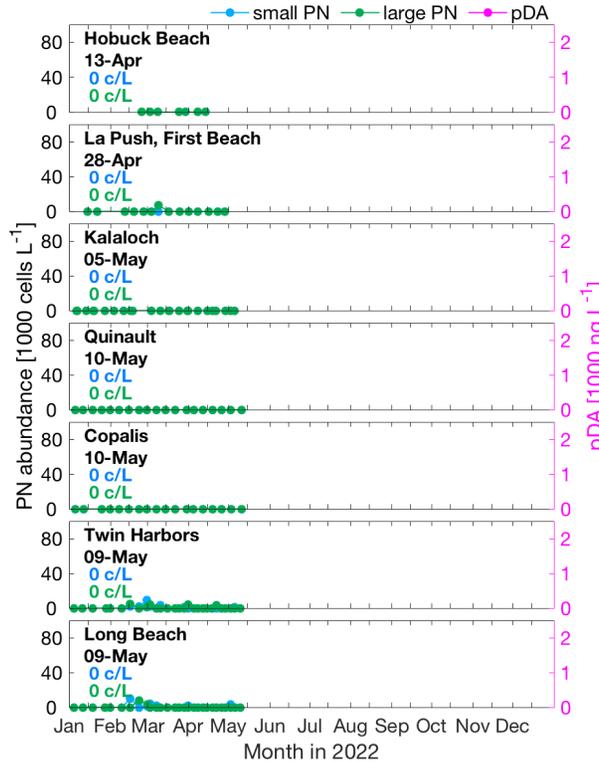
(*Pseudo-nitzschia*)



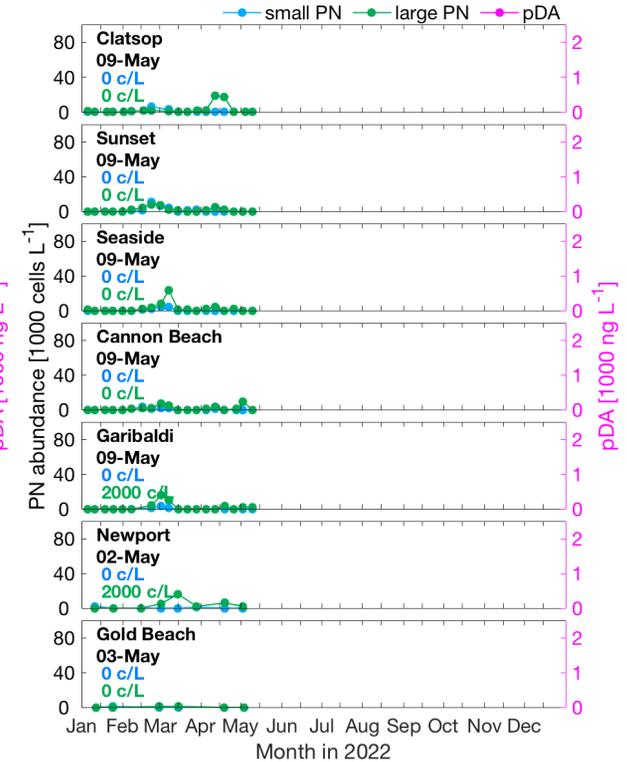
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

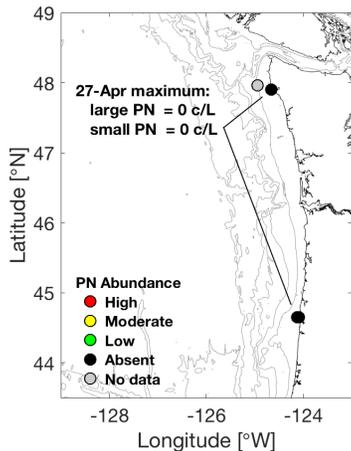


OR *Pseudo-nitzschia* & Domoic Acid

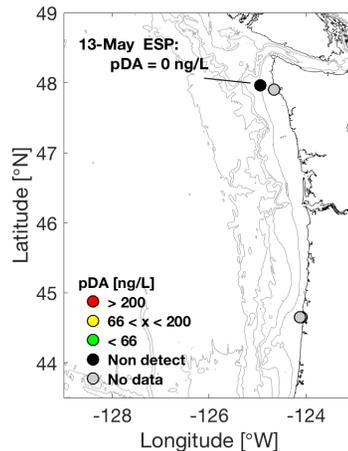


Offshore Sampling

(*Pseudo-nitzschia*)



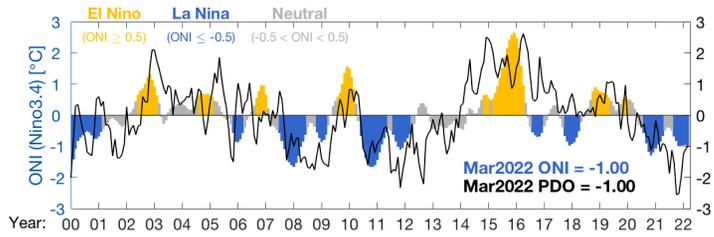
(particulate domoic acid)



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.

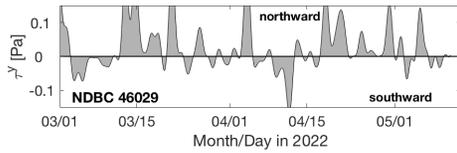
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



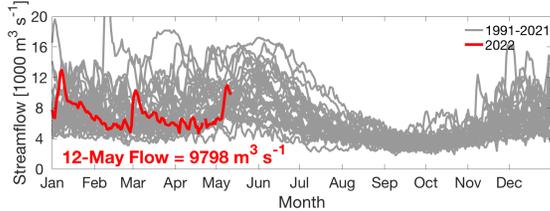
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

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



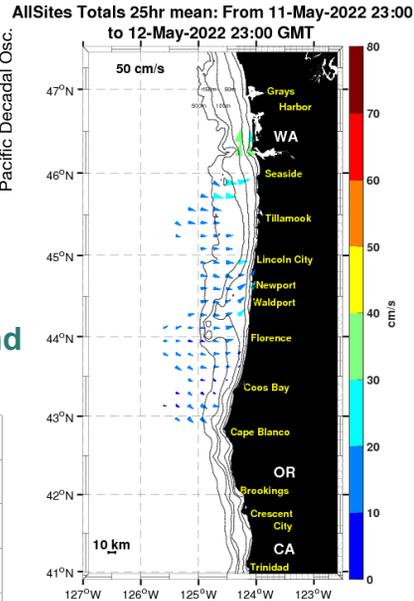
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



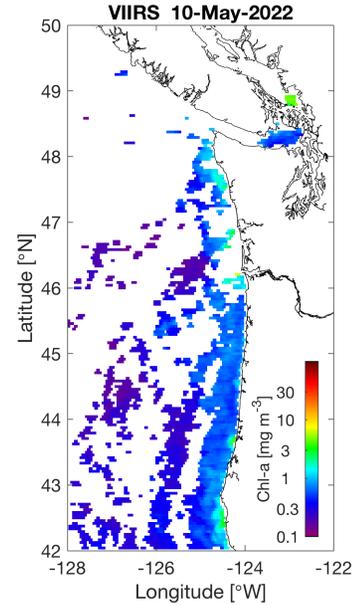
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

Ocean Surface Currents



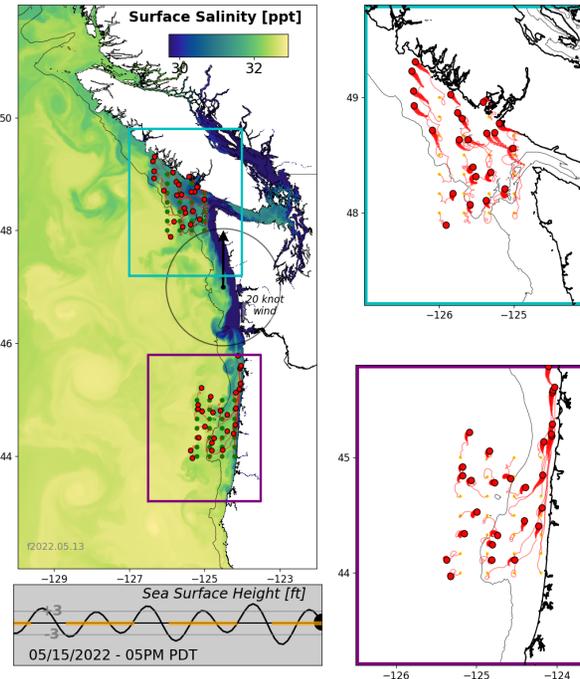
Primary currents flow north and south in winter and summer, respectively, except within ~10 km of shore, where fluctuations follow changes in wind direction.

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.

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 - Cool and wet spring conditions have continued over the last few weeks. Only a couple of weak short-lived upwelling-favorable wind events have occurred; along-coast winds have remained predominantly northward. Surface ocean currents still appear weak, though a mid April cross-shelf transect off Newport, OR, indicated that upwelled density surfaces existed at depth, nearly to the inner shelf. Outflow from the Columbia River has increased substantially since late April. Clear satellite images have been rare, but available data indicate moderate chlorophyll-*a* concentrations off OR and somewhat higher values off WA. *Pseudo-nitzschia* (*PN*) continue to be sparse at beaches throughout the region. The highest recent abundance was in northern OR (Cannon Beach) where 9,000 cells/L of large morphology *PN* were recorded on 2-May. Otherwise, *PN* remain absent from most beaches. Given the low *PN* concentrations, seawater particulate domoic acid (pDA) has not yet been quantified at beaches. Samples collected near the coast but offshore of both La Push, WA, and Newport, OR, on 27-Apr contained no *PN*. The ESP moored off La Push, recorded a pDA concentration of 58.2 ng/L on 7-May, but values since then have been unquantifiably low. WA and OR razor clam DA concentrations also remain low. Samples collected at WA beaches were generally ≤3 ppm as recently as 11-May. In OR, razor clam DA has not been detected since the 4-Mar sample from Sunset Beach (8.5 ppm) and the 4-Feb sample from Gold Beach (52 ppm).

Forecast - The current La Niña conditions are expected to continue through summer but with a weakening trend. Models now suggest La Niña may build again this fall. The recent PDO value remains negative. Strong northward winds are expected along the coast over the weekend. Winds will then weaken and turn primarily shoreward early next week. Uncertain longer-term forecasts indicate the possibility of upwelling-favorable conditions later next week. We thus believe there is continued low risk of a large DA outbreak over the next few days, with risk increasing some beyond mid next week. If upwelling-favorable winds become established, *PN* should bloom quickly since deep nutrient-rich water is already poised to upwell. Such changes may take a bit longer to manifest at WA beaches given the large quantity of Columbia plume water present there. Once *PN* are detected in elevated quantities, pDA monitoring will help ensure safe harvests.