



Pacific Northwest Harmful Algal Blooms Bulletin

Apr 27, 2023 HAB risk =

HAB risk key:

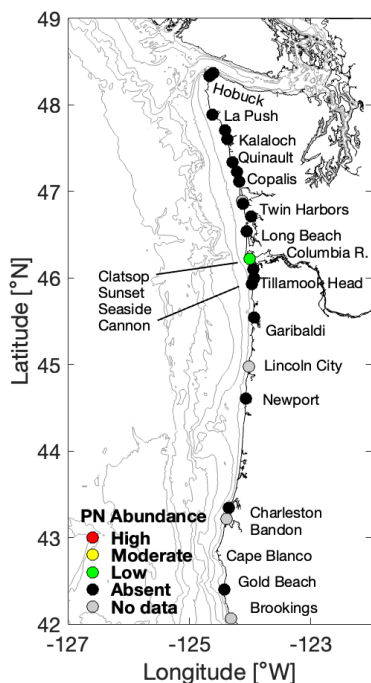
- = low
- = medium
- = high



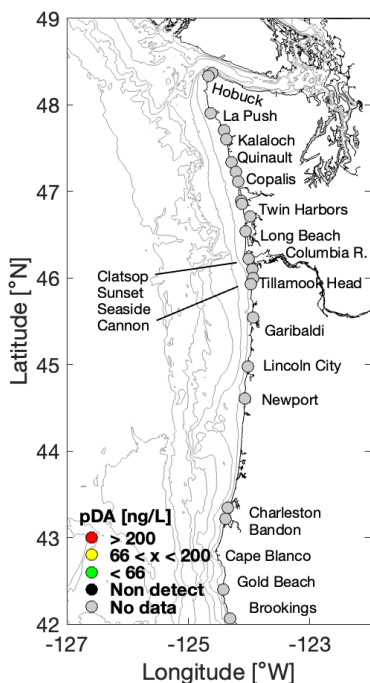
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

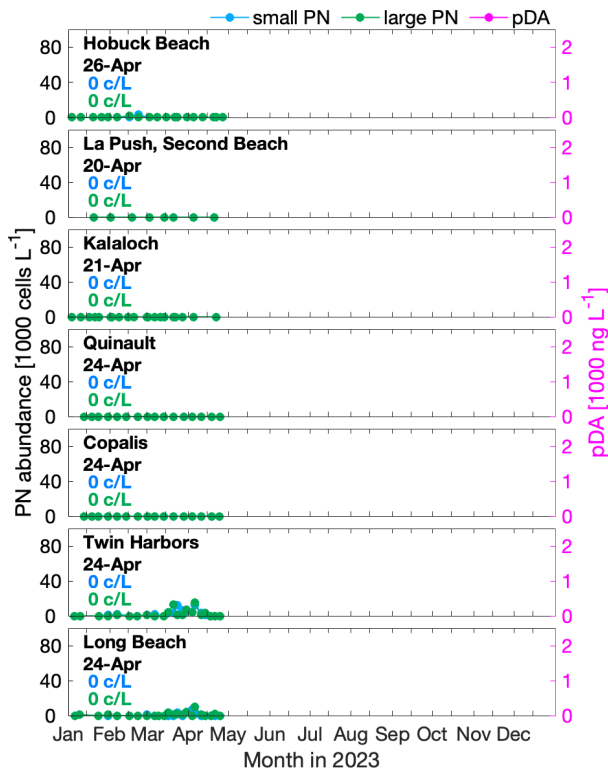
(*Pseudo-nitzschia*)



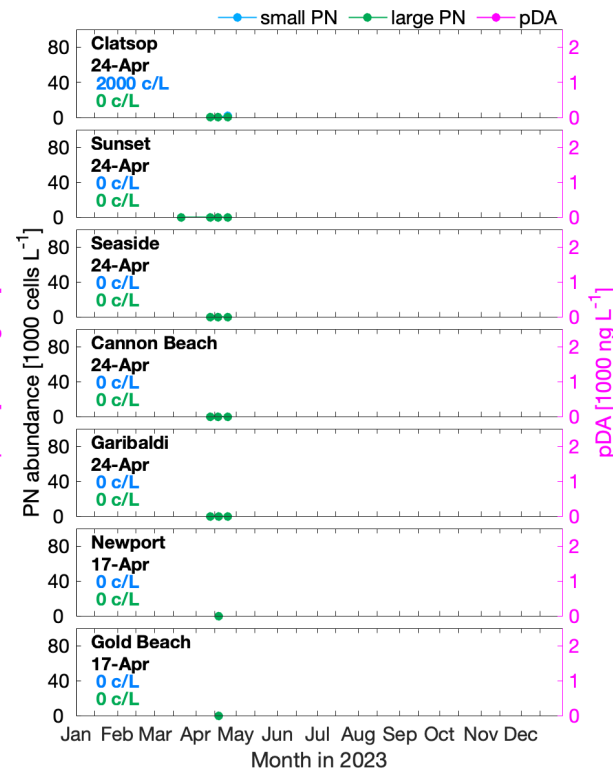
(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

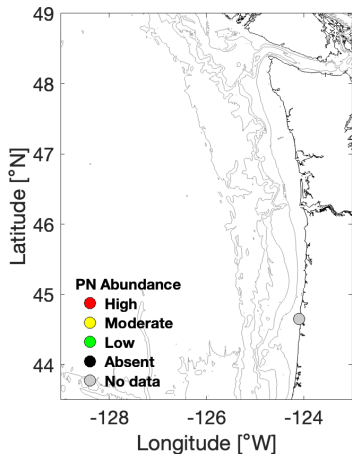


OR *Pseudo-nitzschia* & Domoic Acid

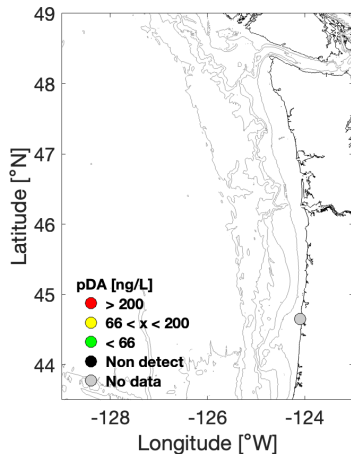


Offshore Sampling

(*Pseudo-nitzschia*)



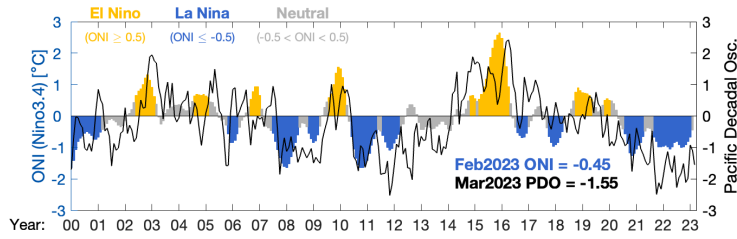
(particulate domoic acid)



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.

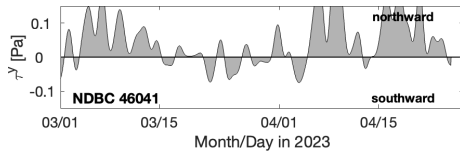
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



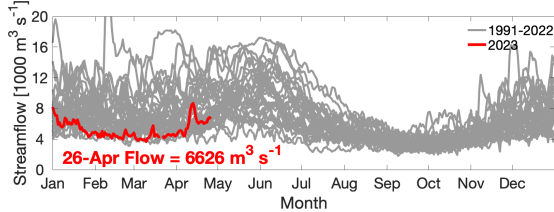
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

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



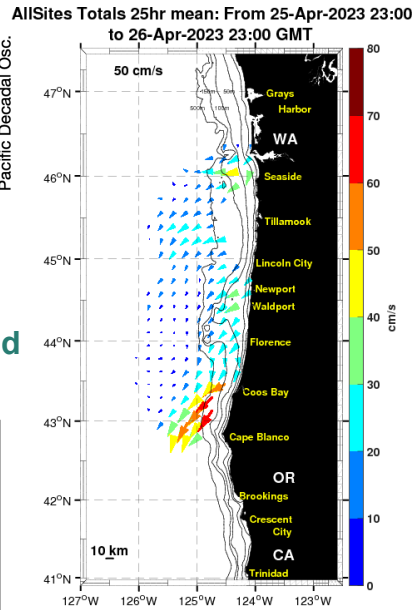
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



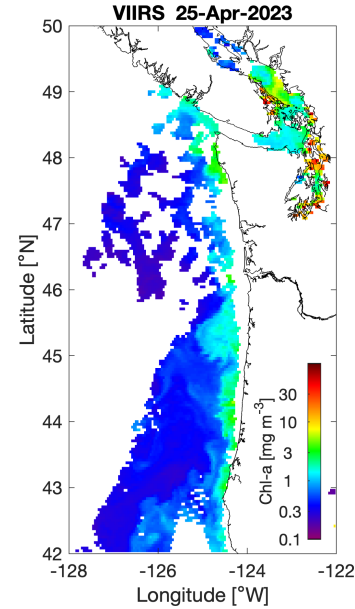
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

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.

Summary - Another round of storms inundated the region last weekend (22–23 Apr). On Monday, 24-Apr, high pressure began to build over the coast and winds turned southward, to upwelling-favorable. Southward winds have continued for the past four days. This week may mark the beginning of this year's oceanic spring transition. So far, satellite chlorophyll-*a* images continue to show moderate values along the coast, but upwelling conditions have only just begun. According to the LiveOcean forecast model, a large quantity of Columbia River water is still present along the entire WA coast. *Pseudo-nitzschia* (*PN*) cell concentrations remain low or nonexistent at beaches. The highest recent quantities were at Long Beach, WA, on 20-Apr (2,000 cells/L of large morphology *PN*) and at Clatsop Beach, OR, on 24-Apr (2,000 cells/L small *PN*). *Pseudo-nitzschia* cells have not been recently detected at any other beaches. Razor clam DA concentrations continue to fluctuate with overall decreases. Samples collected at WA beaches were all below the 20 ppm DA closure limit, with highest values (14 ppm) at Twin Harbors on 13-Apr. Razor clams remained over the closure limit at OR beaches as of 14-Apr (25 ppm at Sunset Beach), but values have continued decreasing.

Forecast - An ENSO neutral state continues and is expected to transition to El Niño at some point this summer. The PDO remains negative, but should decrease in magnitude in the coming weeks. The current upwelling-favorable conditions should give rise to increasing *PN* cells, particularly in OR, where the coast is largely free from the influence of Columbia River water. Southward winds will be interrupted late Friday as another spring storm impinges on the coast. Northward winds are forecast through Sunday, but should then return to upwelling-favorable on Monday. The longer-term forecast is uncertain. At present, there are indications of a return to fluctuating coastal winds as a low-pressure system develops offshore. In any case, while we expect *PN* cells to begin increasing at beaches, conditions should not generally be conducive to high domoic acid production. This is especially true for this time of year. Near-term risk appears low. Since the next planned razor clam harvests do extend well into the future, diligent monitoring of beaches for *PN* cells and seawater toxins, as well as the soon-to-be-deployed ESP mooring, will provide excellent longer-term guidance during the upcoming harvest period.

LiveOcean Forecast Model

