



Pacific Northwest Harmful Algal Blooms Bulletin

Apr 21, 2022 **HAB risk =**

HAB risk key:

- = low
- = medium
- = high

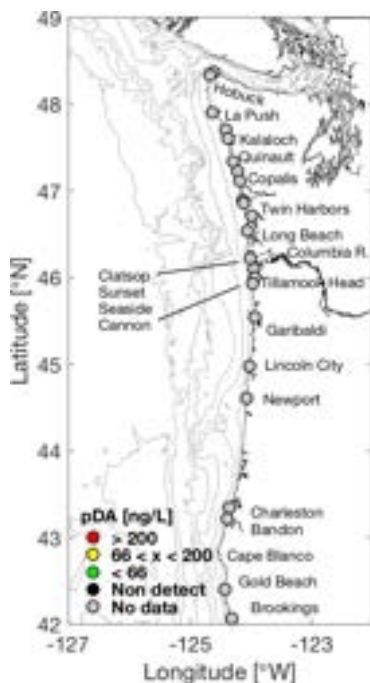
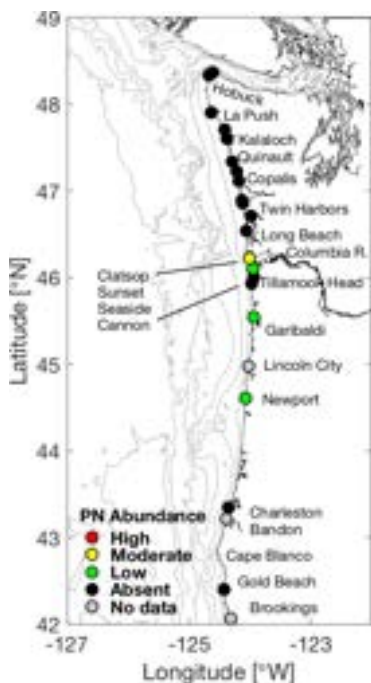


The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

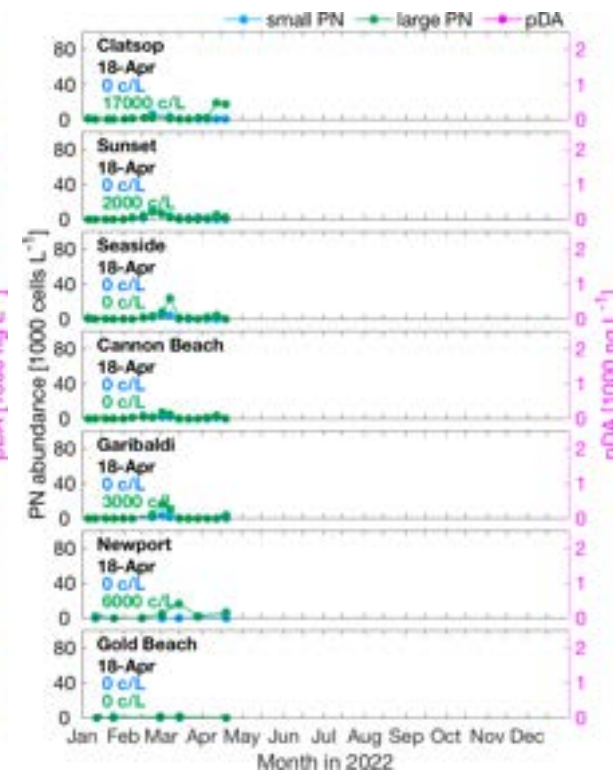
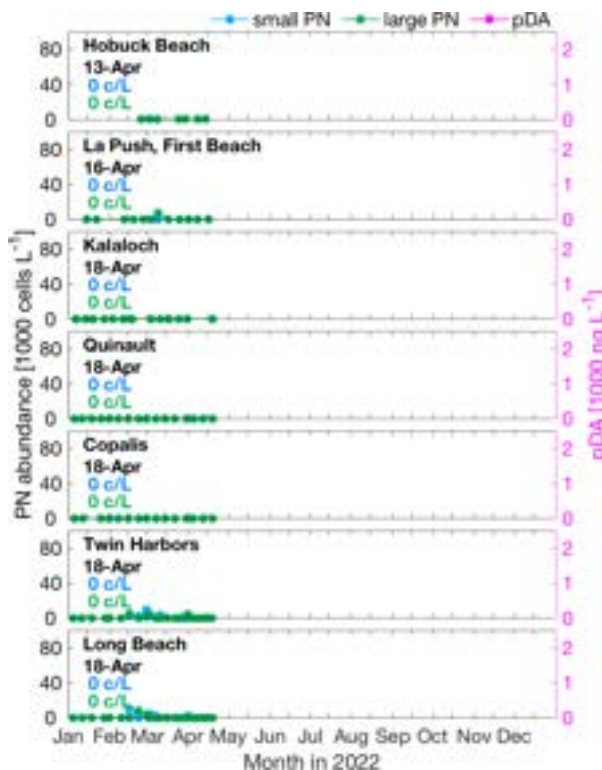
(*Pseudo-nitzschia*)

(particulate domoic acid)



WA *Pseudo-nitzschia* & Domoic Acid

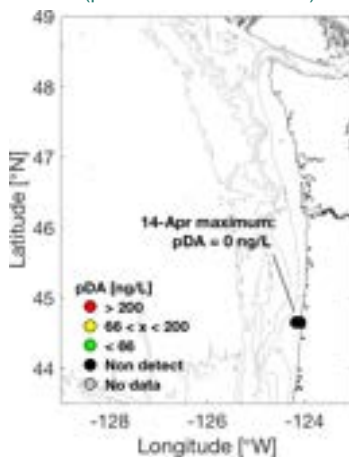
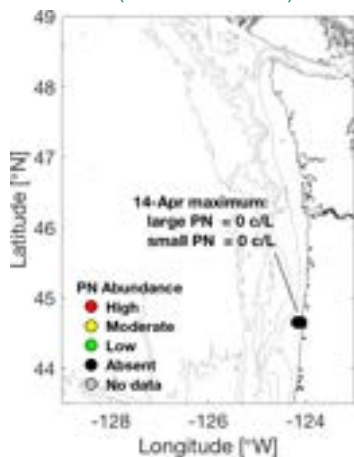
OR *Pseudo-nitzschia* & Domoic Acid



Offshore Sampling

(*Pseudo-nitzschia*)

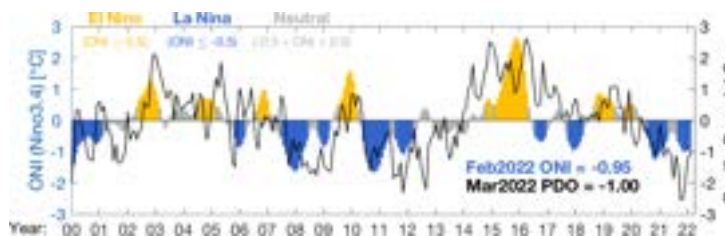
(particulate domoic acid)



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



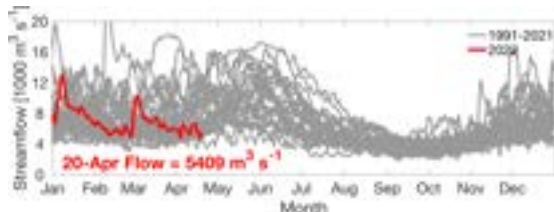
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

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



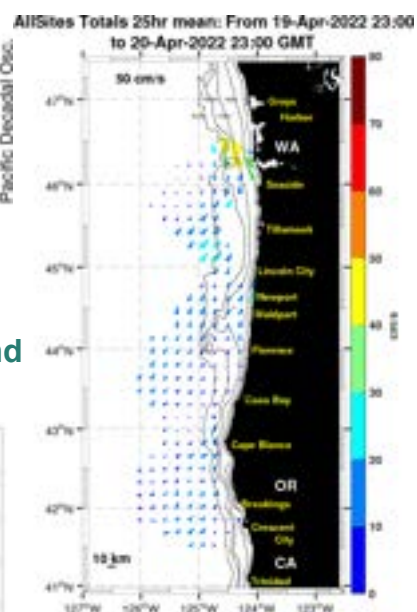
The Columbia River plume can help transport HABs and toxins from the south, northward along the WA coast. However, the plume can also serve as a protective barrier by preventing offshore toxins from reaching beaches.

Marine Weather Forecast



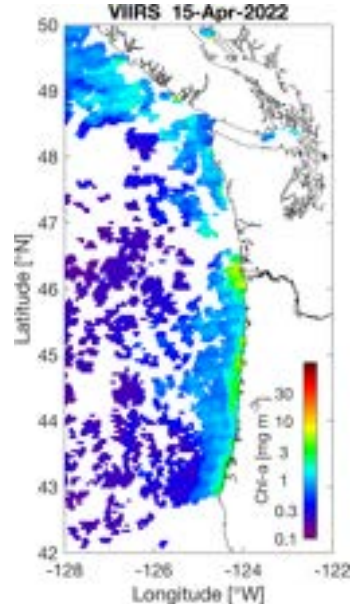
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

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



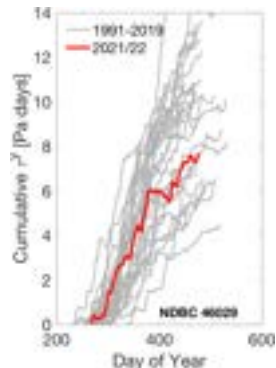
Clouds often obstruct satellite views, but the extent of phytoplankton blooms can at times be seen from space. Blooms do not necessarily reflect the presence of toxins.

Summary - During the last two weeks an anticipated period of upwelling-favorable conditions arrived but did not persist. Instead, along-coast winds returned to a weak state. Surface ocean currents also continue to appear generally weak. The upwelling-favorable winds in the second week of April displaced Columbia River water slightly south to occupy both WA and OR, but more recent northward winds will enhance the freshwater plume off WA (see LiveOcean). Available satellite imagery suggest that chlorophyll-*a* concentrations remain moderate off both WA and OR.

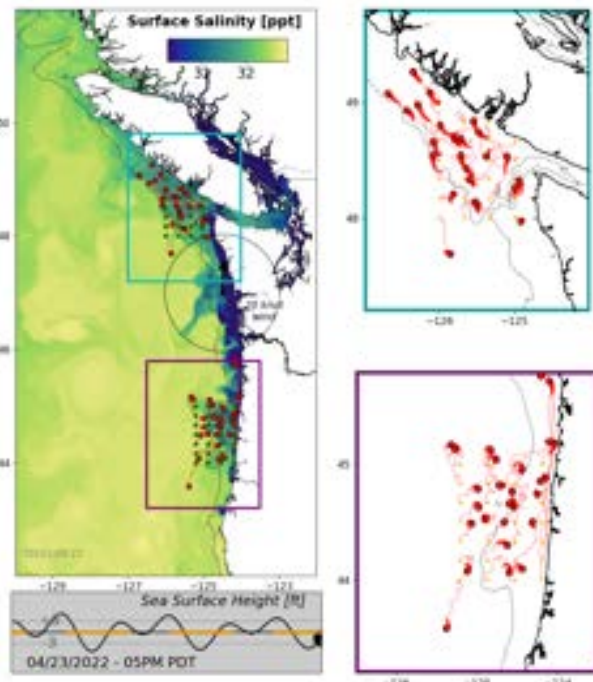
Pseudo-nitzschia (*PN*) cells continue to be relatively sparse at both WA and OR beaches. The highest recent abundance was in northern OR (Clatsop) where 17,000 cells/L of large morphology *PN* were recorded on 18-Apr. Otherwise, *PN* concentrations remain <10,000 cells/L. Given the low *PN* concentrations, seawater particulate domoic acid (pDA) has not yet been quantified at beaches. Samples collected at three sites located 1–5 nm offshore of Newport, OR, on 14-Apr contained no *PN* and had no detectable pDA. WA and OR razor clam DA concentrations remain low. Samples collected at WA beaches were generally ≤ 4 ppm as recently as 18-Apr. 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 toward an ENSO neutral state. The recent PDO value remains negative. Partly sunny weather is expected this weekend, though Friday's light and variable winds will turn northward Saturday as a weak storm front approaches. Longer-term weather forecasts remain uncertain, but they do suggest a continuation of recent conditions: generally onshore directed winds with a relatively weak along-coast component, but with the potential for northward events. Upwelling-favorable conditions appear possible later next week. Given the continuation of current conditions, we believe there is continued low risk for a large DA outbreak over the next few days. This risk increases mid to late next week with the uncertainty in weather predictions. Risk may be somewhat higher in OR since the freshwater plume is currently weaker there and more large-celled *PN* have been recently observed in OR. Once *PN* appear in more significant concentrations, pDA monitoring will be key for ensuring safe harvests.

Cumulative Wind Stress



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.