



Pacific Northwest Harmful Algal Blooms Bulletin

Aug 19, 2017 HAB risk =

HAB risk key:

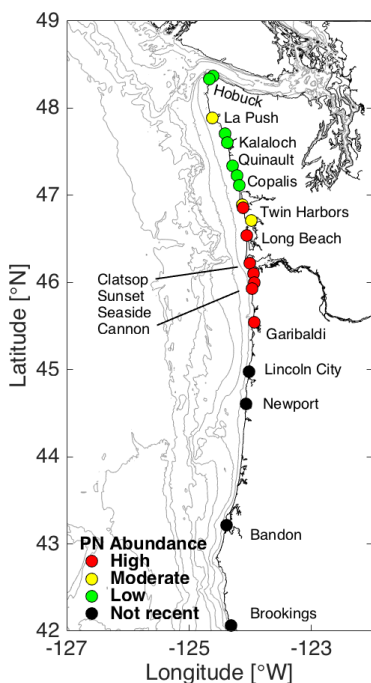
- = low
- = medium
- = high



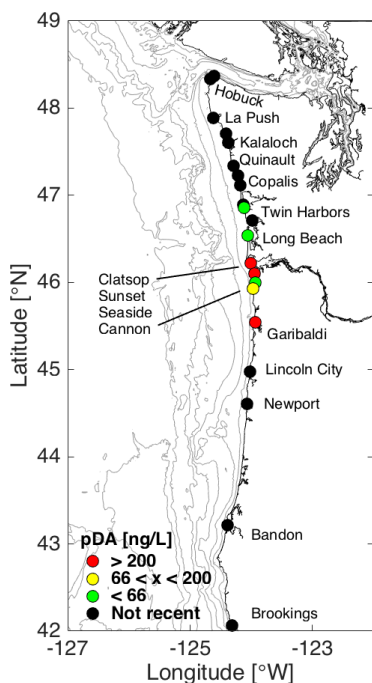
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

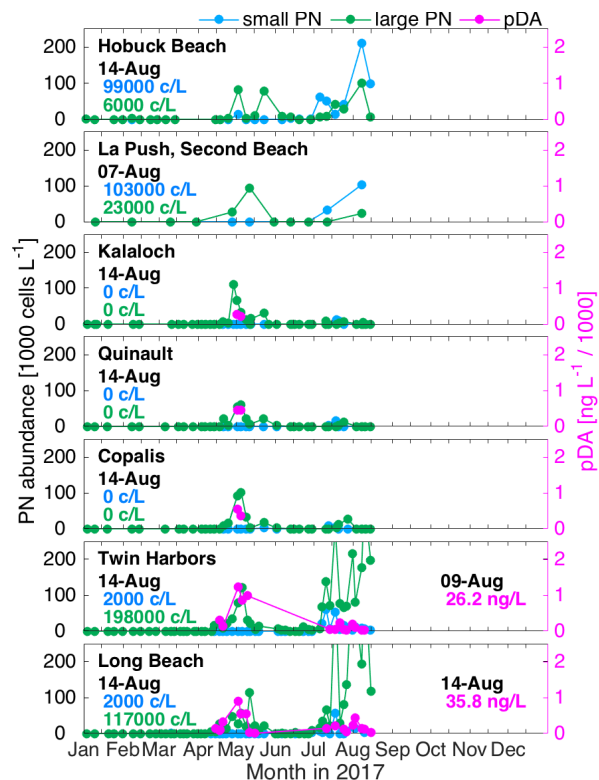
(*Pseudo-nitzschia*)



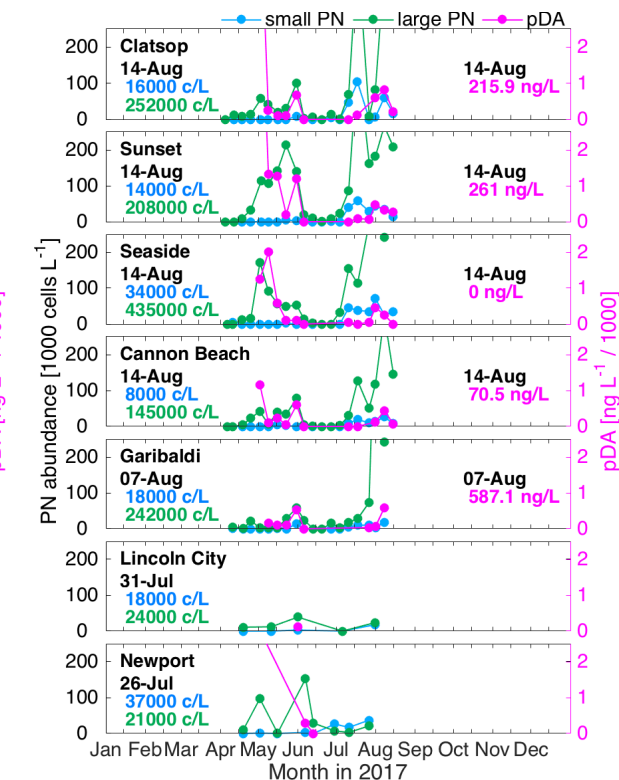
(particulate domoic acid)



WA *Pseudo-nitzschia* & domoic acid

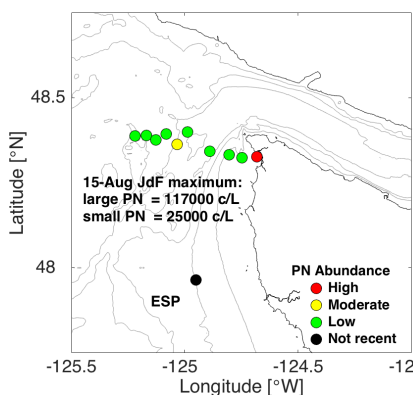


OR *Pseudo-nitzschia* & domoic acid

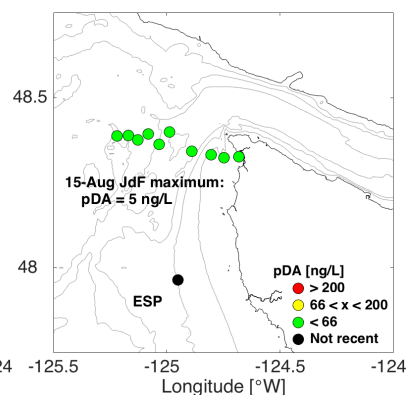


Offshore Sampling

(*Pseudo-nitzschia*)



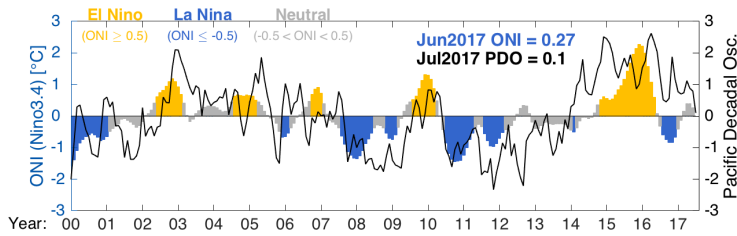
(particulate domoic acid)



Pseudo-nitzschia (PN) abundances are quantified for large and small cell morphologies using light microscopy. Threshold values of 50,000 cells/L for large cells, and 1,000,000 cells/L for small cells trigger additional testing for water column particulate domoic acid (pDA). Water column pDA values >200 ng/L often 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 value; *low*: < 1/3 threshold value) and pDA, are shown in the upper left two panels. "Not recent" 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.

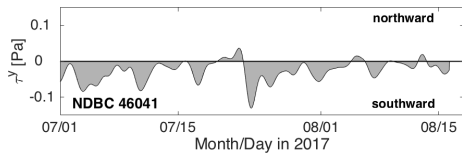
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health and the Oregon Department of Agriculture after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information presented here.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



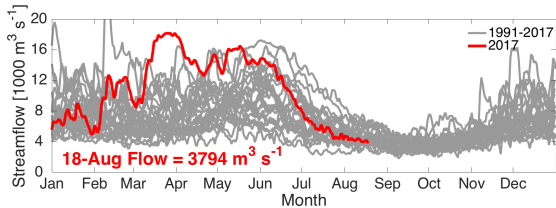
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south wind stress



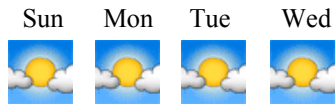
Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cumulative upwelling index (i.e. during years with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

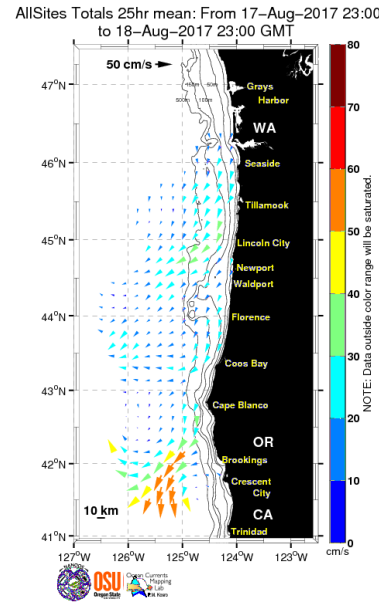
Marine Weather Forecast



Sun - NW wind, 10 kt
 Mon - NW wind, 10 kt
 Tue - NW wind, 10 kt
 Wed - NW wind, 10 kt

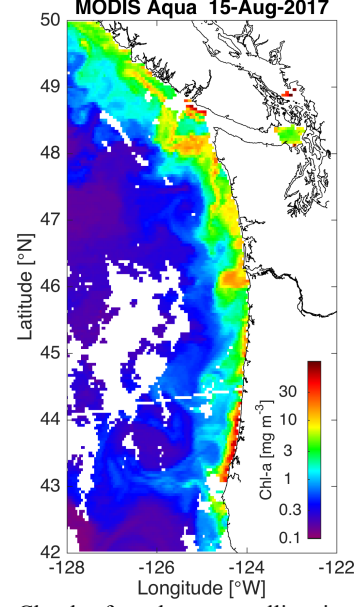
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

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

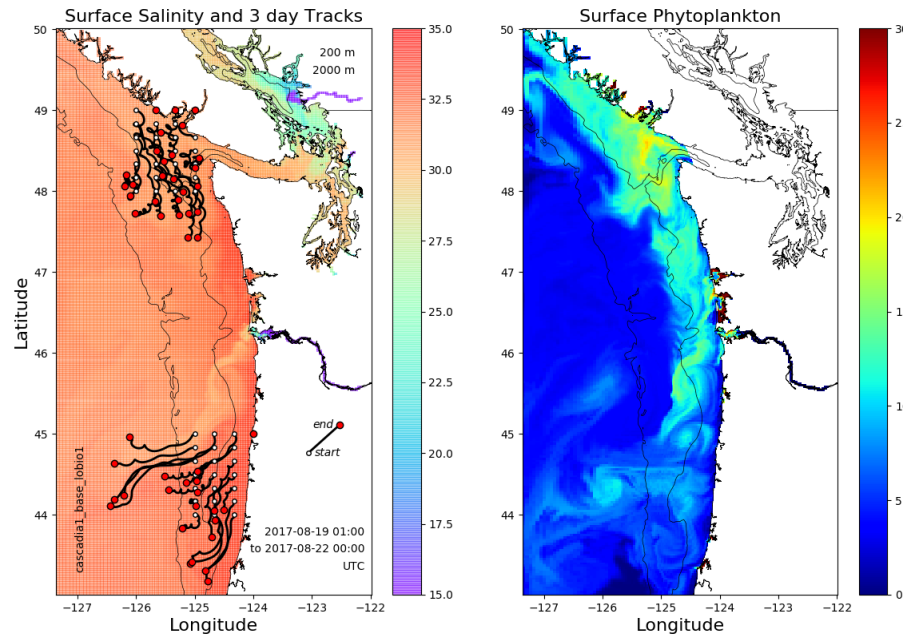


Clouds often obstruct satellite views, but the extent of phytoplankton blooms can at times be seen from space. Blooms do not necessarily reflect the presence of toxins.

Summary - Strong upwelling-favorable winds have fueled dense phytoplankton blooms this summer. *Pseudo-nitzschia* (PN) have been present on WA and OR beaches at concentrations above the action levels since early July. Small cell morphologies currently are dominant north of La Push, WA (~100,000 cells/L). In southern WA and northern OR, large-type cells are dominant (~400,000 cells/L), although small-type cells are also present (~40,000 cells/L). Scanning electron microscope analysis of a Sunset Beach, OR, sample collected 17-July indicated a predominance of *P. pungens* cells (but with *P. australis* present). Reports from 7-Aug indicate that some cells are unhealthy and abundances off southern WA and northern OR have begun to decline. Water column particulate domoic acid (pDA) has also been elevated at southern WA and northern OR beaches with recent values as high as 811 ng/L (Columbia River South Jetty). Beach samples collected this past week suggest that pDA concentrations are also decreasing at these sites. In the Juan de Fuca eddy, both large- and small-type cells were present, but pDA was only detected nearshore (5 ng/L) at the 15 m isobath off Hobuck Beach. WDOH reports that all sites recently sampled were below the 20 ppm limit except for Willapa Spits (current maximum values are 15 ppm at Long Beach on 8-Aug and 11 ppm at Quinalt Beach on 16-Aug). On 11-Aug ODFW announced that razor clam harvest is open from Tillamook Head to Cascade Head, OR; other OR beaches remain closed to razor clam harvest.

Forecast - ENSO conditions have been neutral and are now expected to remain so for the foreseeable future. The most recent PDO value is weakly positive having dropped to its lowest value since Dec 2013. The short-term weather forecast predicts continued upwelling-favorable conditions through the middle of next week. The LiveOcean forecast similarly suggests that plankton (and any toxins) should continue to be pushed offshore over the next few days. Toxic beach events are less likely during this short-term period. However, managers should be wary of any wind reversals since toxins are present in the water. Recent southward winds have diminished in strength. As the season continues, weak southward winds with more reversals are likely and nutrient-stresses on the phytoplankton community could emerge. This combination could give rise to toxic fall blooms. Thus, we do urge continued caution as summer gives way to fall. Enjoy the eclipse!

LiveOcean Forecast Model



Model predicted sea surface salinity and phytoplankton with particles released near the Juan de Fuca eddy and Heceta Bank and tracked 3 days into the future.