



Pacific Northwest Harmful Algal Blooms Bulletin

Oct 18, 2018 HAB risk =

HAB risk key:

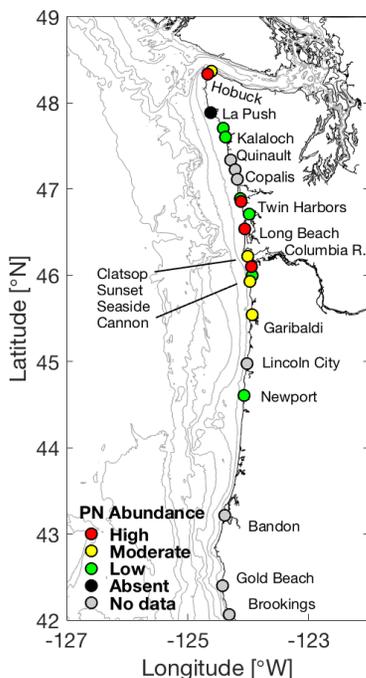
- = low
- = medium
- = high



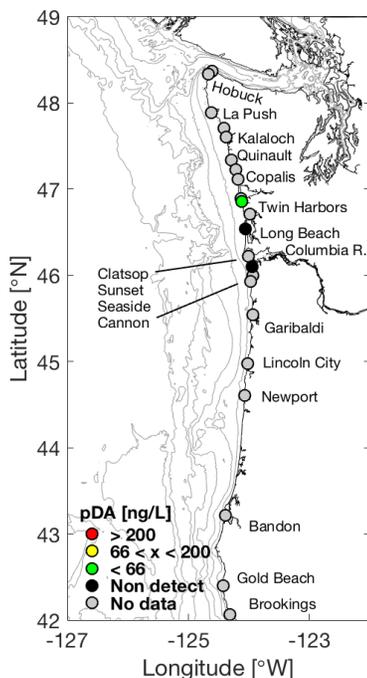
The statements, findings, conclusions, and recommendations do not necessarily reflect the views of NOAA or the Department of Commerce.

Beach Sampling

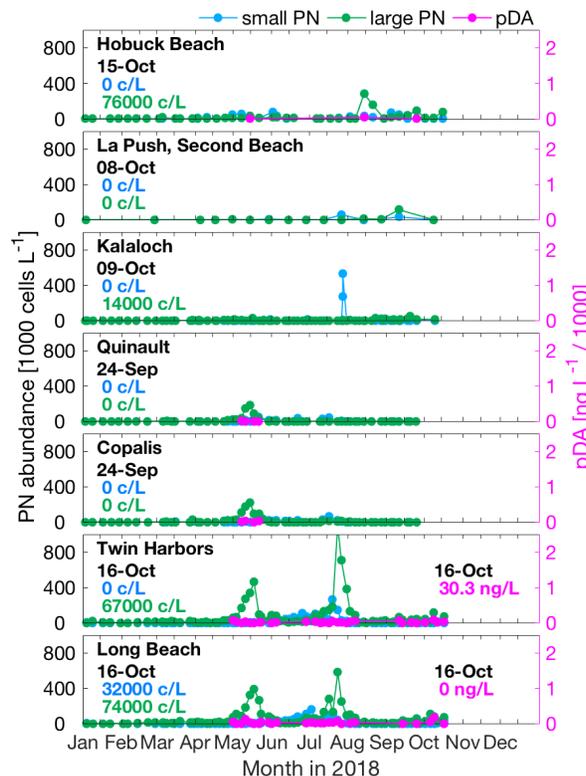
(*Pseudo-nitzschia*)



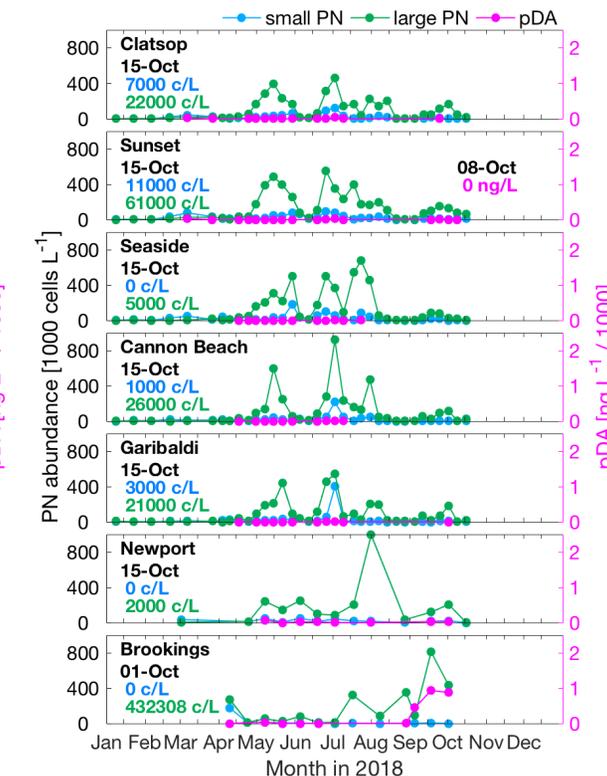
(particulate domoic acid)



WA *Pseudo-nitzschia* & domoic acid

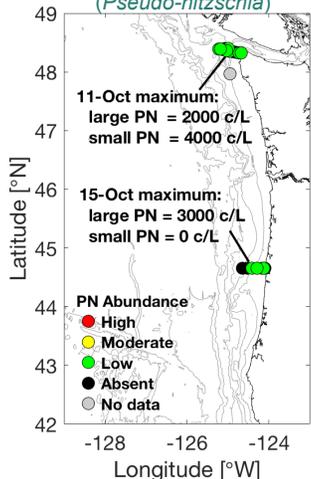


OR *Pseudo-nitzschia* & domoic acid

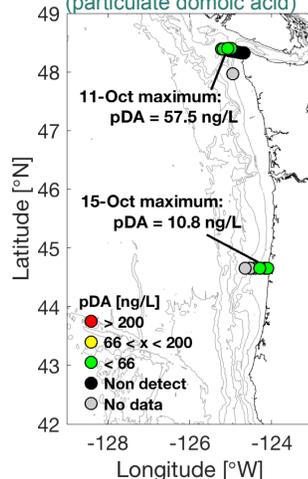


Offshore Sampling

(*Pseudo-nitzschia*)



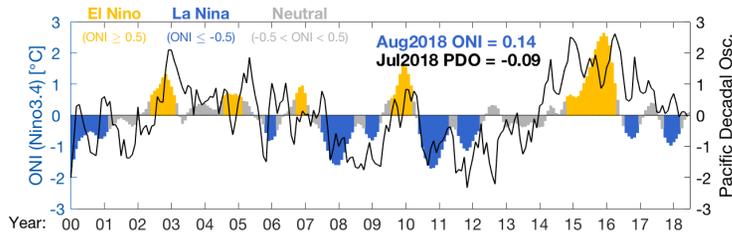
(particulate domoic acid)



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.

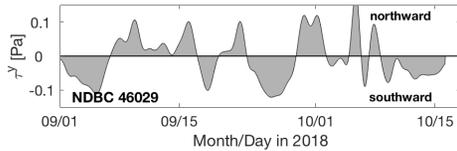
Decisions regarding shellfish harvest closures at individual beaches are made by the Washington Department of Health, the Oregon Department of Agriculture, and Coastal Treaty Tribes after measuring toxin levels in shellfish collected from each beach (WA [link](#); OR [link](#)), and not from the information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



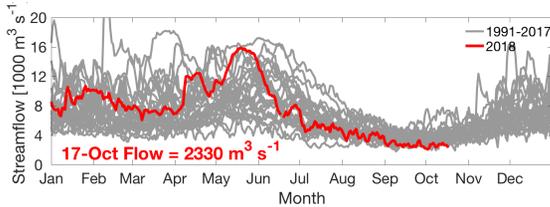
Research has shown that toxic HAB events off WA and OR tend to occur during or following periods of El Niño and/or positive phases of the PDO, when ocean temperatures are relatively warm.

North-south wind stress



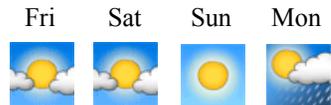
Southward wind stress drives coastal upwelling that can lead to plankton blooms. Northward wind stress tends to push any existing offshore plankton and toxins towards beaches. In addition, summer/fall toxic blooms often occur in years with a moderate cumulative upwelling index (i.e. during years with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

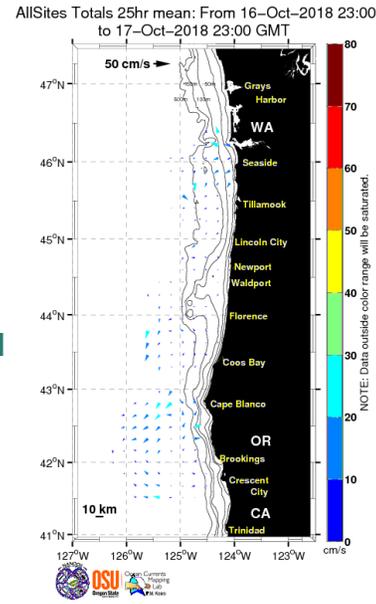
Marine Weather Forecast



Fri - NW wind, 10 kt
Sat - N wind, 10 kt
Sun - NE wind, 10 kt
Mon - S wind, 10 kt

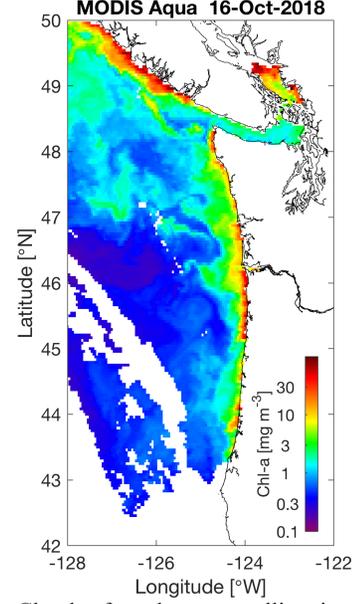
Fair weather can support plankton blooms whereas storms can concentrate any plankton and toxins on beaches.

Ocean Surface Currents



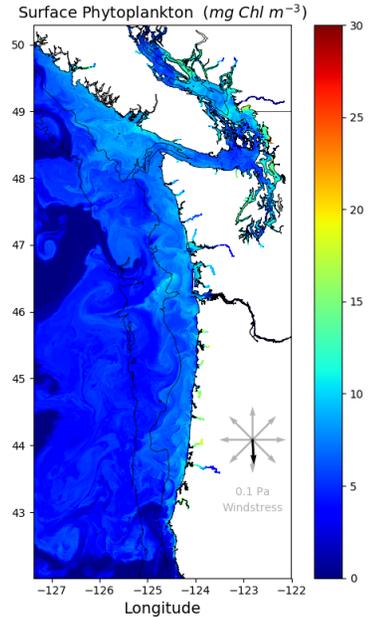
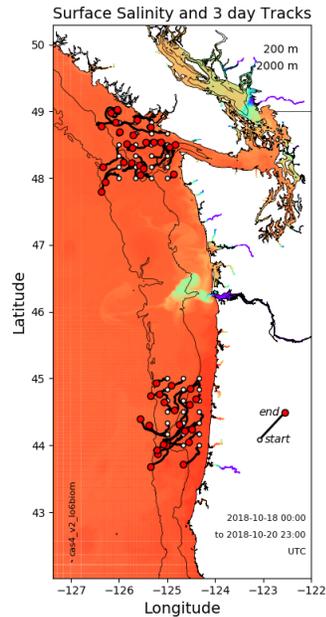
Primary currents flow north and south in winter and summer, respectively, except within ~10 km of shore, where fluctuations follow changes in wind direction.

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.

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.

Summary - An offshore ridge of high pressure extended summer for the past two weeks, and led to continued phytoplankton blooms along the coast. Both WA and OR beaches currently have *Pseudo-nitzschia* (*PN*) abundances over the action limit. As of 16-Oct the highest abundances were in northern and southern WA (Hobuck: 76,000 cells/L large morphology *PN*; Long Beach: 74,000 cells/L large *PN*), and northern OR (Sunset Beach: 61,000 cells/L large *PN*). On 8-Oct, particulate domoic acid (pDA) was 176 ng/L at Long Beach, WA, and undetectable at Sunset Beach, OR; on 16-Oct pDA was 30.3 ng/L at Twin Harbors, WA. Offshore samples collected near the Juan de Fuca Eddy, WA, on 11-Oct contained low abundances of *PN* (2000-4000 cells/L) and moderate pDA at sites over the shelf (max 57.5 ng/L). Offshore samples collected near Heceta Bank, OR, also contained large *PN* in low abundance (max 3000 cells/L) and low pDA (max 10.8 ng/L) at sites near shore. Near Humboldt, CA, a 15-Oct mussel sample was at 6 ppm DA and seawater total DA was 610.9 ng/L, indicating an ongoing toxic event. Southern WA beach samples collected 8-10 Oct were confirmed by scanning electron microscopy to be comprised primarily of *P. pungens* (~80%), with *P. pseudodelicatissima* (~10%) and *P. australis* (~10%) also present. As of 16-Oct, WA razor clam DA was ≤ 3 ppm at all sites sampled. OR razor clam DA was < 5.5 ppm at Clatsop Beach on 12-Oct, as were mussel samples throughout OR. OR razor clam harvest remains closed from the CA border to the Umpqua River (near Coos Bay, OR).

Forecast - ENSO neutral and PDO neutral conditions continue. A weak El Niño is expected to develop in the next couple of months. The short-term weather forecast suggests that high pressure and predominantly southward but weak winds will continue through this weekend. The LiveOcean forecast similarly indicates that weak upwelling conditions will continue in the short term, without any notable shoreward motion. Winds are expected to shift to northward by Monday as a front passes through the region; a second stronger storm is expected Wednesday. The recent weak winds and ocean currents increase the likelihood of toxin production. We expect that *PN* abundances, and possibly toxin concentrations, will increase significantly at beaches with next week's storms. Since toxic species, including *P. australis*, are currently present off WA and OR, we recommend exercising continued caution, with enhanced vigilance after Monday.