**Pacific Northwest Harmful Algal Blooms Bulletin**

Sep 3, 2018  HAB risk = 

**HAB risk key:**
- **= low**
- **= medium**
- **= high**

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### Beach Sampling (Pseudo-nitzschia)

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 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.

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### Offshore Sampling (Pseudo-nitzschia)

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**WA Pseudo-nitzschia & domoic acid**

- **Hobuck Beach** 29-Aug: 0 c/L, 4000 c/L
- **La Push, Second Beach** 27-Aug: 7000 c/L, 4000 c/L
- **Kalahloch** 28-Aug: 0 c/L, 16000 c/L
- **Quinault** 30-Aug: 0 c/L, 0 c/L
- **Copalis** 30-Aug: 0 c/L, 0 c/L
- **Long Beach** 27-Aug: 0 c/L, 6000 c/L
- **Sunset** 27-Aug: 1000 c/L, 1000 c/L
- **Sea Side** 27-Aug: 0 c/L, 6000 c/L
- **Cannon Beach** 27-Aug: 0 c/L, 0 c/L
- **Newport** 27-Aug: 1000 c/L, 35000 c/L

**OR Pseudo-nitzschia & domoic acid**

- **Clatsop** 27-Aug: 0 c/L, 5000 c/L
- **Seaside** 27-Aug: 1000 c/L, 1000 c/L
- **Garbaldi** 27-Aug: 0 c/L, 14000 c/L
- **Lincoln City** 24-Jul: 3000 c/L, 29000 c/L
- **Newport** 27-Aug: 1000 c/L, 35000 c/L

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

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.

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.

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

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.