

2013 Stream Team Phytoplankton Monitoring Summary

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On Thursday afternoons from mid-July to late-September, Stream Team volunteers collected water quality data from the Port Plaza dock in downtown Olympia, Budd Inlet. Volunteers measured water temperature and salinity at surface and depth using a YSI instrument, as well as water clarity with a secchi disk. A phytoplankton sample was collected by performing a vertical net tow from a depth of 3 meters and concentrating it down to a 125-ml volume. Samples were taken to LOTT's Wet Science Center classroom for processing. Phytoplankton was projected onto a large screen so that volunteers could list all species present. A portion of the sample was preserved with Lugol's solution so that cell counts could be performed on harmful algal bloom (HAB) species and entered onto Sound Toxins data sheets.

Results

Water temperatures were warmer and more variable at the surface ranging from 22.2°C (72°F) on 7/25 to 15.7°C (60°F) on 9/26.

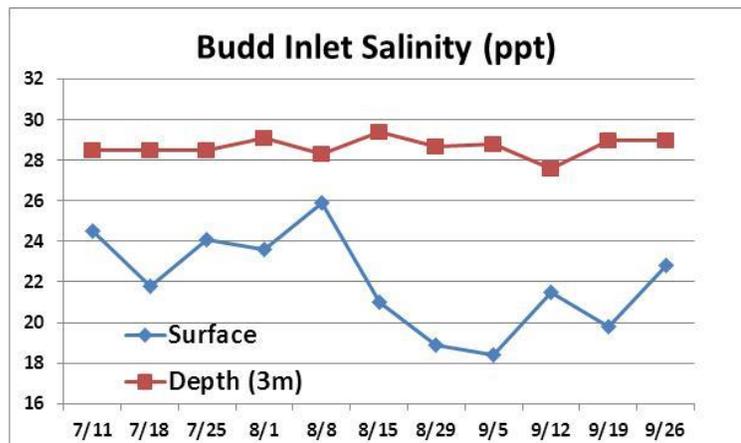
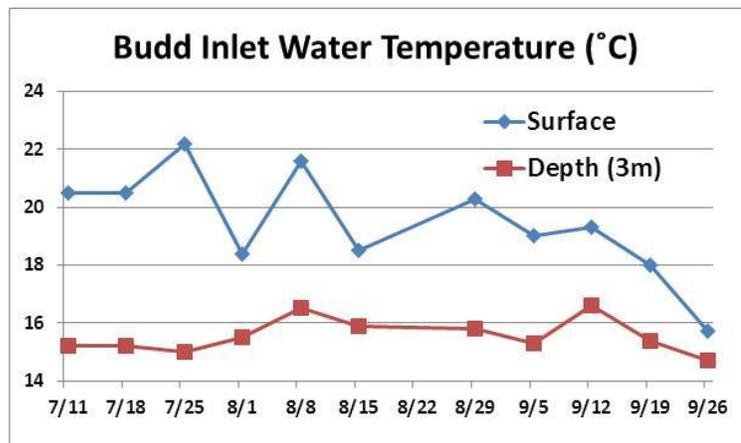
Temperatures showed an overall downward trend from July to September. Temperatures collected at a 3 meter depth were consistent throughout the season averaging 15.5°C (60°F).

Water salinity ranged from 25.9 ppt on 8/8 to 18.4 ppt on 9/5. The freshest surface waters were noted in early September during periods of light drizzle. Salinity at depth remained consistent throughout the season at 28.6 ppt.

Seasonal Observations

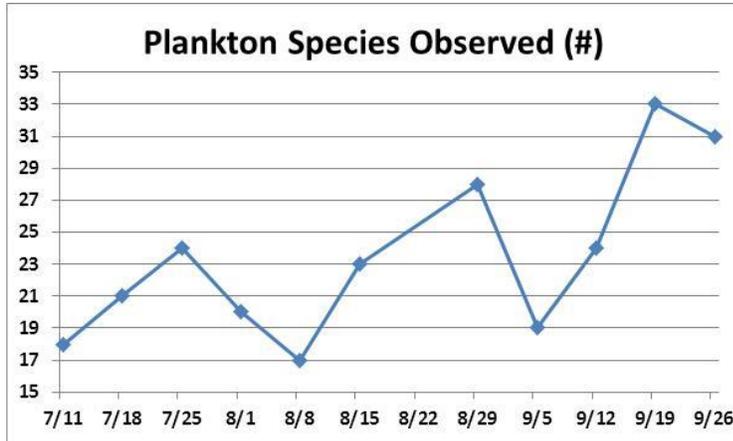
In July, waters were warm and stratified. Phytoplankton

communities were less diverse and dominated by the dinoflagellates *Akashiwo sanguinea*, *Ceratium fusus*, and *Noctiluca scintillans*. On 7/11, *Dinophysis*, the species responsible for

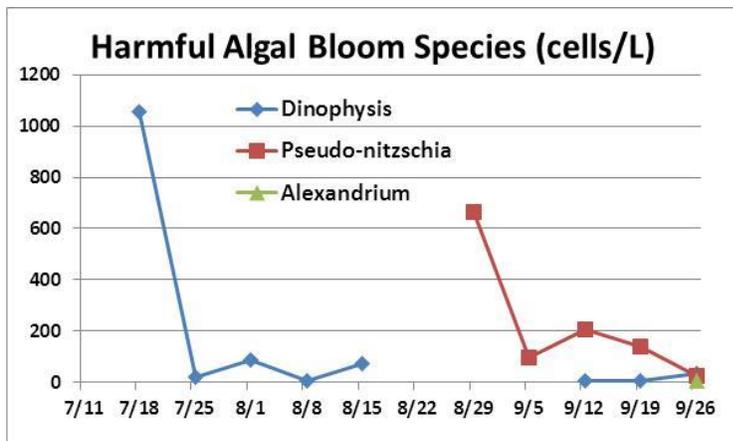


Diarrhetic Shellfish Poisoning (DSP) was detected in our samples. Increased numbers were observed on 7/18. In mid-July, WDOH closed Budd inlet to recreational shellfish harvesting due to elevated DSP toxin levels in routinely monitored mussel tissue. The DSP closure was the first in Budd Inlet's history.

In August, lower Budd Inlet remained stratified with warm, fresh water at the surface and cold, salty water at depth. *Akashiwo* and *Ceratium* still dominated the plankton community. *Pseudo-nitzschia*, the HAB species responsible for Amnesic Shellfish Poisoning (ASP) was detected.



In September, the water was often a reddish brown color. By the end of the month, stratification was starting to break up and temperatures were almost the same at surface and depth (~15°C). The water remained fresher at the surface due to increased rainfall flowing from the Deschutes River. Water clarity (5 meters) and species diversity (33 species) within the plankton community were greatest by the end of the month. While *Akashiwo sanguinea* was still somewhat common, an increasing number of diatom species including *Thalassionema*, *Thalassiosira*, *Chaetoceros* and *Skeletonema* were observed. All three HAB species [*Pseudo-nitzschia*, *Dinophysis*, and *Alexandrium* (the species responsible for Paralytic Shellfish Poisoning)] were detected in the final sample collected on 9/27.



Conclusions

Port Plaza plankton monitoring attracted an average of 13.5 volunteers per sampling event during July and August. Numbers dropped in September with school is session and increased rainfall, but still attracted dedicated volunteers. Community members enjoyed collecting real data and learning about water quality in Budd Inlet. Phytoplankton data were used to assist Department of Ecology's Eyes over Puget Sound and NOAA/Sea Grant's Sound Toxins programs. Sound Toxins is a monitoring program designed to provide early warning of HABs in order to

minimize human health risk and economic losses to fisheries. In addition, Department of Health's Shellfish Program was interested in Budd Inlet *Dinophysis* data during and immediately after the DSP closure.

Water quality and phytoplankton monitoring is a hands-on way to draw community members to the water to teach them about local water quality issues and Puget Sound stewardship. Given the fact that lower Budd Inlet experiences issues such as nutrient enrichment and DSP closures, continued monitoring may be justified.