

2014 Stream Team Phytoplankton Monitoring Summary

Prepared by: Pacific Shellfish Institute, psi@pacshell.org

The City of Olympia Stream Team partnered with Pacific Shellfish Institute (PSI) to conduct its third year of the “What’s Blooming in Budd?” phytoplankton monitoring program in Budd Inlet near downtown Olympia. The goal was to offer engaging hands-on activities that educate the public about local water quality issues and encourage environmental stewardship. To meet this goal, volunteers met on Thursday afternoons from June to September at the Port Plaza dock to collect information on weather, tides, water temperature, salinity, and water clarity. A phytoplankton sample was also collected by performing a vertical net tow from a depth of 3 meters. Participants viewed and identified plankton on the dock using battery powered AmScope field microscopes.

After the plankton samples were collected, they were transported to LOTT’s Wet Science Center classroom and projected onto a large screen where volunteers generated a complete list of species present. A 20-ml sample was also preserved and quantitatively screened for phytoplankton species known to produce biotoxins using Sound Toxins protocols. This information was shared with other monitoring programs such as Department of Ecology’s Eyes Over Puget Sound, NOAA/Sea Grant’s Sound Toxins, and Washington Department of Health.

This year, lower Budd Inlet became an official Sound Toxins site and the data collected was entered directly into their program’s database. Sound Toxins is a volunteer monitoring program designed to provide early warning of harmful algal blooms (HABs) in order to minimize human health risk and economic losses to fisheries. A “What’s Blooming in Budd?” page was also created on PSI’s website and updated weekly with new photos (plankton and volunteers), raw data, and volunteer comments. In addition, the “What’s Blooming in Budd?” program was featured in the June edition of Eyes Over Puget Sound: (http://www.ecy.wa.gov/programs/eap/mar_wat/eops/EOPS_2014_06_23.pdf). Finally, PSI tabled a station at South Sound Estuary Association’s grand opening on August 16th. Activities included identifying local shellfish species, viewing live plankton under a microscope, performing a shellfish filtration demonstration, and learning about water quality issues in south Puget Sound.



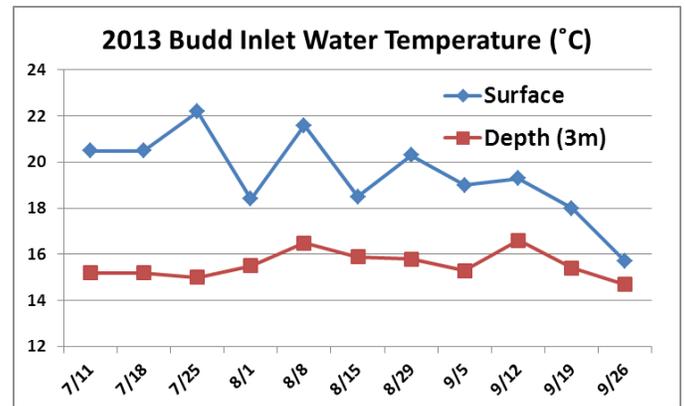
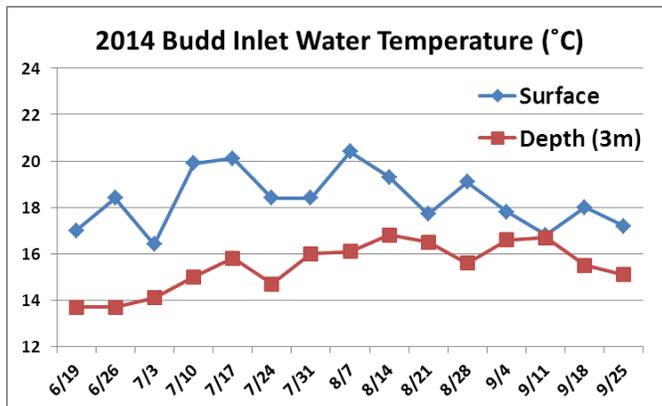
Young citizen scientists collecting a plankton sample from Budd Inlet.

Results

A total of 15 sampling events were conducted at Port Plaza between June 19th and September 25th totaling 293 contacts with the public. Sampling was initiated three weeks earlier than in 2013. The number of contacts peaked during the last 3 weeks of August averaging 32 contacts per event. Despite public schools recommencing in September, several home school programs registered to volunteer for the remaining sampling days.

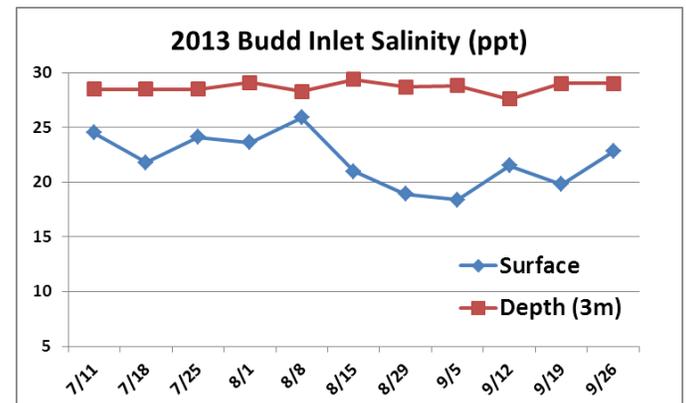
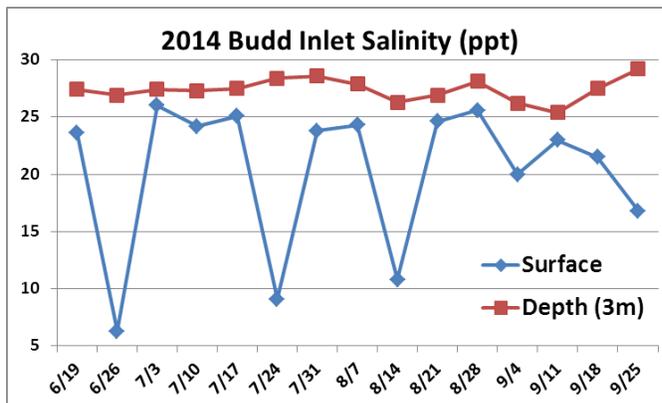
Temperature

Surface seawater temperatures ranged from 16.4°C to 20.4°C (61.5°F to 68.7°F), peaking on August 7th. At 3 meter depth, the temperatures ranged from 13.7°C to 16.7°C (56.6°F to 62.1°F), steadily increasing until September 11th and then starting to decline in early fall. In 2014, surface temperatures peaked at 22.2°C (71.9°F) on July 25th.



Salinity

Surface salinities fluctuated greatly in 2014 indicating 3 dramatic drops that coincided with fresh water dam releases from Capitol Lake. During one release, surface salinity was measured as low as 6.3 ppt! More typical surface readings ranged from 16.8 ppt after a significant rainfall event to 26 ppt during the summer. In both 2013 and 2014 salinity at 3 meter depth remained fairly consistent between 25ppt and 29ppt.

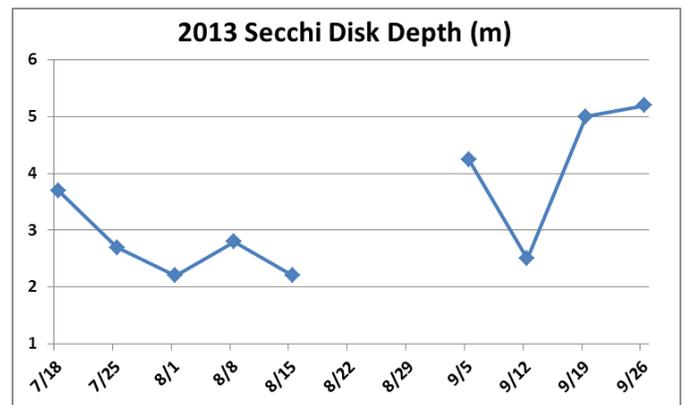
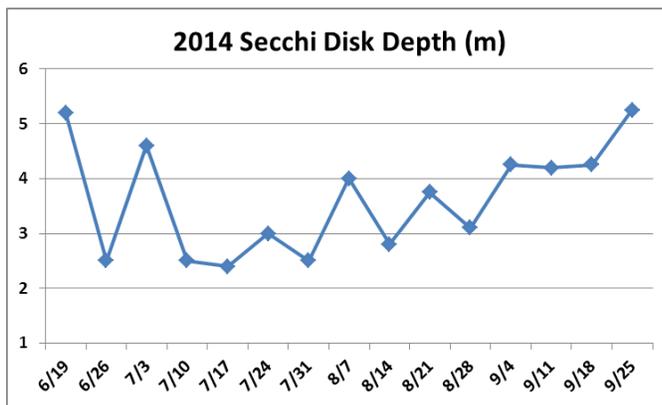


Water Clarity

Water clarity ranged from 2.4 meters in July to 5.2 meters in early June and late September. In mid-September an extraordinary bloom of *Akashiwo sanguinea* pushed up against downtown Olympia during incoming tides turning the water a thick, reddish brown color. Water clarity was measured at less than 1 meter. Interestingly, water clarity exceeded 4 meters during outgoing tides during the same time period.

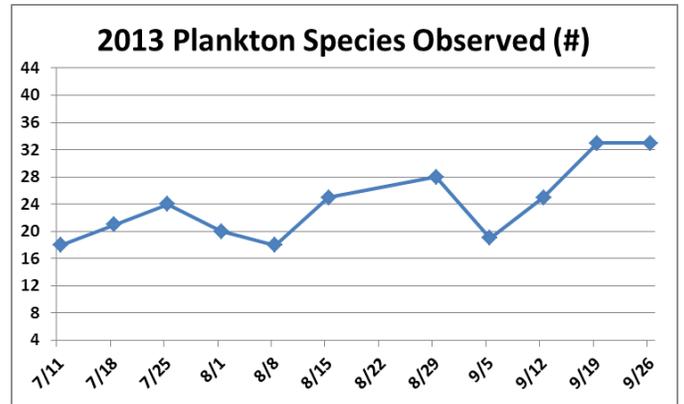
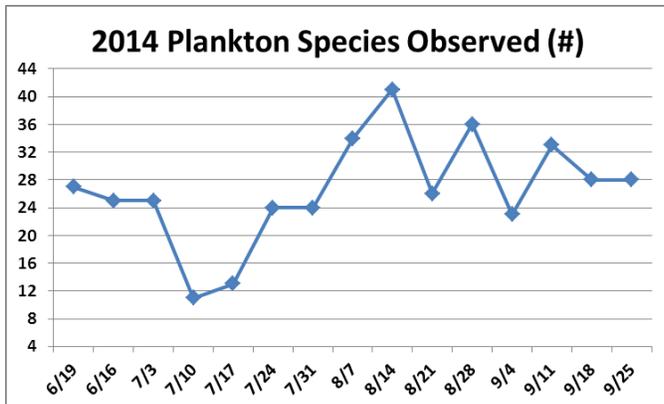


Akashiwo sanguinea bloom in mid-September. Photo: Kelsey Browne, LOTT Clean Water Alliance.

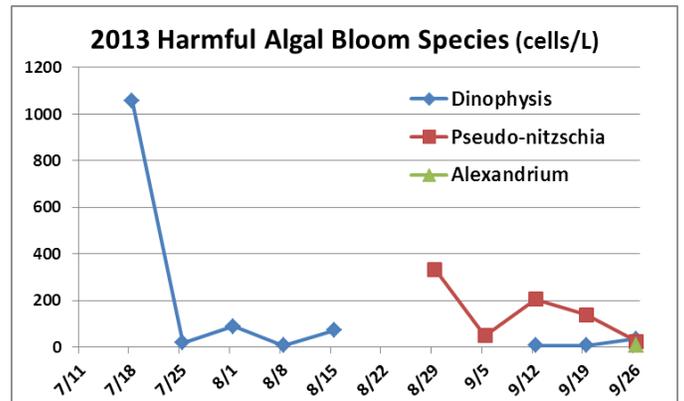
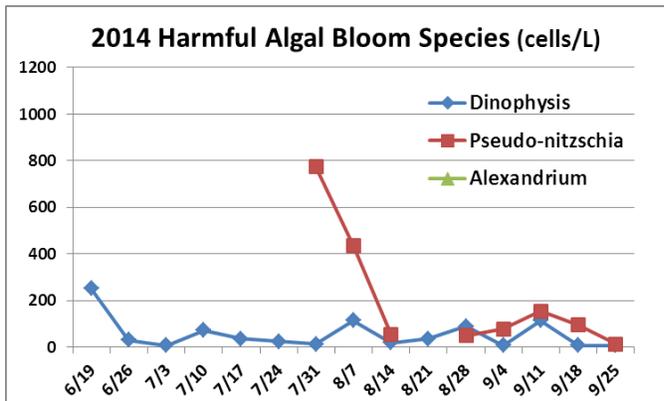


Plankton

The total number of species (phytoplankton and zooplankton) observed in samples ranged from 11 in mid-July to 41 in mid-August. In June, the dinoflagellates, *Noctiluca scintillans* and *Ceratium fusus* dominated the samples along with an assortment of diatoms and other dinoflagellates. In July, species diversity declined, particularly for diatoms, with *Ceratium fusus* as the dominant species and several other dinoflagellates reported as common (*Noctiluca*, *Protoperidinium*, *Scrippsiella*). The first two weeks of August were dominated by *Ceratium fusus* until *Akashiwo sanguinea* appeared on the 21st along with a transitory bloom of the diatom *Skeletonema*. *Akashiwo sanguinea* continued to dominate throughout September until displaced by the diatoms, *Thalassiosira*, *Leptocylindrus* and *Skeletonema* during the final week.



During the 2014 season, both *Dinophysis* and *Pseudo-nitzschia* were observed. *Dinophysis*, the species responsible for Diarrhetic Shellfish Poisoning (DSP) was observed at concentrations over 200 cells/L in mid-June. In 2013, it exceeded 1000 cells/L in mid-July when WDOH closed Budd inlet to recreational shellfish harvesting due to elevated DSP toxin levels in routinely monitored mussel tissue. The 2013 DSP closure was the first in Budd Inlet’s history. *Pseudo-nitzschia*, the HAB species responsible for Amnesic Shellfish Poisoning (ASP) was detected at 800 cells/L in late July, but quickly dissipated.



Conclusions

The 2014 “What’s Blooming in Budd?” events attracted an average of 25 volunteers per sampling event during July and August – an increase from 13.5 volunteers per event in 2013. Community members enjoyed learning about water quality issues in Budd Inlet such as eutrophication and HABs while collecting real data for the Sound Toxins monitoring program. This year, information about the program, including real-time water quality and plankton data, were available to the public by logging onto the “What’s Blooming in Budd?” webpage hosted on PSI’s website.