

## 2015 Stream Team Phytoplankton Monitoring Summary

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The City of Olympia Stream Team partnered with Pacific Shellfish Institute (PSI) to conduct its fourth 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 through 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.



Citizen scientists at the “What’s Blooming in Budd?” August 27<sup>th</sup> monitoring event.

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 NOAA/Sea Grant’s SoundToxins volunteer monitoring program.

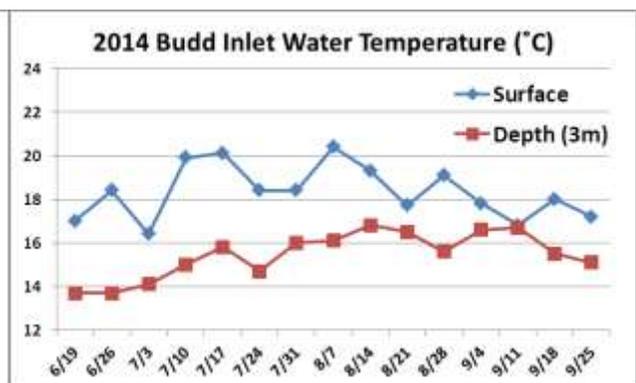
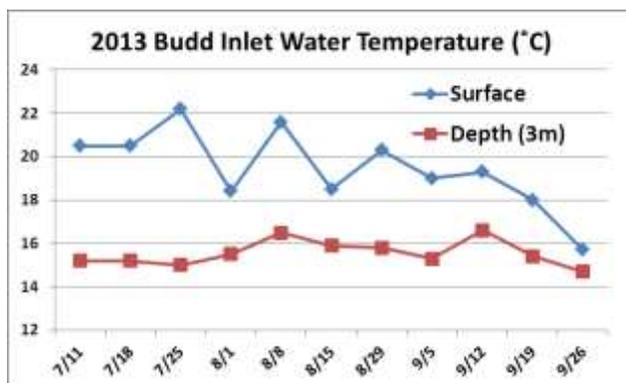
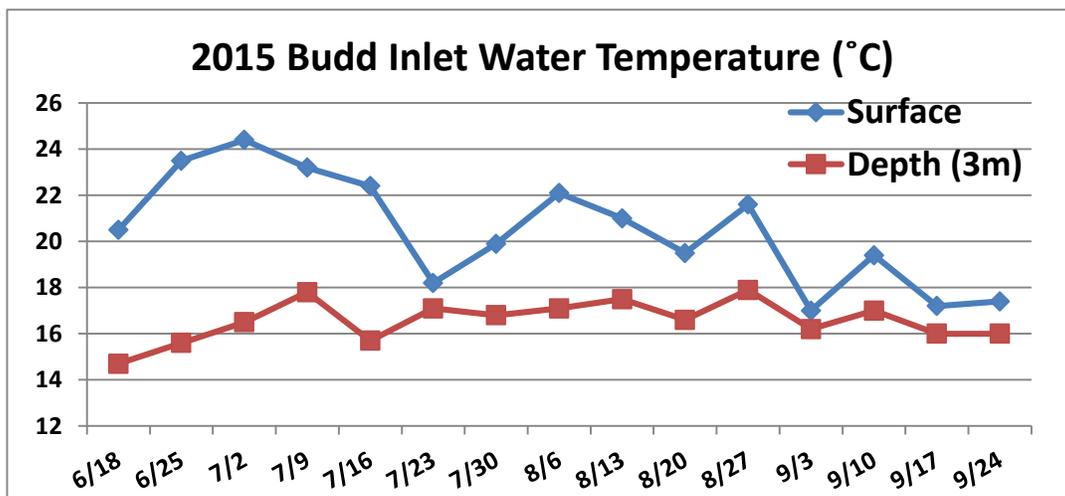
The data collected was entered directly into the SoundToxins monitoring database. Sound Toxins is a volunteer monitoring program designed to provide early warning of harmful algal blooms (HABs) in order to minimize human health risk and economic losses to fisheries. Monitoring results were also updated weekly on PSI’s “What’s Blooming in Budd?” web page which included new photos (plankton and volunteers), raw data, and volunteer comments. PSI also hosted educational activities at the science table at the Hands On Children’s Museum on August 6<sup>th</sup>. 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. A total of 96 contacts were made during this event. The event was so well received that the museum invited PSI back for two additional events this year, which will be funded under a separate project. As a final event, PSI attended the South Sound Estuary Association’s (SSEA) Turning of the Tides festival on December 19<sup>th</sup>. This event included phytoplankton viewing, mussel filtration demonstration, identifying local shellfish species, and a shell ornament making activity.

## Results

A total of 15 sampling events were conducted at Port Plaza between June 18<sup>th</sup> and September 24<sup>th</sup> totaling 286 contacts with the public. The average number of visitors was 20 (dock and LOTT combined), with the highest attendance on July 16<sup>th</sup> and September 3<sup>rd</sup> with 35 visitors on both of those days. A majority of the contacts (n=187) were made at the dock, while a smaller, but significant number were made at the LOTT Wet Center (n=99). The Hands On Children's Museum event resulted in 96 contacts, and 57 contacts were made at the SSEA Turning of the Tides Festival. An article summarizing the data from the past 4 years was submitted for the spring edition of the Stream Team Newsletter, which will be widely distributed throughout Thurston County.

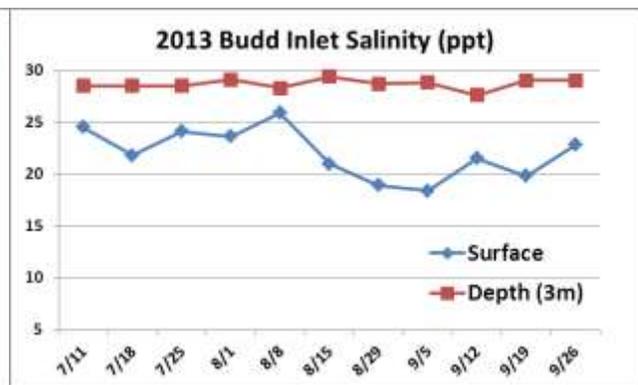
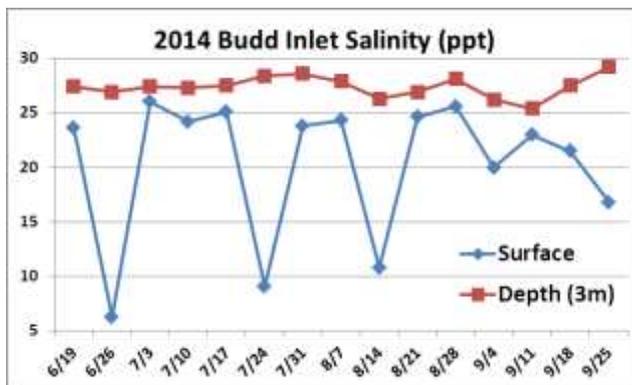
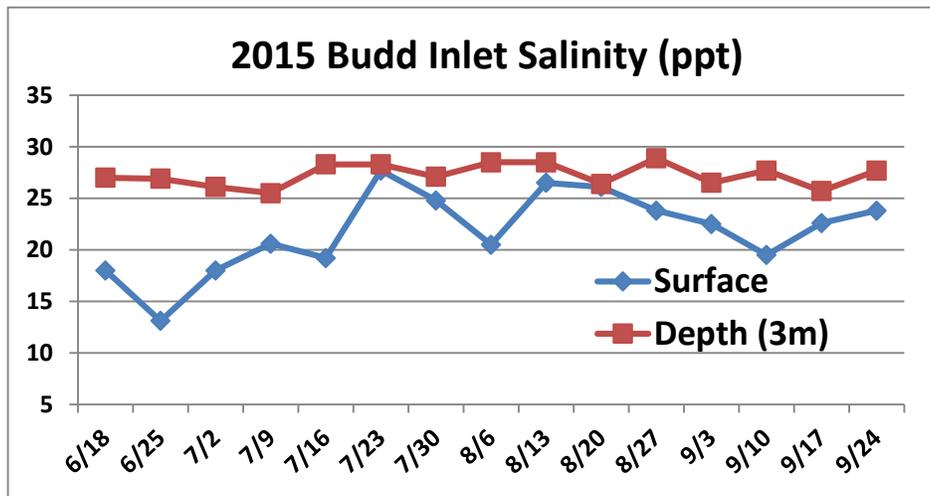
## Temperature

Surface seawater temperatures ranged from 17°C to 24.4°C (62.6°F to 75.2°F), peaking on July 2<sup>nd</sup>. At 3 meter depth, the temperatures ranged from 14.7°C to 17.9°C (59°F to 64.4°F), gradually increasing until declining in early fall. This was a very warm year with several weeks of water temperatures exceeding 20°C in early summer. On July 2<sup>nd</sup>, surface temperatures reached 24.4°C, or 75.2°F!



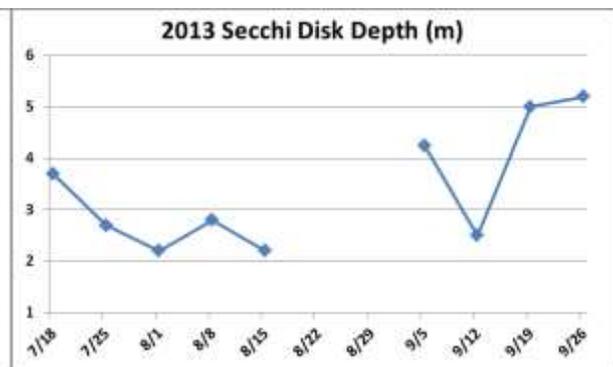
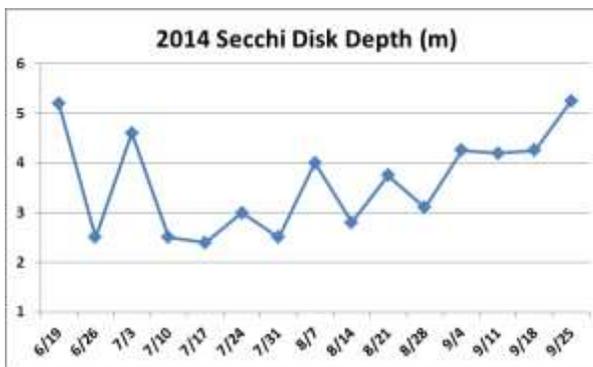
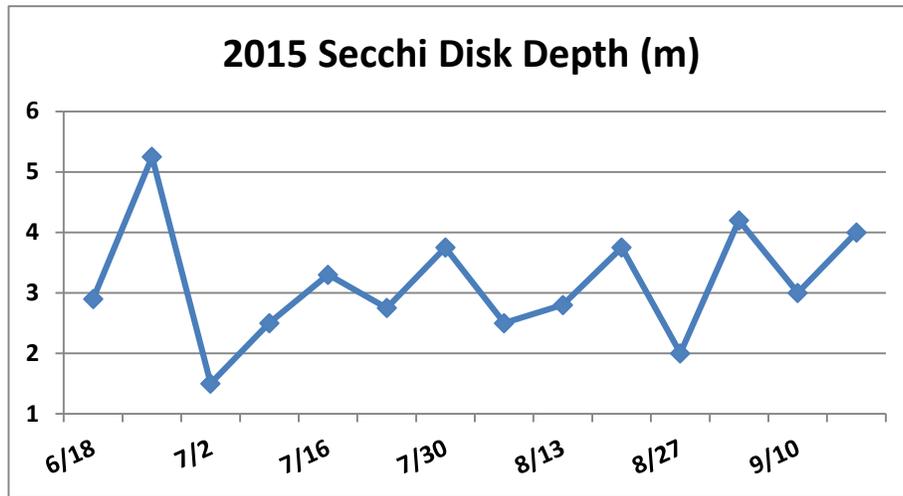
## Salinity

Surface salinities were a bit more stable this year than in 2014, with just one freshwater dam release incident causing a decline in salinity to 13.1 ppt. The average surface water salinity was 21.8 ppt. Similar to other years the surface water salinity fluctuated very little and was typically just below 30 ppt, with an average salinity of 27.3 ppt.



## Water Clarity

Water clarity ranged from 1.5 meters in July to 5.25 meters in late June. During the week of July 2<sup>nd</sup> a thick bloom of *Akashiwo sanguinea* and *Ceratium fusus* persisted that turned the water a dark reddish-brown, and accounted for the very low visibility. *Ceratium fusus* was blooming during the August 6<sup>th</sup> and 13<sup>th</sup> sampling events and *Akashiwo sanguinea* bloomed again on August 27<sup>th</sup>, which resulted in low secchi disk readings on these dates. The secchi disk was unavailable for the September 24<sup>th</sup> sampling event, so no data was collected on that day.

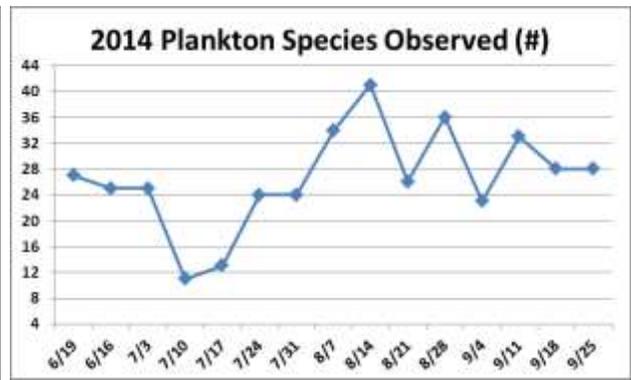
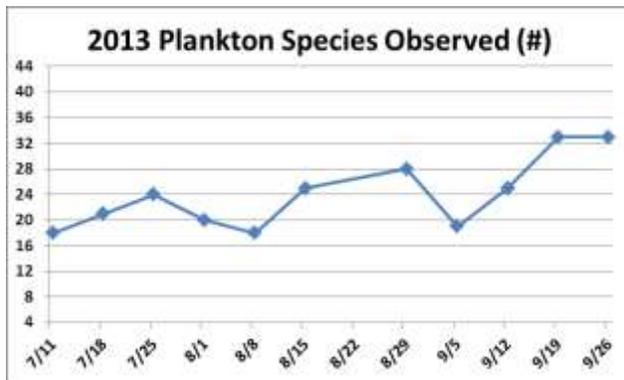
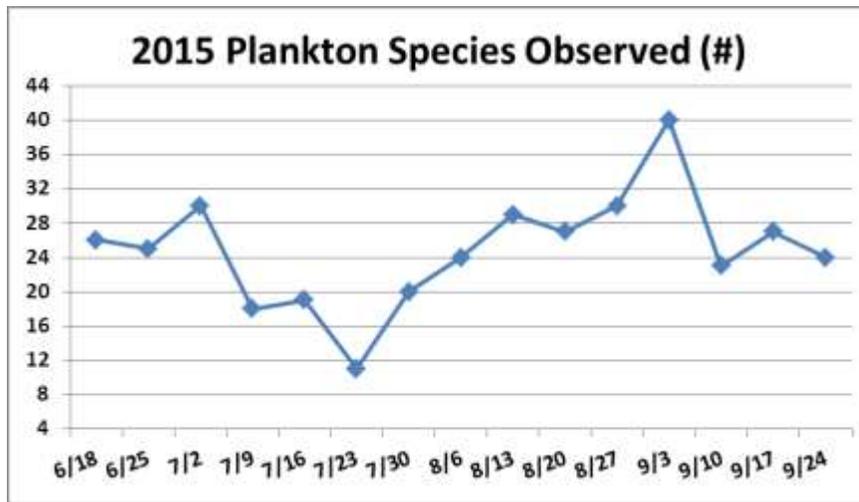


## Plankton

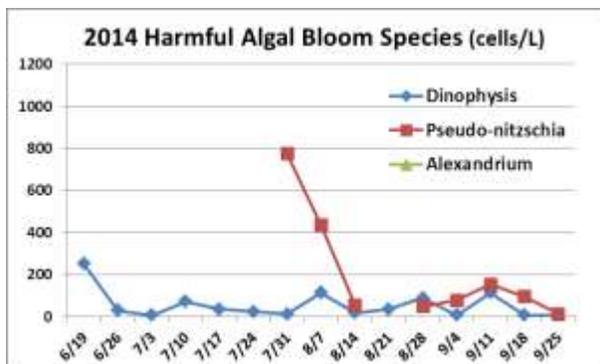
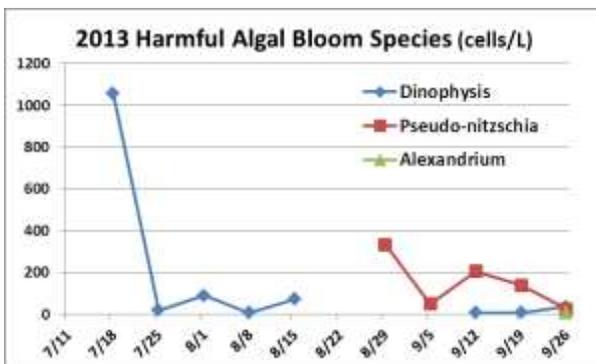
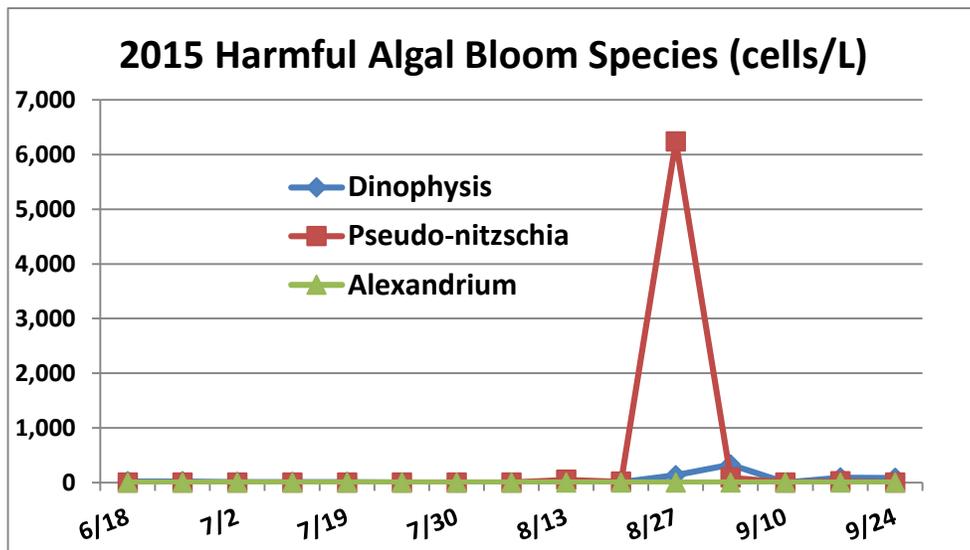
The total number of species (phytoplankton and zooplankton) observed in samples ranged from 11 species in mid-July to 40 in early September. Dinoflagellates, *Akashiwo sanguinea*, *Ceratium fusus*, and *Noctiluca scintillans* dominated the samples through most of the season from June through early September. In July, species diversity declined, particularly for diatoms, with *Ceratium fusus* and *Akashiwo sanguinea* as the dominant species. In a similar pattern to last year, the first two weeks of August were dominated by *Ceratium fusus* until *Akashiwo sanguinea* appeared on the 20<sup>th</sup>, *Ceratium fusus* still remained common. *Akashiwo sanguinea* continued to dominate throughout August until displaced by the arrival of diatoms in the



beginning of September. *Chaetoceros* was abundant on September 3<sup>rd</sup>, and was blooming on September 10<sup>th</sup>. *Thalassiosira* was also common during September.



During the 2015 season, both *Dinophysis* and *Pseudo-nitzschia* were observed. *Dinophysis*, the species responsible for Diarrhetic Shellfish Poisoning (DSP) was observed low concentrations through much of the season with a bloom of concentrations over 300 cells/L in early September. On September 3<sup>rd</sup>, PSI contacted Jerry Borchert in Washington Department of Health's Shellfish Program to inform him that *Dinophysis* was on the rise in lower Budd and that 55 cells of *Dinophysis* were observed in 0.1-mls of seawater collected from a 3-meter net tow sample. *Pseudo-nitzschia*, the HAB species responsible for Amnesic Shellfish Poisoning (ASP) was detected in samples during August and September with a large bloom on August 27<sup>th</sup> reaching 6,240 cells/L.



## Conclusions

The 2015 “What’s Blooming in Budd?” events attracted an average of 20 volunteers per sampling event during July and August – similar to 2014’s average of 21 per event. Attendance significantly increased after the program was promoted in the Olympian during the week of July 9<sup>th</sup> and in the Stream Team newsletter published in late August. Community members enjoyed learning about water quality issues in Budd Inlet such as eutrophication and HABs while collecting useful data for the Sound Toxins monitoring program.



Information about the plankton monitoring events, including up-to-date water quality and

plankton data, were available to the public by visiting the “What’s Blooming in Budd?” web page hosted on PSI’s web site.

