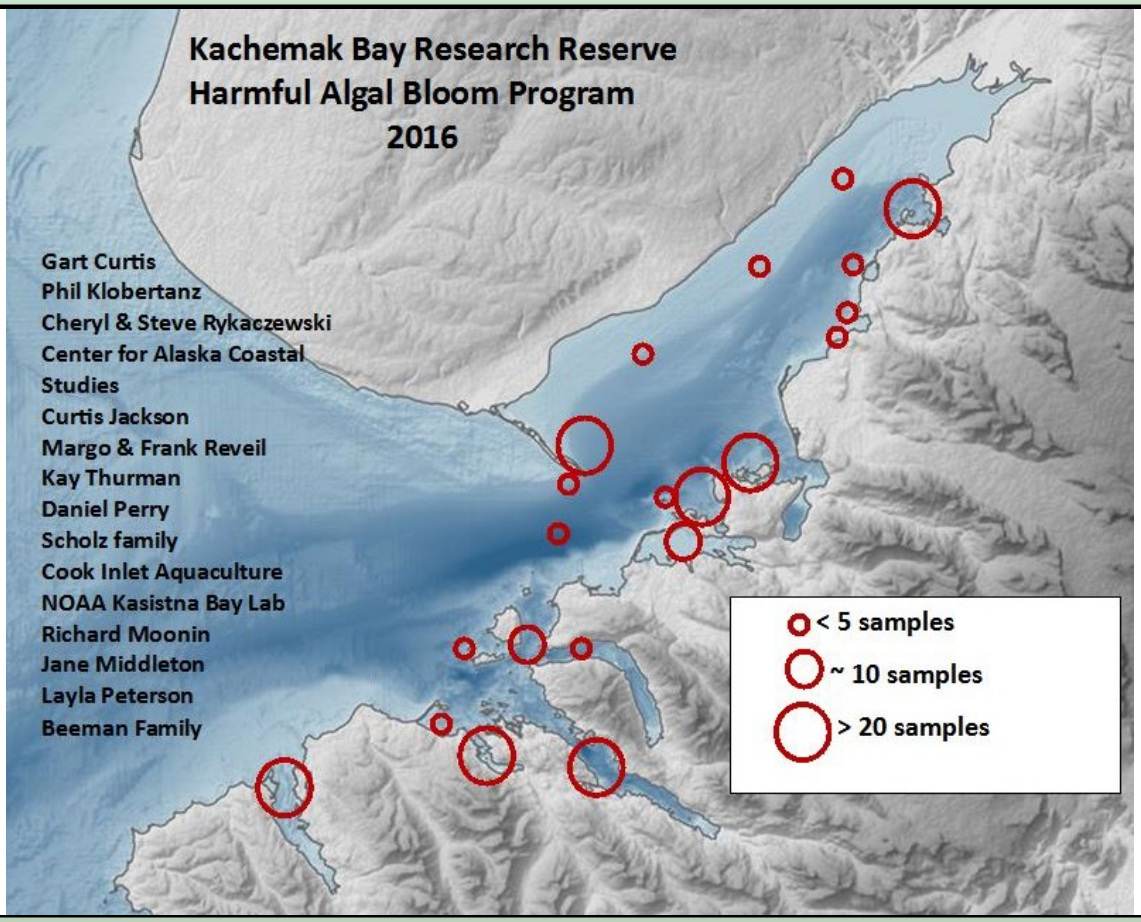
KACHEMAK BAY RESEARCH RESERVE

Harmful Algal Bloom Monitoring

2016 Progress Report

The main goal of the Harmful Algal Bloom monitoring program is to look for groups of phytoplankton that are known to carry toxins that can result in shellfish poisoning. Over 300 phytoplankton samples were collected from 9 consistent sites by community monitors and KBRR staff this summer.

Thank you volunteers for dipping, peering, recording and communicating this season! Your work was valuable in this year of potential and real toxic blooms.



Kachemak Bay Research Reserve Summary of the Harmful Algal Bloom 2016 season

-During the summer of 2016 Kachemak Bay Research Reserve's Harmful Algal Bloom Program saw more of the potentially harmful phytoplankton species than we have seen in past summers.

-*Alexandrium*, which produces saxitoxins that can cause Paralytic Shellfish Poisoning, was detected off and on throughout Kachemak Bay this summer. Shellfish began accumulating the toxins around the first week of August with toxin levels coming down below the regulatory limit by the middle of October.

-National Harmful Algal Bloom experts advise that with warmer water temperatures we can expect to see the pattern of HABs to continue.

Kachemak Bay National Estuarine Research Reserve

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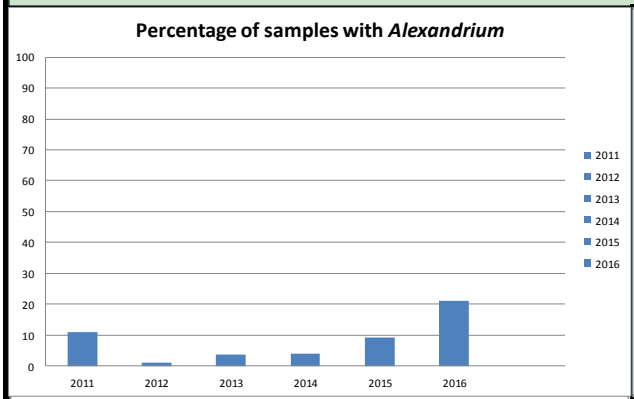
Are we seeing more of the toxin producing cells than we used to?

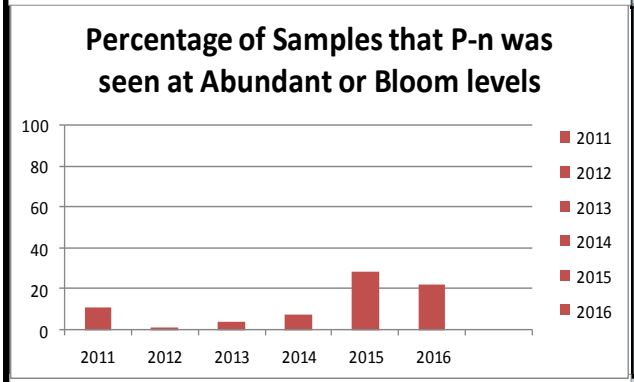
What is a Bloom?

Phytoplankton blooms are a common phenomenon in the ocean. They are caused by many different kinds of microscopic plants that float in the upper, sunlit layers of water. When large numbers of colored phytoplankton are concentrated in one area, the color of the water may change. Other times a large bloom will not affect the color of the water at all. The dangerous cells in our area do not discolor the water. Large blooms are part of every summer in our thriving Kachemak Bay. This year we kept a close watch on all three potential toxic phytoplankton cells. Only one, the Saxitoxins, were detected at troublesome levels.



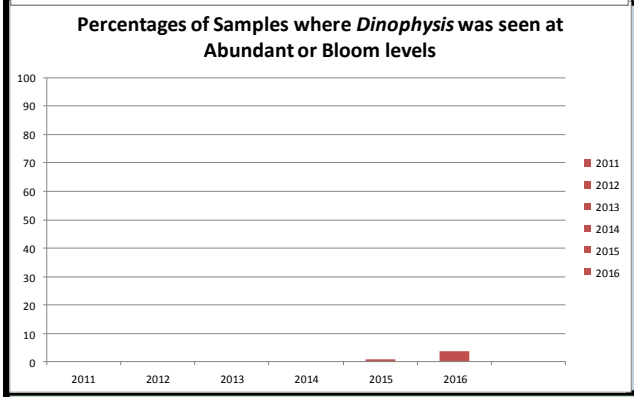
Percentage of Samples containing *Alexandrium*

The graph to the left shows the percentage of samples each year that we saw *Alexandrium* . We are concerned about *Alexandrium* because it is the dinoflagellate that can cause Paralytic Shellfish Poisoning (PSP). As you can see from the graph, the amount of samples with *Alexandrium* has been rising. ISaxitoxins can be a problem even if *Alexandrium* cells are at low numbers. For the two following graphs we only are concerned if the species is in Abundance or a Bloom.



Percentage of samples containing *Pseudo-nitzschia*

The graph on the left shows the percentage of samples where we saw *Pseudo-nitzschia* (P-n) at abundant or bloom levels from 2011-present. P-n is a diatom of concern because it produces Domoic Acid which can lead to Amnesic Shellfish Poisoning (ASP). P-n is usually only a problem when at higher abundance levels. When you look at the graph you can see how the number of samples with high P-n decreased from last year. Last year the "Blob" brought P-n all along West Coast in high concentrations, but this year, they saw a decline. P-n is different in that sometimes it carries toxins and sometimes it doesn't.



Percentage of samples containing *Dinophysis*

The graph on the left shows the percentage of samples in which *Dinophysis* was seen at abundant or bloom levels. Although *Dinophysis* is not as toxic as the other two species of concern, it can still lead to extreme discomfort. 10 samples that came in this year had *Dinophysis* at concerning levels. We sent in one sample that had high cell counts to test for the toxin that makes us sick, Okadaic Acid. The result was that the toxin did show up, (for the first time) but at very low levels.

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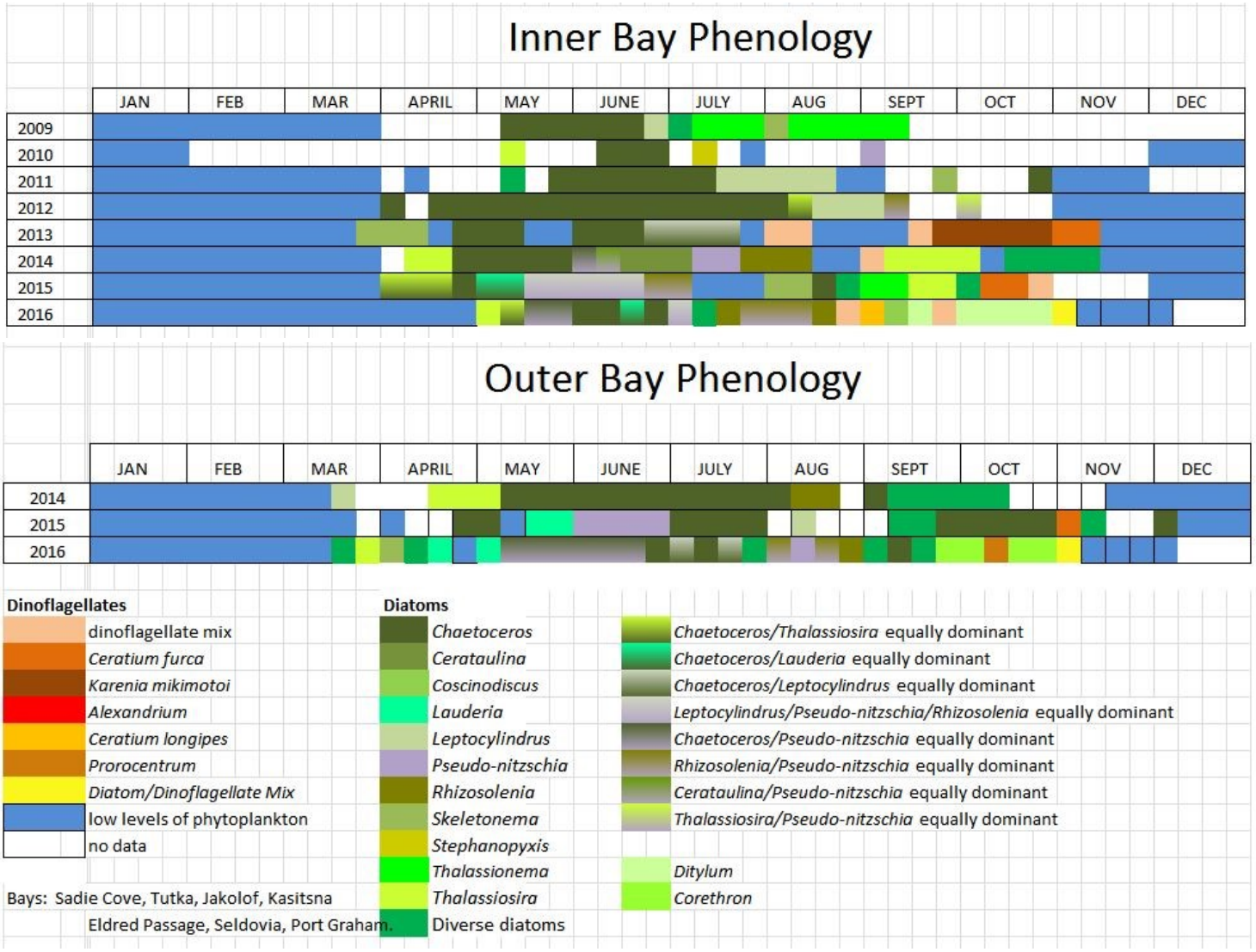
When did different phytoplankton groups bloom in 2016 compared to previous years?



Phytoplankton Phenology

This is what our phytoplankton timing looks like over the course of a year. This 'phenology' chart doesn't say anything about how **much** plankton there was, but it tells us which group dominated inner or outer Kachemak Bay waters and when. Look how *Chaetoceros* dominates for a shorter period of time now compared to 2012 in the inner bay and 2014 in the outer bay. In other areas, phytoplankton has a consistent switch to dinoflagellates in the fall (dinos are colored in oranges and reds on the chart). They definitely come into their own in the later part of our summer, but it is not very consistent. Things are changing all the time and this year we are seeing low level diatoms become more prominent. Kudos to our wonderful volunteers who are responsible for no data gaps this year!!!

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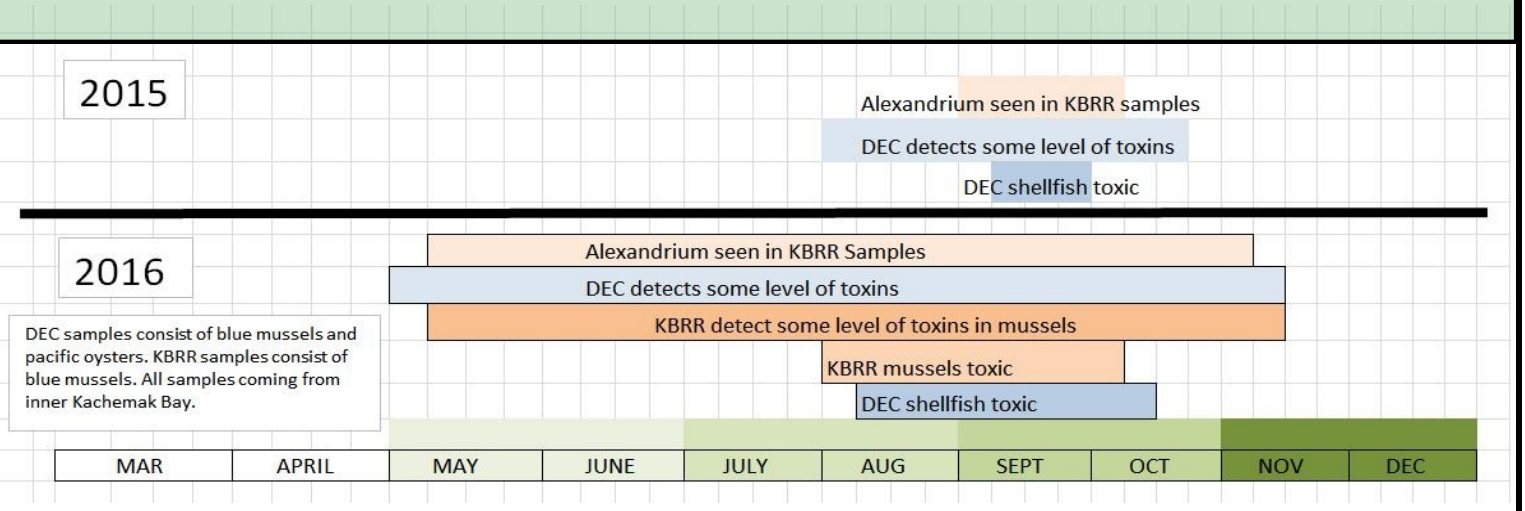
Would Homer Harbor make a good sentinel site?

At last years KBRR HAB workshop here in Homer, the State of Washington presented on their Harmful Algal Bloom Program . One tool they were using that we were not, was to regularly check blue mussels for toxins in key locations called sentinel sites. A sentinel site is a spot where one can collect information that represents a larger area. Research is done initially to demonstrate that the sentinel site truly does reflect the larger chosen area. Cost effectiveness is also an important goal when setting up a long term study site. With this in mind we ordered a 18"x24" wire cage and loaded it up with blue mussels from the Homer Harbor (the idea behind the cage is that it keeps predators from eating your mussels and the precise collection location is always the same). We pulled out a batch of these blue mussels every two weeks. When we received results back with Paralytic Shellfish toxins on August fourth, we increased our sampling schedule to every week. As you can see in the graph below, Homer Harbor did reflect when toxins were present in Inner Kachemak Bay. This is pretty good information for our first year and is encouraging enough to continue with this program next year. The toxicity levels came down quite a bit in October and when we get two samples in a row with very low levels of saxitoxins we will quit for the winter. You can also see that when we see *Alexandrium* in our samples, it's time to pay attention.



Results time for toxin testing goes down dramatically!

Southeast Alaska Tribal Ocean Research has built a lab that can test for Harmful Alga Bloom toxins in Sitka. All commercial product is tested through the State of Alaska DEC lab in Anchorage, but recreational or subsistence samples are not their priority. The NOAA labs we have worked with in years past were just too far away to get timely results; the average results time being 12 days. This year we sent a sample almost every week to SEATOR and sometimes got results back in 4 days! (Average results time was about 7 days).

KBNERR is on the steering committee and assisting in facilitating the Developing a Harmful Algal Bloom Action Plan for Alaska workshop. The December 8th & 9th workshop will include presentations on HAB-related activities around Alaska and then breakout groups focusing on developing an action plan for HAB monitoring, research, and outreach. To receive the results of this meeting contact Ginny Eckert.

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