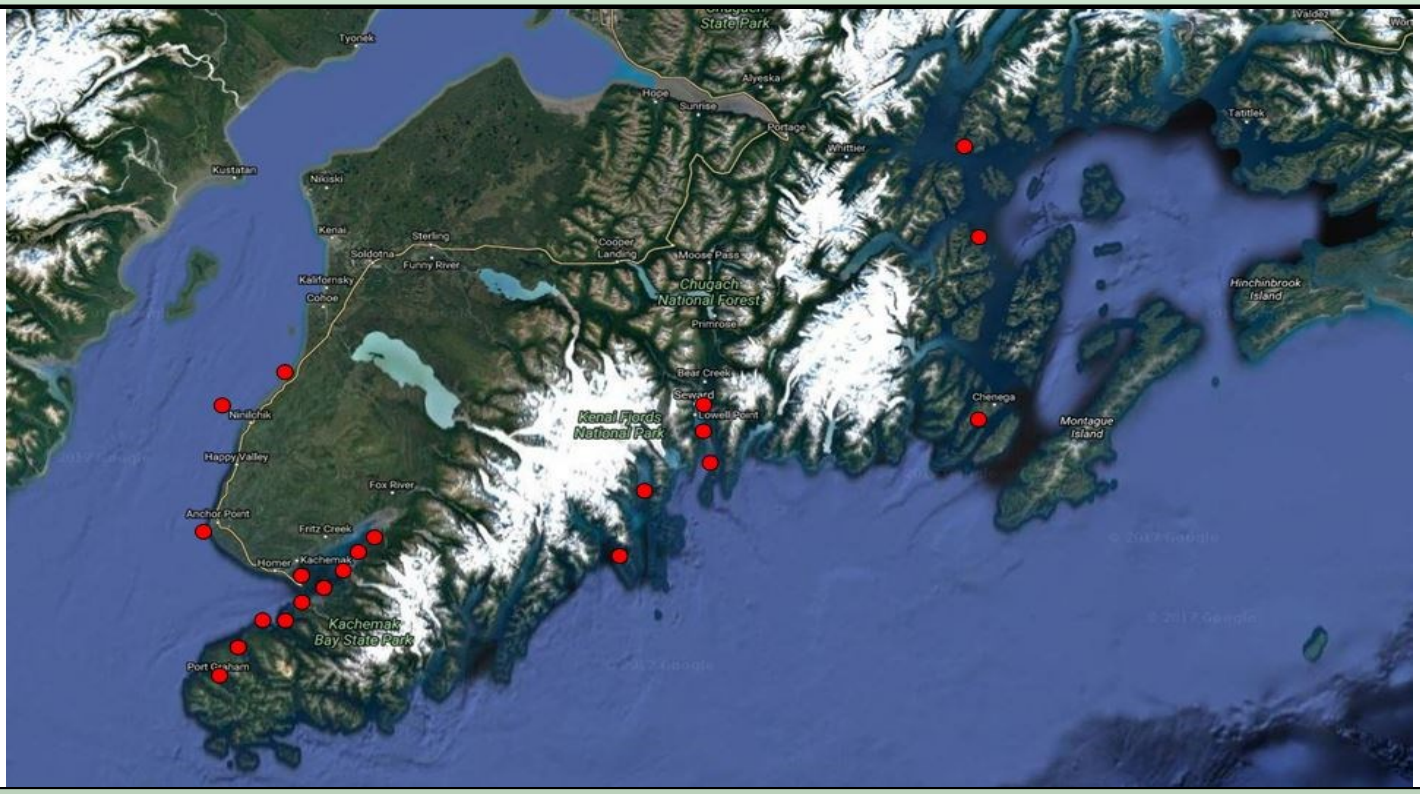
KACHEMAK BAY RESEARCH RESERVE

Harmful Algal Bloom Monitoring

2018 Progress Report

The main goal of the Harmful Algal Bloom (HAB) monitoring program is to look for groups of phytoplankton that are known to carry toxins that can result in shellfish poisoning. Over 200 phytoplankton samples were collected from 14 consistent sites by community monitors and KBNERR staff this summer.

Thank you volunteers for dipping, peering, recording and communicating this season! Your work allowed us to track HABs in Kachemak Bay and provide beyond essential warnings to state managers!



Kachemak Bay Research Reserve Summary of the Harmful Algal Bloom 2018 season

-This season we had lower levels of toxin-producing species of phytoplankton. In inner Kachemak Bay we also had all around lower abundances of phytoplankton, with many sparse samples.

-No shellfish tested for saxitoxins were above the regulatory limit this year. These toxin levels were significantly lower than last season, when we had the highest amount recorded since our monitoring program began in 2008.

-The shift from diatoms to dinoflagellates at the end of summer occurred later in the season this year. Next year we may expand our sampling program into the fall to further monitor for toxin-producing dinoflagellates.

-Kachemak Bay Research Reserve is not a regulatory agency. We provide our information to State of Alaska DEC and Epidemiology offices, which use their regulatory directives to post advisories.

-Commercial shellfish are tested regularly and are not sold if shown to hold harmful levels of toxins. If you dig shellfish yourself, you dig at your own risk.

Kachemak Bay National Estuarine Research Reserve

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This project is supported by a State Wildlife Grant from FWS administered by ADFG with support from NOAA.

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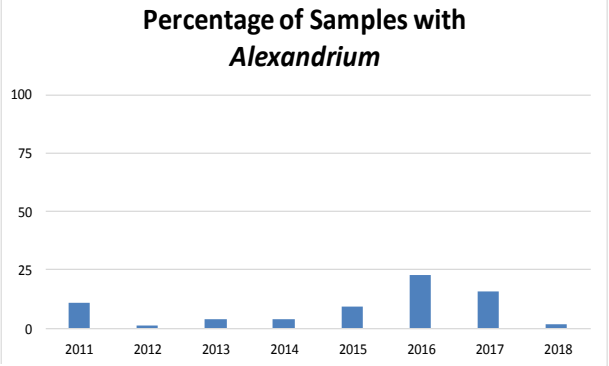
Are we seeing more of the toxin producing cells than we used to?

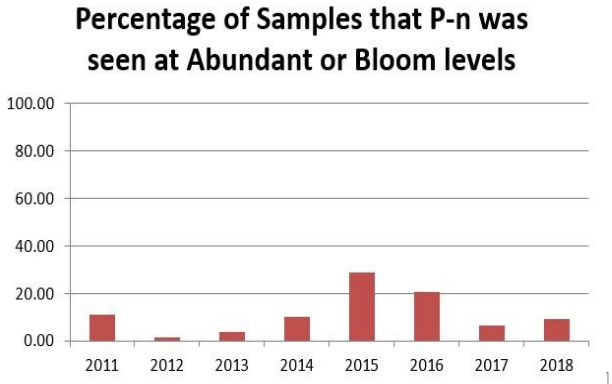
What is a Bloom?

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 the three potential toxic phytoplankton cells. Only one, saxitoxins, were detected at troublesome levels.



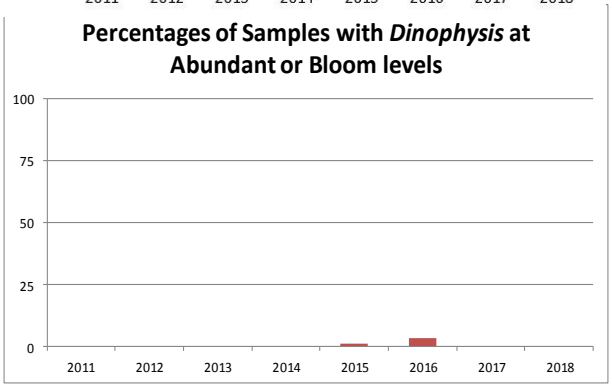
Percentage of Samples containing *Alexandrium*

The graph to the left shows the percentage of samples where *Alexandrium* was detected by year . We are concerned about *Alexandrium* because it is the dinoflagellate that produces saxitoxins, which can lead to Paralytic Shellfish Poisoning (PSP). As you can see from the graph, the amount of samples with *Alexandrium* present was lower this year compared to the last three years. Last summer the shellfish saxitoxin levels were the highest seen in Kachemak Bay since our program began in 2008. That was very different from this year where we did not have any shellfish saxitoxin levels higher than the regulatory limit.



Percentage of samples containing *Pseudo-nitzschia*

The graph on the left shows the percentage of samples that had *Pseudo-nitzschia* (P-n) at **abundant or bloom levels** by year. P-n is a diatom of concern because it produces Domoic Acid which can lead to Amnesic Shellfish Poisoning (ASP). P-n can also cause issues with marine mammals, ie: leading to seizures in sea lions. This year, the amount of samples with P-n at abundant or bloom levels was higher than last year, but still lower than the bloom levels that occurred all down the west coast in 2015. The percentage of samples this year with P-n at abundant or bloom levels was 9.2%, similar to the amount in 2014.



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 and has not led to a recorded fatality, it can still lead to extreme discomfort. *Dinophysis* produces Okadaic Acid which can lead to Diarrhetic Shellfish Poisoning (DSP). Looking at the graph you can see we saw an increase in the percentage of samples with Dinophysis at abundant or bloom levels in 2016. However, we did not see abundant or bloom levels of *Dinophysis* in any samples this year or last year.

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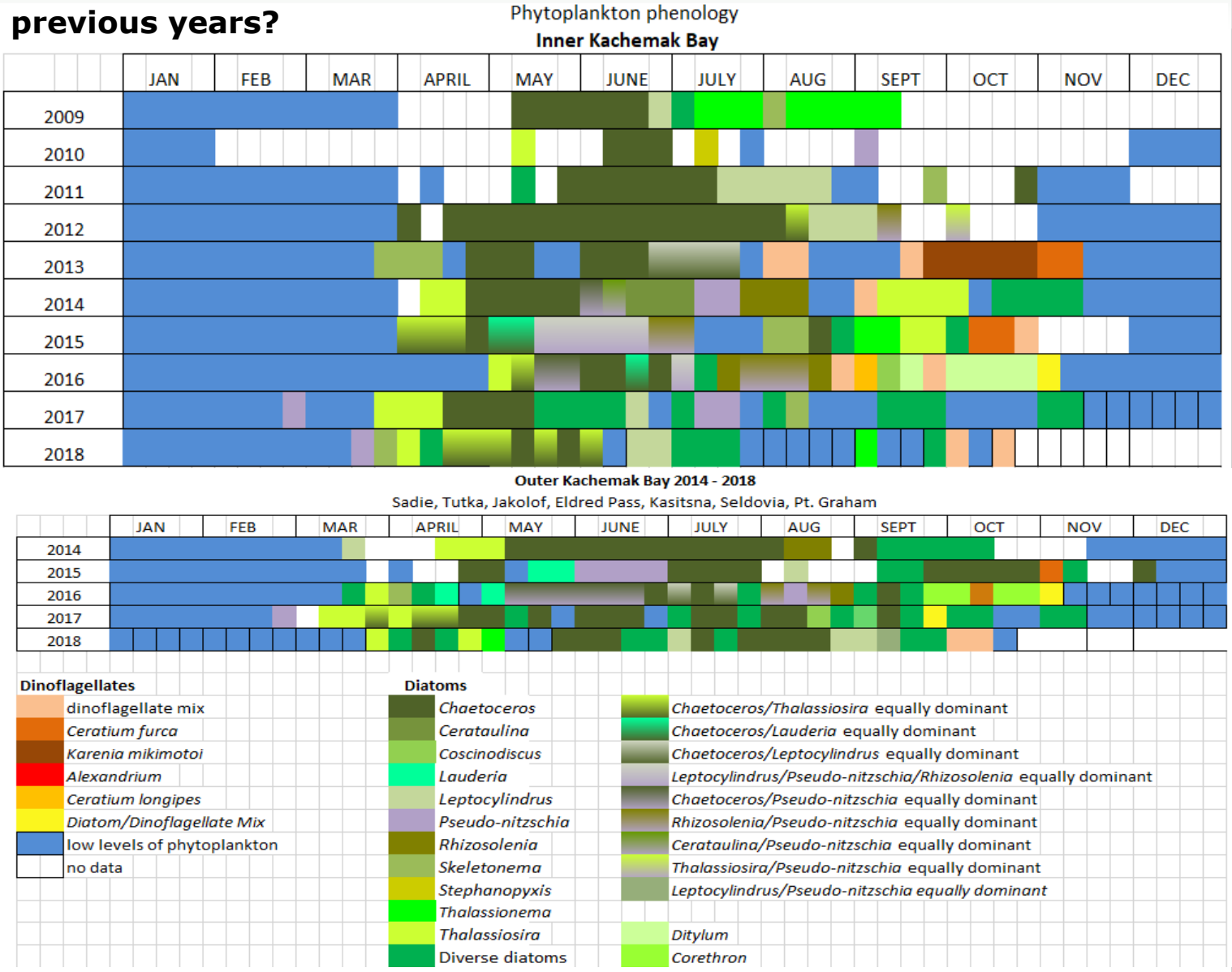
When did different phytoplankton groups bloom in 2018 compared to previous years?



Phytoplankton Phenology

This 'phenology' chart does not say anything about how **much** plankton there was, but it tells us which group dominated inner or outer Kachemak Bay waters and when. In the spring we saw *Chaetoceros and Thallassiosira* dominate the Inner bay, with *Leptocylindrus* dominating later in the summer. In the outer bay C*haetoceros* dominated for the majority of the season. During August and September of this year most of our samples contained low levels of phytoplankton. Looking over the past seasons you can see that at the end of the summer there has usually been a transition from diatoms to dinoflagellates. However, this year this change occurred later, as we did not start seeing samples dominated by dinoflagellates until the fall. We may sample later in the season next year to monitor this change.

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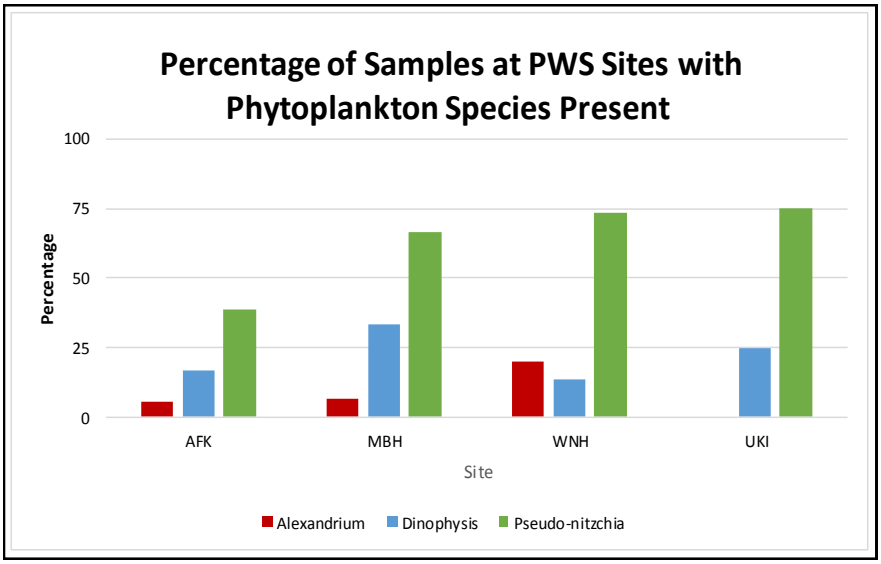
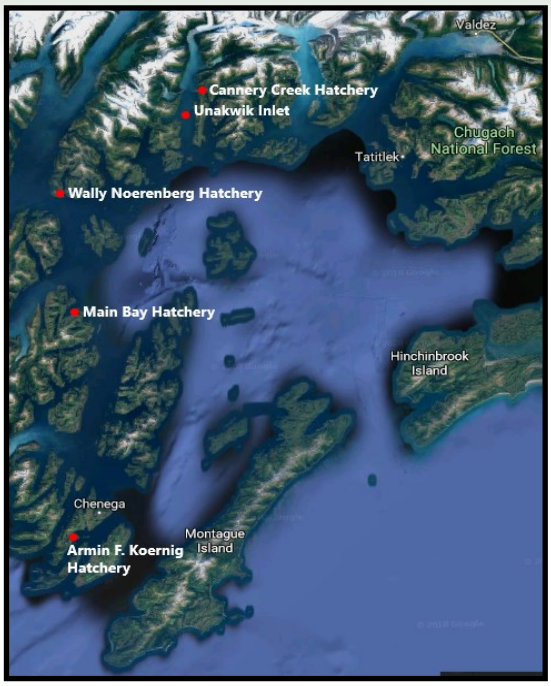
KACHEMAK BAY RESEARCH RESERVE

2018: New Partners in Prince William Sound

Prince William Sound Aquaculture Corporation 2018





Last year KBNERR partnered with the Prince William Sound Aquaculture Corporation to expand our HAB monitoring program, we now have four consistent sampling sites in Prince William Sound. In 2017 we received samples from the Wally Noerenberg Hatchery (WNH) in Lake Bay, Main Bay Hatchery (MBH) in Main Bay, and the Armin F. Koernig Hatchery (AFK) in Sawmill Bay, and added the Unakwik Inlet (UKI) site this year. Over 60 samples were collected from Prince William Sound this year which is 30% more samples than last year! The sampling this season was also more consistent and covered a larger time period than last season, giving us more information about when different species of phytoplankton dominated the sites. The three species of phytoplankton we monitor for toxins are *Alexandrium spp., Dinophysis spp.,* and *Pseudo-nitzchia spp.,* they can produce toxins that can potentially cause shellfish poisoning and harm to the ecosystem. We spotted all three of these harmful algal bloom species at AFK, MBH, and WNH sites , but we only saw two of those species at our new UKI site. UKI is also the only site that had any of these species at Bloom levels, where *Pseudo-nitzchia spp*. bloomed in April and June. Although *Alexandrium spp.* and *Dinophysis spp.* were present in the samples from Prince William Sound, they were never seen at Abundant or Bloom or levels.

The Alaska HAB Network-

The idea for a statewide HAB network had been in the works for multiple years and was officially formed in 2017. The mission of the network is to provide a statewide approach to HAB awareness, research, monitoring, and response in Alaska. The network consists of a diverse group of coastal stakeholders who are concerned with HABs for both human and ecosystem health risks. Partners consist of local, state, and national organizations, who are working with HABs. AHAB collaborators will be meeting in person in February to further HAB collaboration in Alaska. The meeting will cover ongoing HAB research and monitoring projects around the state. KBNERR Harmful Species Staff will be co-leading breakout groups discussing HAB monitoring and event response.

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