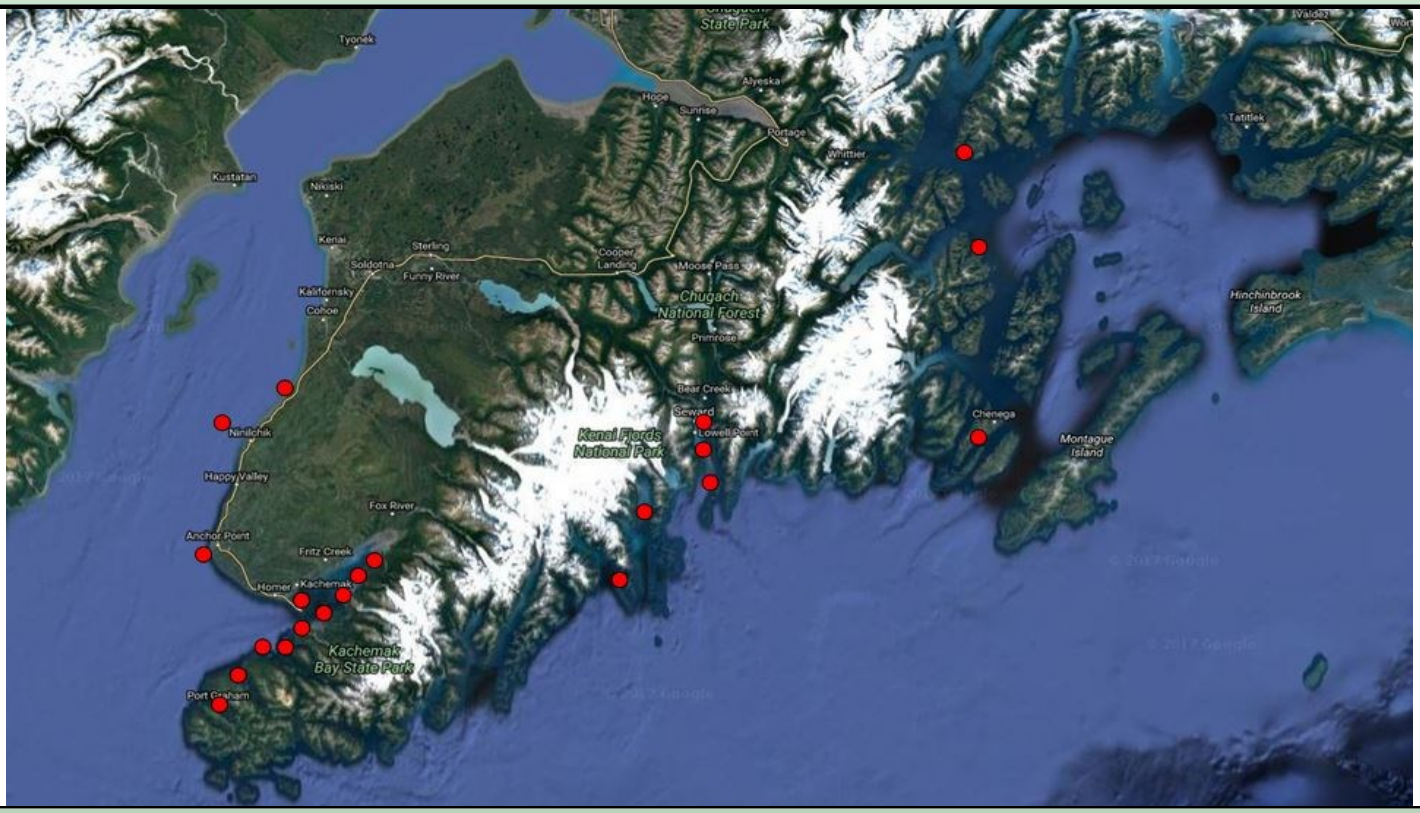
KACHEMAK BAY RESEARCH RESERVE

Harmful Algal Bloom Monitoring

2017 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 300 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 2017 season

-Our sampling map looks a lot different this year now that we have included sites in lower Cook Inlet, Resurrection Bay, and Prince William Sound. HAB species were spotted at all of our new sites but phytoplankton compositions differed throughout!

-*Alexandrium spp.* was spotted early on throughout our sites and shellfish toxin levels in Kachemak Bay were the highest KBNERR has ever recorded since our program began.

-Illnesses potentially from PSP related shellfish toxins, were reported on two separate occasions and led to the Department of Health and Social Service to release a Public Service Announcement warning about toxic shellfish in Sadie Cove and Tutka Bay.

-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.

Kachemak Bay National Estuarine Research Reserve

2181 Kachemak Drive, Homer, Alaska 99603

Phone: 907-235-4797

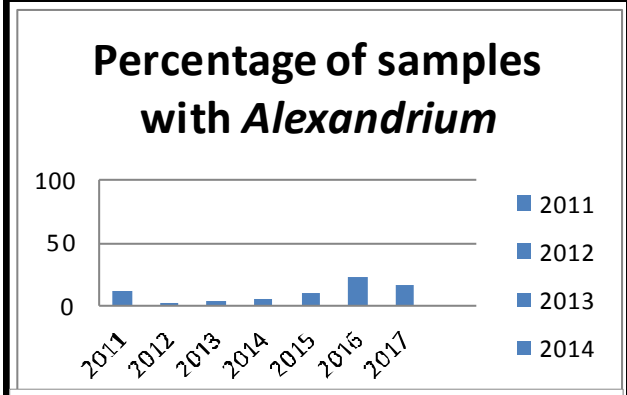
This project is supported by a State Wildlife Grant from FWS administered by ADFG with support from NOAA.

KACHEMAK BAY RESEARCH RESERVE

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

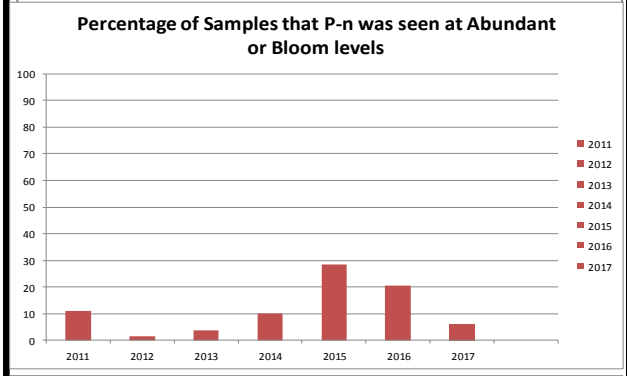
What is a Bloom?

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.



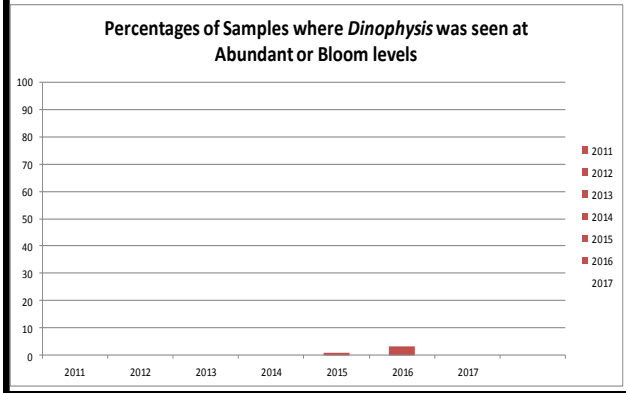
Percentage of Samples containing *Alexandrium*

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* rose in 2016 but dropped down in 2017. The percentage that we were seeing was still higher then in 2011 to 2015. Shellfish saxitoxin levels were the highest KBNERR has seen in Kachemak Bay since our program began in 2008. These shellfish may be holding toxins that they accumulated in 2016.



Percentage of samples containing *Pseudo-nitzschia*

The graph on the left shows the percentage of samples that we saw *Pseudo-nitzschia* (P-n) was 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 can also cause issues with marine mammals, ie: leading to seizures in sea lions. Looking at the graph you can see the spike that occurred in 2015. This bloom occurred all down the West Coast. This year, the amount of samples with P-n at abundant or bloom levels this past year was lower than the past three years.



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). Last year we saw a small increase in the percentage of samples with *Dinophysis* at abundant or bloom levels, yet in 2017 we did not see any samples with it at those levels.

Kachemak Bay National Estuarine Research Reserve

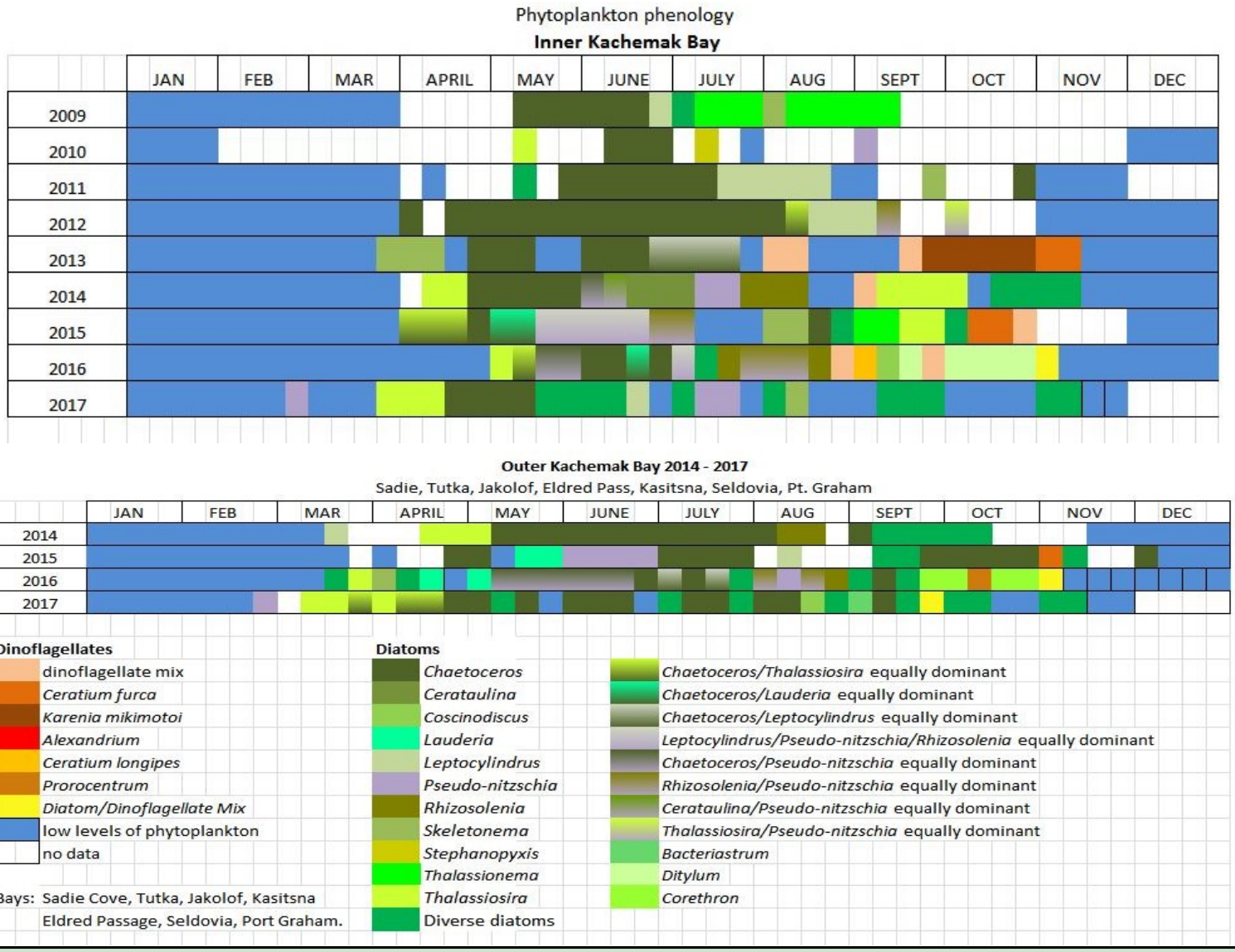
2181 Kachemak Drive, Homer, AK 99603

Phone: 907-235-4797

E-mail: Rmrobinson3@alaska.edu

KACHEMAK BAY RESEARCH RESERVE

When did different phytoplankton groups bloom in 2017 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. Looking over the past seasons you can see that at the end of the summer there have been transitions from diatoms to dinoflagellates. Looking at the Inner and Outer Bays you can clearly see the large *Pseudo-nitzschia spp.* bloom that we had in 2015, that mirrored the bloom that was happening up and down the whole west coast. We had more samples that contained low levels of phytoplankton this past season, shown in the blue on the phenology chart, then we had in the past few years. We also saw a *Pseudo-nitzschia* bloom that stayed in the inner bay, with *Chaetoceros spp.* dominating the outer bay the majority of the season!

Kachemak Bay National Estuarine Research Reserve

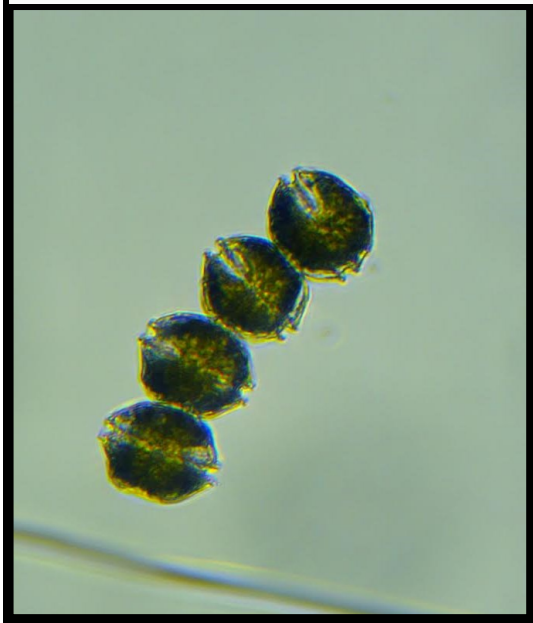
2181 Kachemak Drive

Phone: 907-235-4797

E-mail: Rmrobinson3@alaska.edu

KACHEMAK BAY RESEARCH RESERVE

2017: Toxic Shellfish and Potential PSP related illnesses



During the 2016 season we hung a mussel cage in the Homer Harbor, so that when we saw HAB species in the water we could easily access mussels to see if they were accumulating toxins. For the 2017 season we decided to increase the number of mussel cages from one to three, located at Homer Harbor, China Poot, and Kasistna Bay. We also tested shellfish this summer from multiple other locations in response to HAB species or in response to potential human illnesses. Our toxin testing season began early, in April, with mussels from Port Graham in response to spotting *Alexandrium spp.* in phytoplankton samples. Those mussels came back clean with no toxins detected. From all three of our sites with mussel cages, only Kasistna Bay saw samples go above the regulatory limit of 80ug/100g. The hottest mussel sample from Kasistna Bay came back at 431ug/100g, with toxic butter clam samples coming back at ≥600ug/100g from Tutka Bay and Sadie Cove. What does this mean for those wanting to harvest wild shellfish? Mussels are very rapid filter feeders and can filter out the toxins they accumulate quite quickly. Butter clams are a different story and can take years to filter out the toxins that have accumulated in their meat. The last mussels we sampled from Kasistna Bay was in mid-October and the toxin levels were below the regulatory limit. It is likely that butter clams in Tutka Bay and Sadie Cove are still carrying high levels of toxins, as well as other areas of Kachemak Bay. Anyone harvesting wild butter clams in these areas without testing is taking a risk.

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 wildlife health risks. Partners consist of local, state, and national organizations, who are working with HABs. AHAB will be displaying a poster at the Alaska Marine Science Symposium and will be going public with our website. The website will feature HAB introductory information, monitoring techniques, lists of partners, and access to a data portal that will display real time results for phytoplankton and shellfish monitoring!

Kachemak Bay National Estuarine Research Reserve

2181 Kachemak Drive

Phone: 907-235-4797

E-mail: Rmrobinson3@alaska.edu