BERING SCIENCE

Spring 2020 Bering region ocean update—learn what's changing

Learn more at www.beringregionoceandata.org

Community of Gambell. Photo by NOAA

Alaska Ocean Observing System
1007 W. Third Avenue, Suite 100,
Anchorage, Alaska 99501

Scientists gather samples from seabirds on St. Lawrence Island. Learn more about this research on page 10.

WHAT IS THIS? sharing science

The Bering Sea is experiencing many changes. Loss of sea ice and record high ocean and air temperatures impact wildlife and all aspects of life for coastal communities. 2019 saw many notable events, such as unusual mortality of ice seals, whales and sea birds; and changes in movement patterns and abundance of sub-arctic fish species. We created this publication to share what scientists are learning about some of the most striking changes in the Bering Sea region. This report focuses primarily on what we saw in 2019 in the northern Bering Sea, with some information about the southern and eastern Bering and the southern Chukchi.

What this isn't

We know this publication is not comprehensive, and there is still much that we don't know. It is challenging to cover every species for each region. Some of the data we hoped to include still needs to be analyzed. Scientists often must focus on species important to resource managers to protect, rebuild and sustain marine ecosystems. They also collect information that is important to communities. We've tried to include a bit of everything in this report.

Since this is our first effort, we appreciate questions from readers, suggestions for changes to future reports, and information you would like to receive or see included. Please provide feedback at surveymonkey.com/r/beringreport.

Planned upcoming publications (depending on feedback)

- Mid-summer—brief update on early spring/summer observations (electronic version only)
- Fall—preliminary results of research collected during the 2020 field season
- Winter—final report of the 2020 research field season – similar to this report

WHO ARE WE? scientists

We are Bering Sea scientists, mostly federal, state and university. This report is facilitated by a partnership between the Alaska Ocean Observing System (AOOS) and the University of Alaska Fairbanks International Arctic Research Center (IARC) with funding given to AOOS from a national initiative to increase sharing of ocean data. Our team worked with scientists from across the region to compile current updates of Bering Sea science.

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NAVIGATION

CITE THIS REPORT

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REVIEWERS

Thank you to our reviewers who provided valuable input into this publications. We are particularly grateful to Gay Sheffield, Lauren Divine, Maggie Mooney-Seus, Gabe Dunham & Jennifer Hooper.

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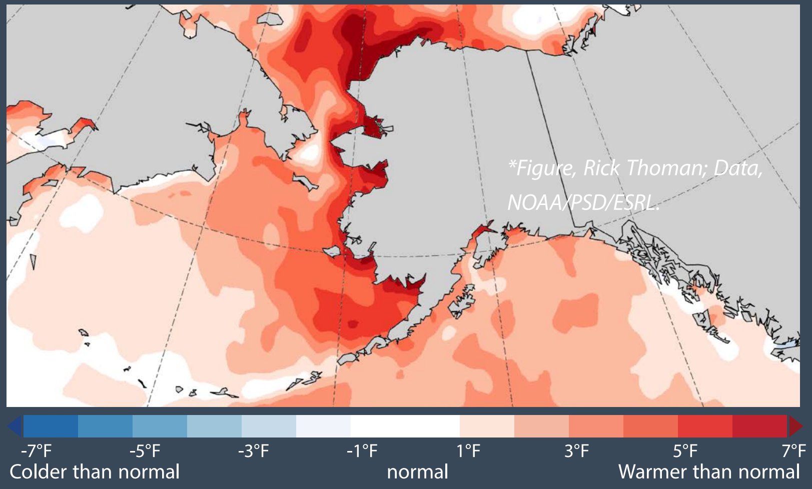
SUMMER TEMPERATURE 2019

OCEAN TEMPERATURES

Ocean surface temperatures were very warm in the Bering and southern Chukchi seas during summer 2019. Except for a small area in the Bering Strait, the May–October sea surface temperatures were more than 5°F above the 1971–2000 average. In some areas, these were the warmest average ocean surface temperatures on record. No Alaska waters were colder than normal.

Sea ice vanished from Bering Sea very early during the summer. By August there was no sea ice within 100 miles of the entire Alaska coast.

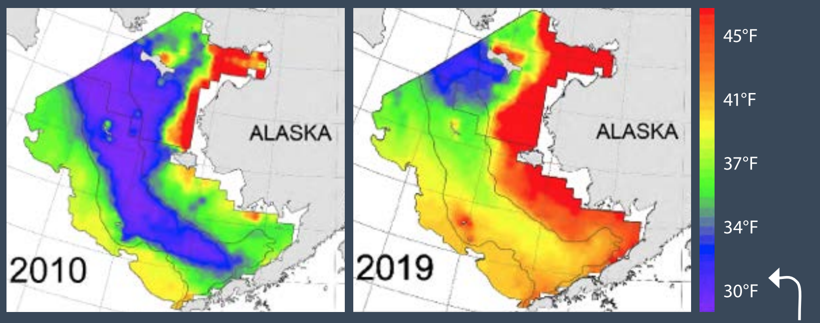
Top: May–October 2019's warm (red color) ocean surface temperatures compared to the 1971–2000 average. **Bottom:** Water temperatures at the ocean floor in summer 2010 (left), when the cold pool was intact, compared to 2019 (right).



COLD POOL

The Bering Sea "cold pool" is a large mass of frigid water that forms near the ocean floor in areas with sea ice. Water temperatures in the cold pool are usually less than 36°F.

The cold pool is an important feature of the Bering Sea. It acts as a barrier between southern species, like pollock and cod, and Arctic waters where northern species flourish. In 2019, the cold pool was the second smallest ever recorded. Only 2018 was smaller. For the first time ever, the temperature at the seafloor in the southern Bering Sea was over 46°F.

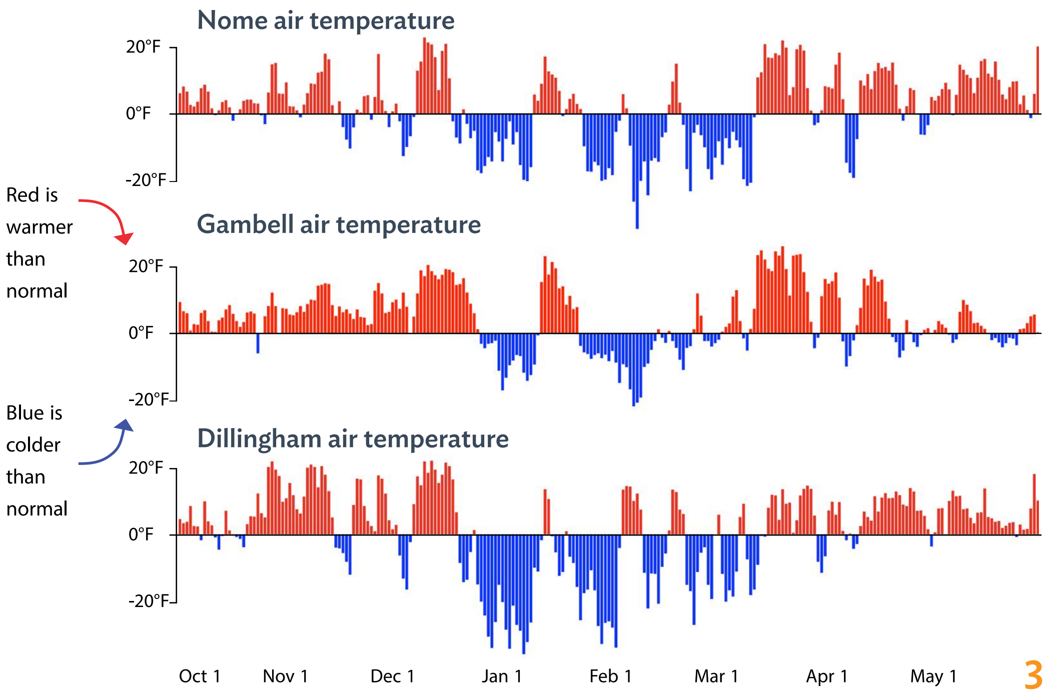


*Figure, NOAA/National Marine Fisheries Service courtesy L. Britt.

WINTER AIR TEMPERATURES

Fall 2019 was very mild, and in most parts of the state it was warmer than usual. These graphs show examples of winter air temperatures in Bering Sea communities. At times, November and December temperatures were 20°F warmer than normal.

All of Alaska became colder by mid-December. Late January 2020 to early March was the coldest period. While cold compared to recent years, no records were set. Conditions since mid-March were generally milder throughout the Bering region.



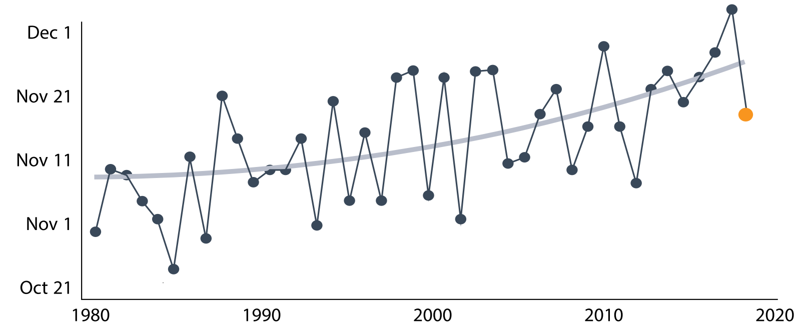
WINTER SEA ICE

FALL FREEZE-UP

Sea ice in the Bering and southern Chukchi Seas developed slower than normal during fall 2019. Even so, freeze-up was not as late as recent years. As is common, ice formed first in protected areas with larger river outlets. Rivers keep near-shore water brackish, which freezes more quickly than saltier sea water.

Some sea ice formed in Kotzebue Sound and Norton Bay by November 1. Nome even had ship traffic until the end of November. Ice grew slowly until mid-December. The ice extent remained far below average.

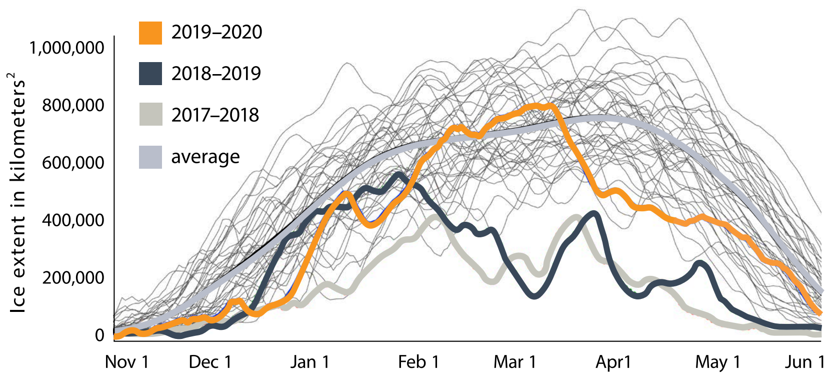
Bering Sea freeze-up date



WINTER ICE

Thanks to the cold weather after New Year's Day, sea ice became thicker and of much higher quality compared to recent winters. Shorefast ice, which had been mostly absent in 2018 and 2019, formed in the usual areas such as Norton Bay, along the southern Norton Sound coast and Yukon Delta area.

Bering Sea ice extent (1978–2020)



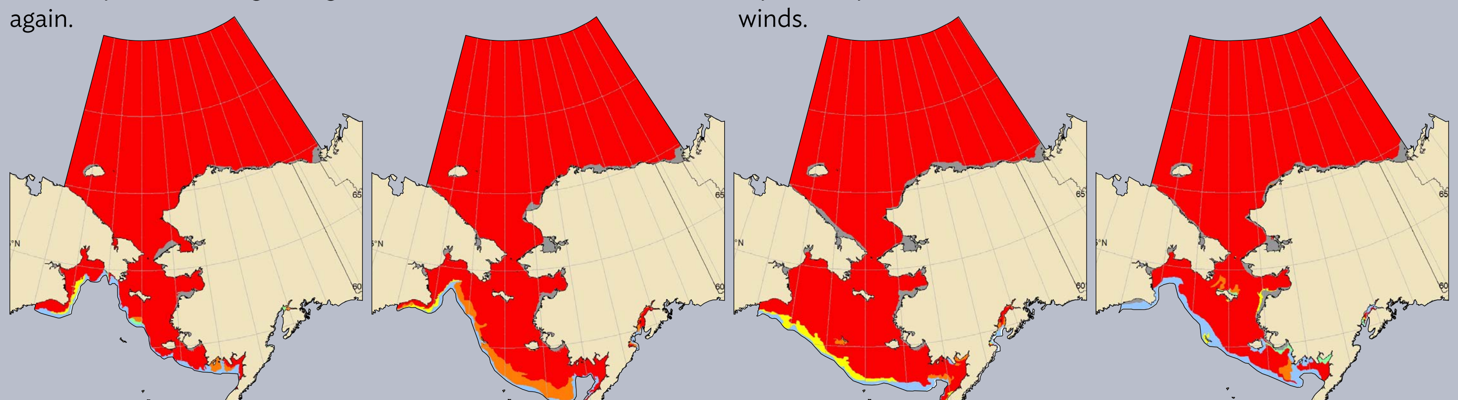
SEA ICE TIMELINE, WINTER 2020

JANUARY 1
Weather changed in mid-December. Bering Sea ice grew out from the coast, reaching the north shore of St. Lawrence Island just before New Year's Eve. Storms in mid-January broke up the new ice and it shrank by 20% before growing again.

FEBRUARY 1
For about five weeks, starting in early February, ice extent was above the long term average.

MARCH 1
The ice pack in early March briefly reached as far southwest as St. Paul Island, before pulling back. The sea ice extent dropped dramatically after a stormy period in mid-March with repeated episodes of south winds.

APRIL 1
Between early and late March the sea ice extent plummeted, faster than ever before in the 42 years of satellite data. Average ice extent the first half of April was lower than all other years, except for 2018 and 2019.



*Data: NOAA/NWS AK Sea Ice program

Less than 10% ice cover | 10–30% ice cover | 40–60% ice cover | 70–80% ice cover | 90–100% ice cover | Landfast ice

Page 3 & 4 information from: Rick Thoman, UAF International Arctic Research Center, Alaska Center for Climate Assessment & Policy

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OCEAN ACIDIFICATION

WHAT IS OA?

Cars, factories and other human activities release carbon dioxide into the atmosphere. The ocean absorbs about a quarter to a third of this carbon dioxide. In the ocean, the carbon dioxide reacts with seawater. The seawater becomes more acidic, which corrodes shells and skeletons of some marine animals. This process is called ocean acidification (OA).

OA, CRABS & OTHER ANIMALS

When the acidity of ocean water changes, it affects marine animals. More acidic water makes it difficult for some animals like clams and oysters to build and maintain their shells, which can make them vulnerable to predators. OA also changes the blood chemistry of animals, causing stress.

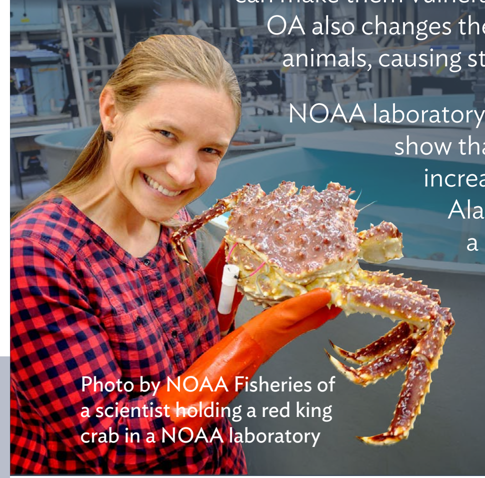


Photo by NOAA Fisheries of a scientist holding a red king crab in a NOAA laboratory

NOAA laboratory studies on Alaska crabs show that OA reduces growth, increasing mortality for many Alaska crab species. Such a response could reduce crab populations and lower the number of crab available for fisheries over the next few decades.

BERING SEA

The cold waters of the Bering Sea make it especially vulnerable to OA. Cold water naturally holds more carbon dioxide. So, it only takes a little extra carbon dioxide emitted by humans to make Alaska waters corrosive to shells.

Where are the OA hotspots?

Ocean acidification varies seasonally and geographically. In the Bering and Chukchi seas, OA hotspots are often found in fall and winter in areas with slow tides or currents, where carbon dioxide has time to build up at the bottom of the ocean. The Bering Sea is also often more acidic near the mouth of the Yukon River where freshwater mixes with seawater.

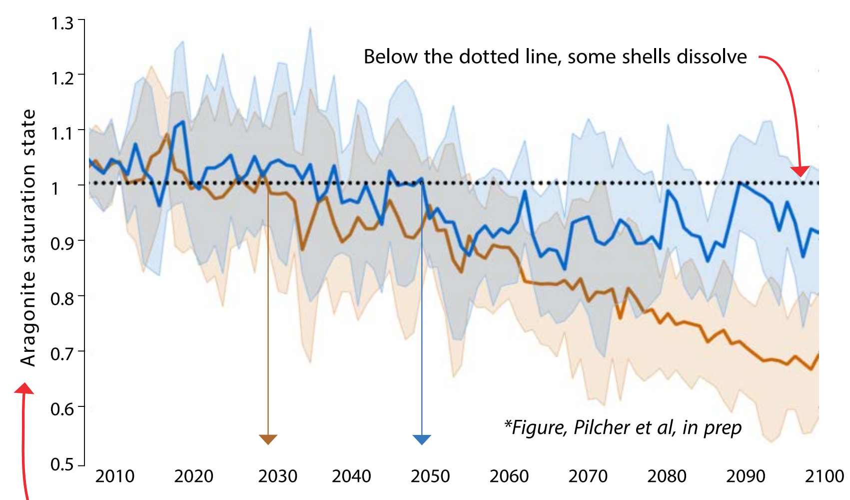
MONITORING OA

The Alaska Ocean Acidification Network is working to better understand OA and its consequences in Alaska. The network monitors OA in the Bering and Chukchi seas several ways:

- Ship-based surveys
- Sensors tethered to the ocean floor (called moorings)
- Ocean gliders that sample across large areas
- People in Nome and Kotzebue gather water samples

MODELING OA ALONG THE BERING SEA SHELF

Scientists are modeling various aspects of OA to understand if Alaska waters were corrosive in the past, and what conditions may be like in the future. The Bering Sea Shelf model to the right explores when seawater may permanently become corrosive to certain shelled animals. The model focuses on water at the bottom of the ocean, where crabs live.



This is the aragonite saturation state. Aragonite is used by some marine animals to build and maintain their shells. When the aragonite saturation state drops below one, some shells may start dissolving.

The brown line is the expected aragonite saturation state if carbon dioxide emissions continue increasing. In this "worst case scenario," the OA model suggests that the Bering Sea shelf may not have enough aragonite for building and maintaining some shells by **2030**.

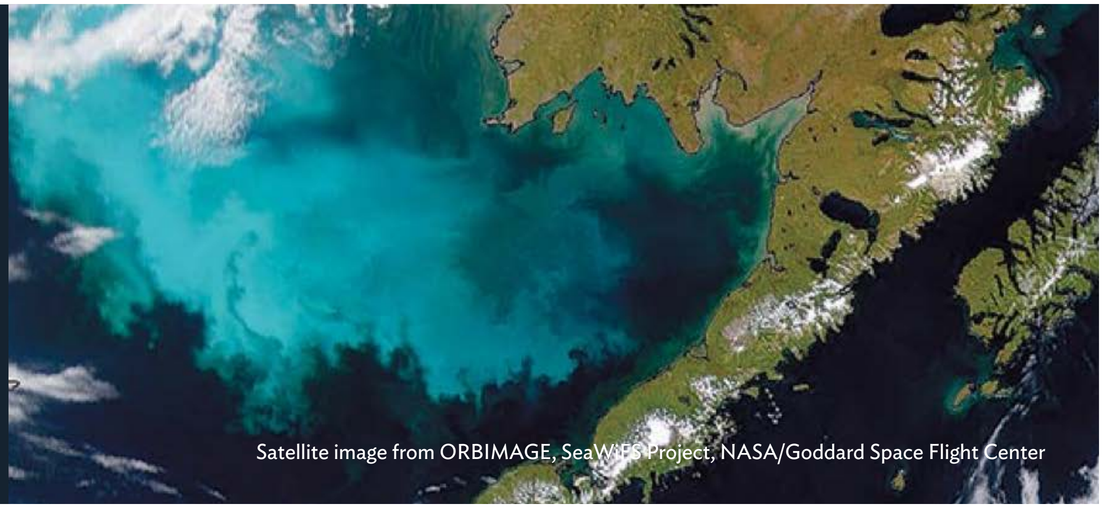
The blue line is the predicted aragonite saturation state if carbon dioxide emissions slowly decline. In this scenario, there won't be enough aragonite by **2050**.

Information from: Jessica Cross & W. Chris Long, NOAA Pacific Marine Environmental Lab; Darren Pilcher, University of Washington; Darcy Dugan, Alaska Ocean Observing System

aoos.org/alaska-ocean-acidification-network

PLANKTON

A satellite image of the spring 2019 phytoplankton bloom that turned the Bering Sea turquoise. This bloom was comprised of coccolithophores, a type of phytoplankton covered in calcium carbonate (chalk). They can cloud the water, making it difficult for visual predators like fish and seabirds to find food.



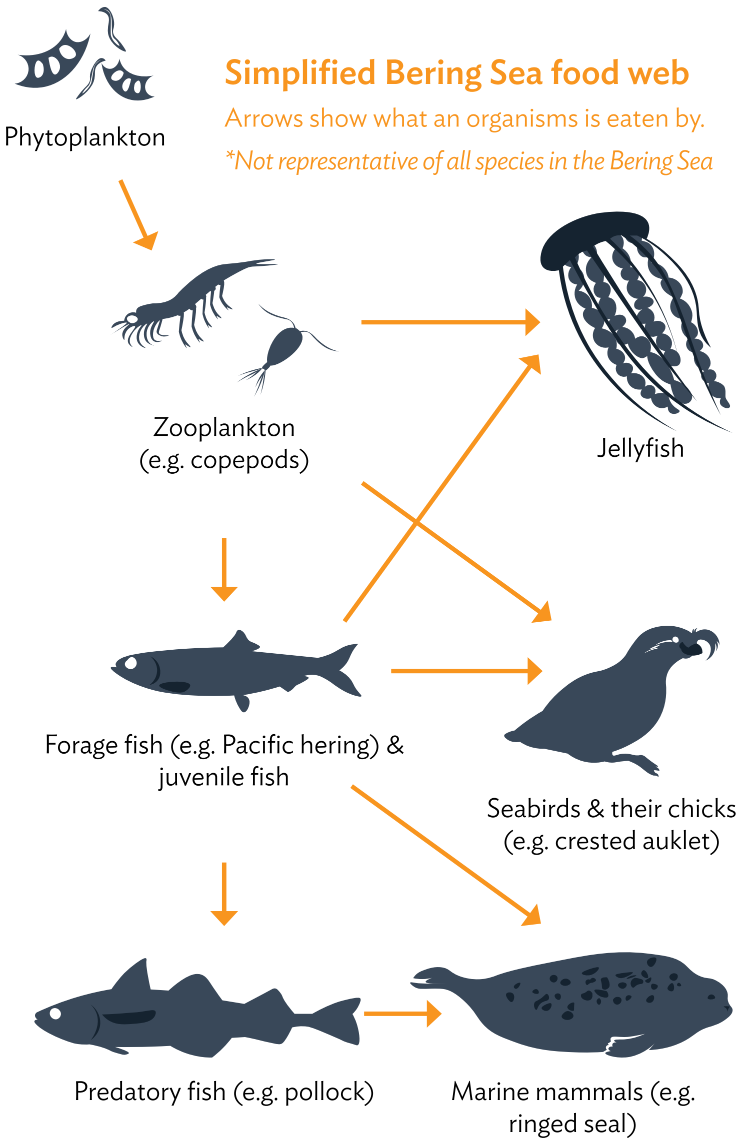
Satellite image from ORBIMAGE, SeaWiFS Project, NASA/Goddard Space Flight Center

PHYTOPLANKTON BLOOM

Phytoplankton are photosynthetic organisms living just beneath the ocean's surface. These tiny algae make up the base of the Bering Sea food web.

Blooms occur when phytoplankton rapidly reproduce and become highly concentrated, making the ocean a productive feeding ground. Large blooms are very common in the Bering Sea, particularly in spring.

The peak of the 2019 spring bloom occurred nine days earlier than normal. An early bloom and warm water temperatures (among other factors) created a productive environment into the summer months.



ZOOPLANKTON

In the Northern Bering Sea, there were high abundances of small copepods in 2019, but low abundances of large copepods and krill.

Based on a limited number of measurements in the southern Bering Sea, there were moderately low numbers of certain zooplankton (e.g., large copepods), but high numbers of small copepods, which is common in warm years.

Jellyfish, which feed on zooplankton and small fish, thrived in the Bering Sea in 2019. The sharp increase, compared to normal, meant jellyfish competed for food with seabirds, predatory fish and other species.

There were fewer zooplankton observed than was expected in the Chukchi Sea during 2019. All species were impacted, including large and small copepods and juvenile krill.

HARMFUL ALGAL BLOOMS

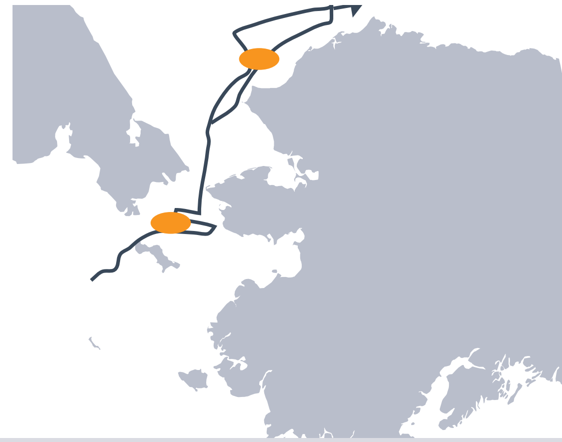
SAXITOXINS

Harmful Algal Blooms (HABs) occur in many locations worldwide when certain kinds of algae grow very quickly. Some of these algae produce powerful toxins.

Saxitoxin is a HAB toxin produced by some algae including the species called *Alexandrium catenella* (referred to as *A. catenella* in this publication). As ocean temperatures warm, blooms of *A. catenella* appear to be more common in the Bering and Chukchi seas. During August 2018 and 2019, high concentrations were found in the Bering Strait and Chukchi Sea (in Ledyard Bay and near Utqiaġvik, respectively).

Saxitoxin produced by this algae causes Paralytic Shellfish Poisoning in humans and is harmful to fish, seabirds and marine mammals. Shellfish and other marine wildlife become contaminated with saxitoxin when they filter seawater to consume tiny algae, or feed on zooplankton. When saxitoxin accumulates in these filter feeders (such as clams), the toxin can be passed on to other wildlife that consume them.

Map: 2019 HABs sampling route. Orange ovals show where clams from the ocean bottom tested high for saxitoxin.



What is a high level of toxic *A. catenella*?

One way to estimate toxicity is by counting the number of *A. catenella* cells found in a liter (~1 quart) of seawater.

500–1,000

A. catenella cells per liter of seawater is considered high.

CASE STUDY: HABS IN THE NORTHERN BERING

Was toxic *A. catenella* present at high levels in the Bering Strait and Chukchi Sea?

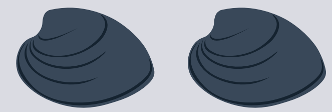
Yes, in 2018 and 2019 Bering Strait and Chukchi water samples tested high for *A. catenella*.

1,500–8,000

A. catenella cells per liter of seawater were found in Bering Strait & Chukchi Sea samples.

Were high saxitoxin levels found in marine organisms?

In 2019, clams 70 miles north of St. Lawrence Island and 50 miles north of Cape Lisburne contained saxitoxin levels above the seafood safety regulatory limit.

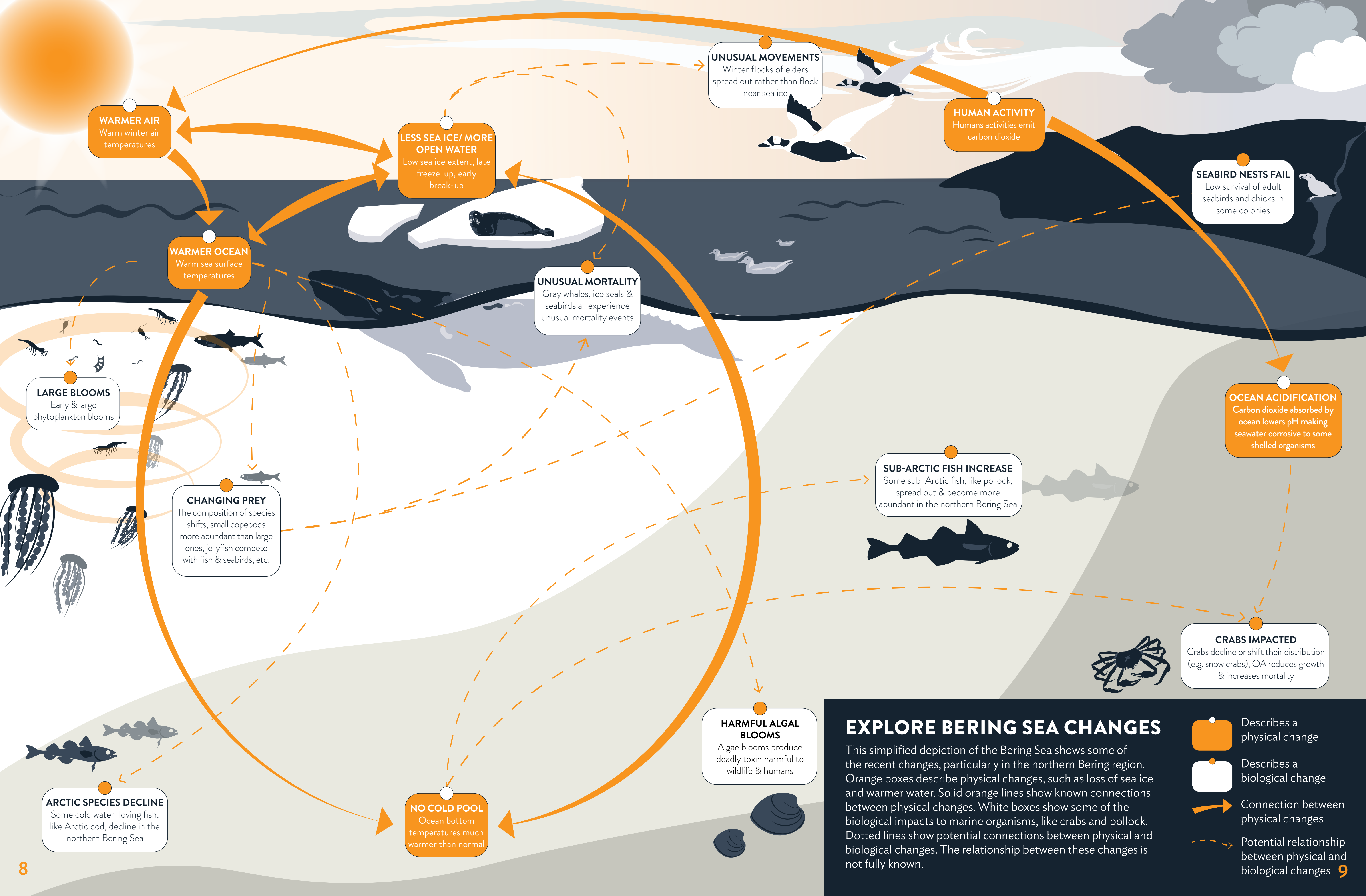


WHY ARE WE CONCERNED ABOUT HABs?

Shellfish found in areas with 500–1,000 cells per liter seawater or higher of *A. catenella* are considered dangerous for human consumption. The US Food & Drug Administration sets a seafood safety regulatory limit for saxitoxin levels in shellfish. If this limit is reached or exceeded, it is considered unsafe to eat. **Cleaning, cooking, freezing and aging contaminated shellfish do NOT reduce the health risk.**

Monitoring and adaptation can reduce human and wildlife health risks associated with HABs. Tribes, communities, and the Alaska Harmful Algal Bloom Network have been working with researchers to coordinate statewide research, monitoring and response.

Photo by NOAA Fisheries



EXPLORE BERING SEA CHANGES

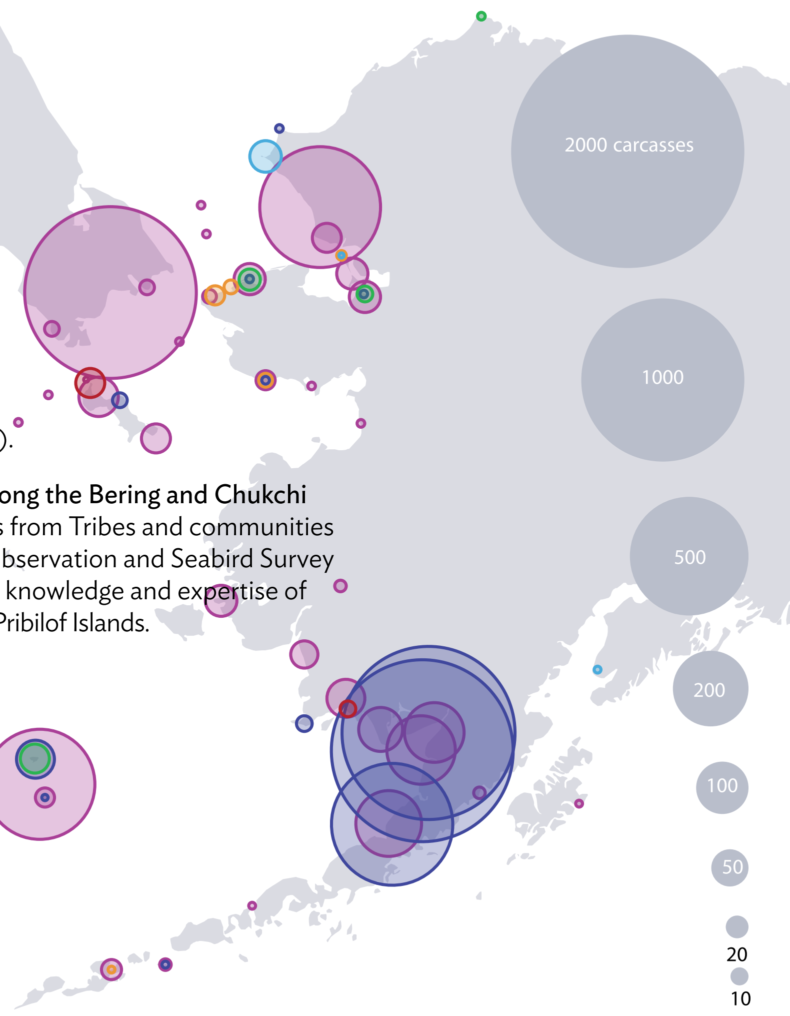
This simplified depiction of the Bering Sea shows some of the recent changes, particularly in the northern Bering region. Orange boxes describe physical changes, such as loss of sea ice and warmer water. Solid orange lines show known connections between physical changes. White boxes show some of the biological impacts to marine organisms, like crabs and pollock. Dotted lines show potential connections between physical and biological changes. The relationship between these changes is not fully known.

SEABIRDS

FREQUENT DIE-OFFS

Since 2016, large numbers of dead seabirds have washed up on Bering and Chukchi sea beaches. Although seabird die-offs occur occasionally (e.g. 1970, 1989, 1993, 1997/1998, and 2004) in Alaska, these recent die-offs are different from past events. They happen more often, last longer, cover larger geographic areas and include more species (at least six species).

This map shows where over 11,500 carcasses were recovered along the Bering and Chukchi coasts in 2019. Data are from reports made by citizen scientists from Tribes and communities to the US Fish and Wildlife Service and surveys from Coastal Observation and Seabird Survey Team (COASST). This work would not be possible without the knowledge and expertise of local residents from Bering Strait, Bristol Bay, and Aleutian and Pribilof Islands.



CASE STUDY: HARD-HIT COLONIES ON SAINT LAWRENCE ISLAND

Kittiwakes & Common Murres

The low sea ice of 2018 and 2019 triggered summer food shortages for black-legged kittiwakes at one colony and common murres at three colonies on Saint Lawrence Island. These seabirds may have competed with northward-expanding adult Pacific cod and walleye pollock for their fish prey. Despite food shortages, black-legged kittiwakes continued to reproduce at a relatively stable, but low level.

Auklets

Ocean circulation patterns that normally transport zooplankton from the Bering Sea basin may have been disrupted. Least and crested auklets feed their chicks zooplankton, especially copepods known as *Neocalanus spp*. In 2017–2019, these copepods were largely missing from chick diets at a colony being studied on Saint Lawrence Island. A large number of jellyfish also thrived in the warm sea of 2019, possibly competing with auklets for the dwindling copepod supplies. Both auklet species produced no surviving chicks at the studied colony in 2018 or 2019.

Thick-billed Murres

On Saint Lawrence Island, breeding thick-billed murres mostly eat small fish that live near the seafloor. These fish populations seemed stable, based on regional bottom trawl surveys conducted over the last decade. Measurements of nutritional stress in breeding thick-billed murres at three colonies indicated no summertime food shortages in 2016–2019. Tissue samples from the fall, when thick-billed murres have left the breeding colony but remain in the northern Bering and Chukchi seas, suggest they were nutritionally stressed by food web changes caused by low sea ice.

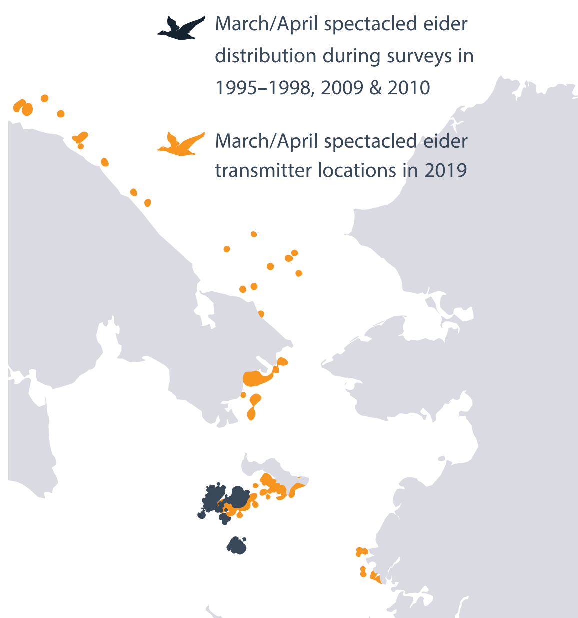
Although diet composition of thick-billed murres did not change over the reproductive season, and birds had enough food in mid to late summer, there was a major die-off on Saint Lawrence Island in 2018. The cause remains unknown, but limited evidence suggests disease may have been a contributing factor. As a result, 25% fewer thick-billed murres were counted at a breeding colony in summer 2019, compared to 2016 & 2017.

Subsistence harvest reduced

According to 88 household surveys, subsistence harvest on Saint Lawrence Island was impacted by the thick-billed murre die-off on the island. In 2018, harvest of adult murres declined 66% and murre egg harvest declined by 75%.

Frequent die-offs information: Hillary Burgess, COASST; Robb Kaler, US Fish & Wildlife Service; Bering Strait, local residents of Bering Strait, Bristol Bay & Aleutian and Pribilof Islands.
Saint Lawrence Island information: Alexis Will, University of Alaska Fairbanks
coasst@uw.edu; robert_kaler@fws.gov; awill4@alaska.edu

SPECTACLED EIDERS



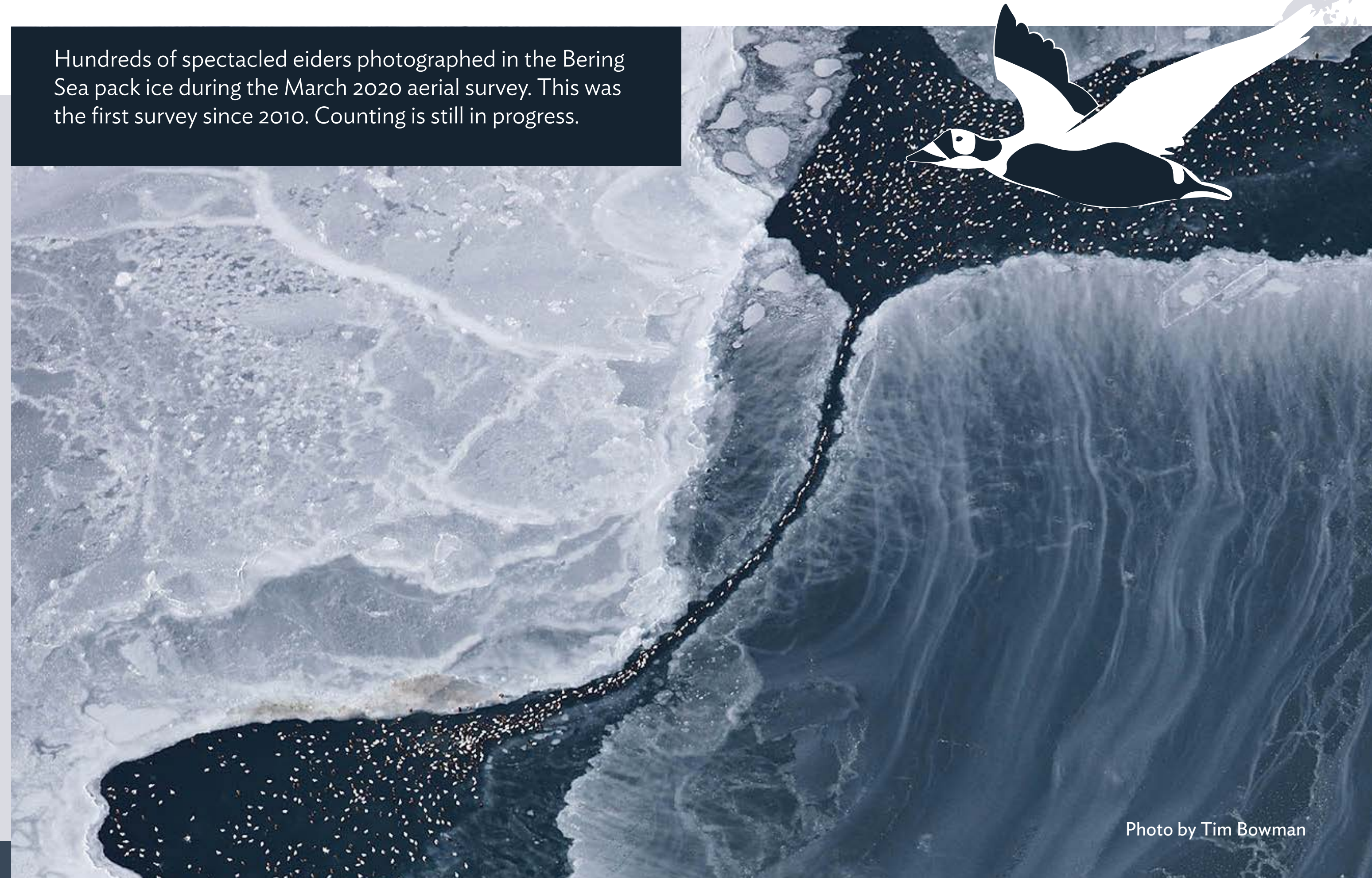
WINTER FLOCKS

US Fish and Wildlife Service aerial surveys and satellite transmitters on spectacled eiders help us understand where they winter. Most years, large flocks congregate in open water leads in the ice south of Saint Lawrence Island. 2019 was different. Without stable sea ice, birds were distributed over 500 miles. They ranged from the usual wintering waters south of Saint Lawrence Island to the northern coast of Russia.

With birds spread so far apart, it was impossible to conduct aerial counts in 2019. Fortunately, March 2020 had more favorable sea ice and a survey was completed. Counting is still in progress, but observers did not see the enormous flocks common in the past. Smaller than normal flocks were located much closer to Saint Lawrence Island.

SURVIVAL

Studies suggest that spectacled eider survival is negatively affected by both very high and very low sea ice extent. When there is little or no sea ice, waves form. In the open, choppy water there are fewer places to rest, and birds use more energy to survive. * *Christie et al, 2018, Ecology and Evolution.*



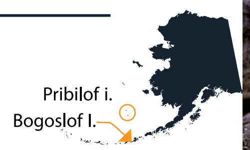
Hundreds of spectacled eiders photographed in the Bering Sea pack ice during the March 2020 aerial survey. This was the first survey since 2010. Counting is still in progress.

Photo by Tim Bowman

Information from: Dan Rizzolo, US Fish & Wildlife Service
daniel_rizzolo@fws.gov

MARINE MAMMALS

FUR SEALS



Northern fur seal populations in the Bering Sea have declined by more than half since the 1990s, according to NOAA surveys. In the Pribilof Islands, where most of the eastern Bering Sea's 635,000 seals live, communities have noticed declines since the 1950s. Pribilof Island pup production has decreased about 3% per year since 1998, a decline driven by low production on Saint Paul Island.

Fur seal pups on Bogoslof Island.

Scientists and communities do not know why Pribilof Island fur seals are declining, but they think it could be related to food availability. When pups are about a week-old, their mothers leave for days at a time to catch fish and squid. Some years, these trips to sea are unusually long, suggesting it is more difficult to find food. When this happens, their pups tend to gain weight more slowly.

It is not clear why fur seals are declining, so research is focusing on understanding the energetic needs provided by the prey and needed by the seals. Video cameras on foraging seals are being used to provide information on prey size and selection. These photographs can supplement existing information on food habits gained from feces. Scientists are still working to understand these changes.

While pup production has been declining in the Pribiliof Islands, it is increasing on Bogoslof Island. In 2019, scientists estimated that 36,015 pups were born on Bogoslof. Since 1997, pup production on the island has increased by about 9–30% each year.

50% fewer
fur seals in the Bering Sea than in 1990.

3% decline
in pups born on Pribilof Islands each year.

9–30% increase
in pups born on Bogoslof Island each year.

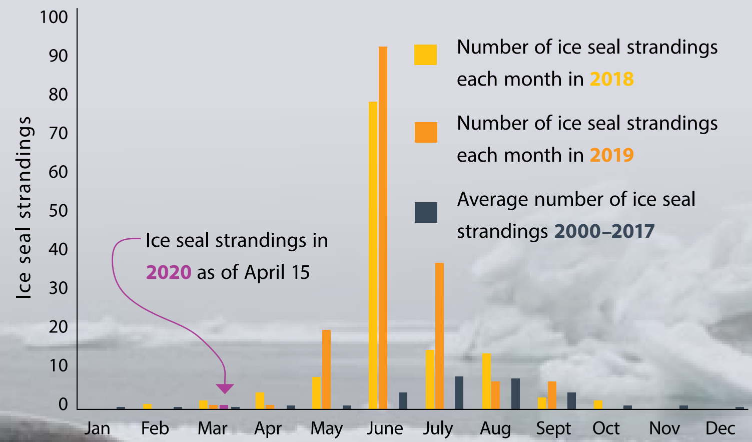
ICE SEALS

Since June 1, 2018, five times more bearded, ringed and spotted seals have washed up dead along the Bering and Chukchi coasts than normal. NOAA classified the elevated strandings as an Unusual Mortality Event, initiating an investigation as to the cause. Only one stranded ringed seal has been reported through April 15, 2020, but previous years' peaks occurred in May, June and July.

We currently do not know why the ice seals are stranding. All age classes of seals have been reported. A subset of stranded seals has been sampled for genetics, harmful algal bloom exposure and other tests. Many stranded seals were skinny and possibly emaciated. Results are pending.

How unusual are the strandings?

This graph compares the number of ice seal strandings each month in 2018, 2019 and 2020 to normal (2000–2017).




Ice seal photo by Dave Withrow, NOAA Permit 15126

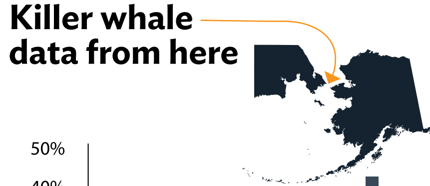
WHALES

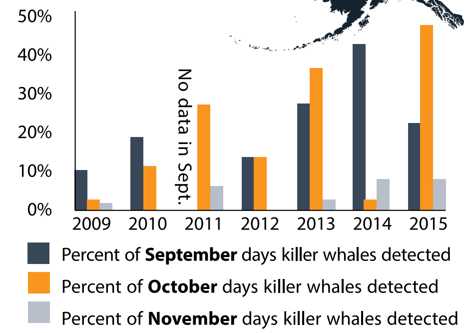
CASE STUDY: WHALE SONGS

Local hunters have seen killer whales in the northern Bering and Chukchi seas during summer for decades. As fall sea ice declines, they may be staying in the area longer.

Underwater microphones, called hydrophones, detect the clicks, whistles and calls of whales from up to 6 miles away. A hydrophone placed in the southern Chukchi Sea from 2009 to 2016 found that the number of killer whale detections in fall was increasing (see graph at right).

A second hydrophone placed in the Bering Sea northwest of Savoonga from 2017–2019 found that Humpback whales are in the region from May well into December, killer whales from May to November, and finback whales into January. These are all subarctic species that normally visit the northern Bering Sea in summer, but by fall usually head south to spend their winters elsewhere in the North Pacific.





Figure, Stafford, 2019, Marine Mammal Science.

What do you think is happening? Send kate2@uw.edu your input/observations!

UNUSUAL GRAY WHALE MORTALITY

Since January 1, 2019, gray whales have washed up dead along their migration route from Mexico to Alaska. 55% of Alaska's gray whale strandings occurred along the coast of the Bering, Chukchi and Beaufort seas. NOAA declared these elevated deaths as an Unusual Mortality Event (UME), an investigation is underway to better understand the cause of the UME.

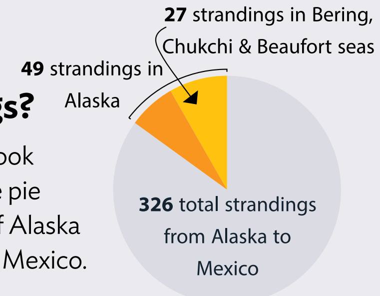
The first dead stranded gray whale in Alaska for 2020 was reported on April 22 by Mark Kosbruk in Port Heiden in the Bristol Bay region.

Ten of Alaska's stranded gray whales were fully or partially necropsied to identify the cause of death. Results are still pending, but preliminary findings from several showed evidence of emaciation. However, in many of the whales it was not possible to assess body condition because they were too decomposed.

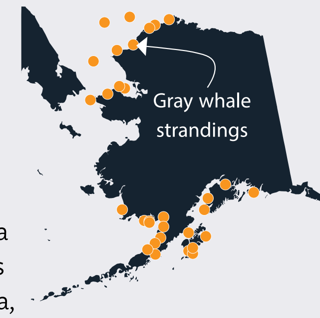
A possible reason for the UME is poor feeding conditions. In summer, gray whales feed on amphipods (small shrimp-like crustaceans), crab larvae and other organisms at the bottom of the ocean in the Bering to Beaufort seas. In fall, they embark on long migrations south to the Pacific ocean off California and Mexico for winter. Without enough food during the spring and summer feeding season, it is possible that whales' nutritional stores could not fuel their migration back to Alaska.

Where were the strandings?

About 15% of the gray whale deaths took place in Alaska (as of May 2020). The pie chart at right shows the breakdown of Alaska strandings compared to lower 48 and Mexico.

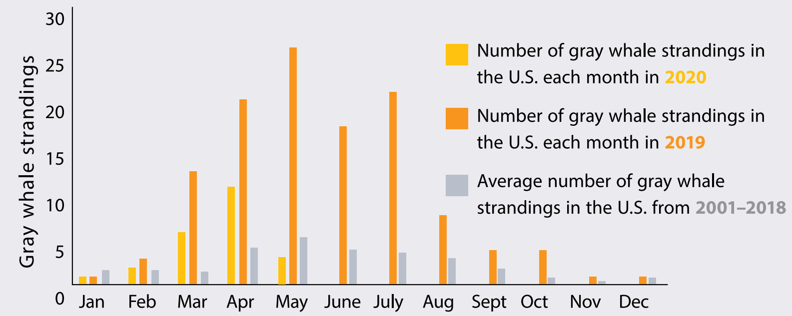


The orange dots on the map at right shows where the Bering, Chukchi and Beaufort gray whale strandings took place from December 2018 to May 2020.



Are strandings normal?

Strandings happen each year, but usually at a much lower rate. The graph below compares the recent gray whale strandings in California, Oregon, Washington and Alaska to normal (2001–2018).



REPORT STRANDED MARINE MAMMALS

Immediately report dead, injured or stranded marine mammals. To make a report, take a photo and call one of the numbers to the right. Scientists are also interested in where you are seeing live gray whales and if they have strange behaviors.

NOAA's Alaska Marine Mammal Stranding Hotline, (877) 925-7773

UAF Alaska Sea Grant, (855) 443-2397

Eskimo Walrus Commission, (907) 443-4380

Kawerak, Inc, (907) 443-4265

Fur seal information: NOAA Alaska Fisheries Science Center **UME information:** NOAA Fisheries, Alaska Region. **Whale song information:** Kate Stafford, University of Washington

www.fisheries.noaa.gov; kate2@uw.edu

FISH

POLLOCK

Young walleye pollock survived the 2018/2019 winter well, according to NOAA surveys. They contributed to a 53% increase in pollock in the southeastern Bering Sea since 2018 and a 59% increase in the northern Bering Sea since 2017. High survival was unexpected, since warm ocean temperatures and reduced prey quality resulted in lower survival in past years with low sea ice. Scientists think that southwest winds may have increased upwelling that brought deep water and nutrients closer to the surface. This could have made winter prey more abundant.

Why were there so many pollock in summer 2019?

In addition to more juvenile fish, the Bering Sea surveys also found more adult pollock. Scientists are uncertain of why so many more adult pollock were found in the Bering Sea during 2019. At this time, possible reasons include:

- fish moved into the region from somewhere else (one theory is that pollock may have been pushed southeast by ice and currents out of Russian waters),
- the movement is part of a large-scale migration of sub-arctic species into more northern waters,
- some other reason.

The breakdown of the cold pool seems to be linked to sub-arctic fish species being more mobile and spread out.

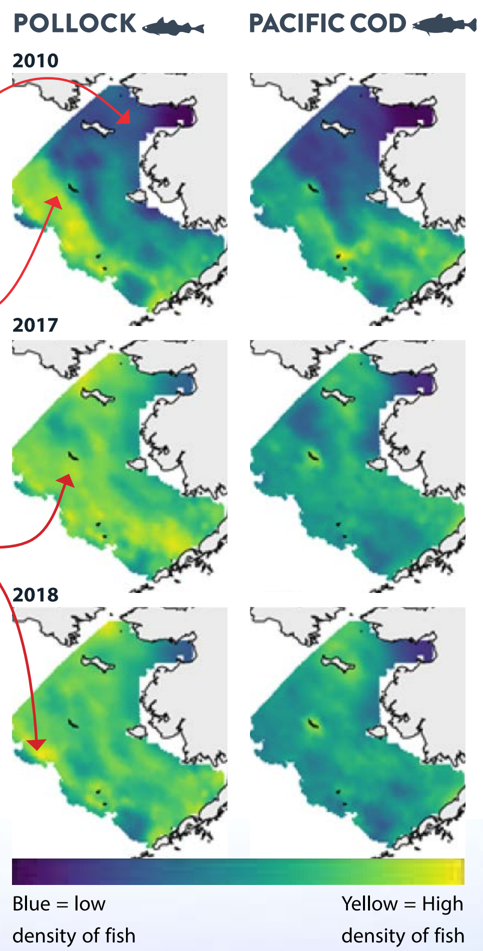
FISH MOVEMENTS

These maps show changes in pollock and Pacific cod distribution from 2010 compared to 2017–2018.

Blue color means there were fewer pollock and pacific cod in the northern Bering Sea.

Yellow color means pollock and pacific cod were more concentrated in the southern Bering Sea.

More **yellow** in these maps means pollock and pacific cod were spread out across the entire region in 2018/2019.



**Figure, Thorson et al., 2019, Arctic Report Card*

Walleye pollock photographed by Ingrid Spies, Alaska Fisheries Science Center

Photo by NOAA fisheries

Young Arctic cod in sea ice, photo by Shawn Harper, NOAA fisheries

PACIFIC COD

Pacific cod increased by 112% (527 million fish were counted) in the southeastern Bering Sea and 52% in the northern Bering Sea during the 2019 NOAA survey.

Changes in fish distribution and the high success of young Pacific cod in surviving their first year of life may have contributed to the increase seen in the southern Bering Sea. Warm water temperatures, like those found in summer 2019, can make fish eat more and move more. This can push young cod away from warm coastal waters, to depths where they are more likely to be counted by NOAA's bottom trawl surveys.

The increase of Pacific cod in the northern Bering Sea may have started in 2015 according to conversations with local communities. Locals suggest that similar increases may have happened at other times in the past.

ARCTIC SPECIES

While more southern species increased and became more mobile, some cold water-loving species are doing poorly, according to the 2019 NOAA surveys.

- Arctic cod experienced the most dramatic change, a 99% decline in biomass in the northern Bering Sea compared to 2017. However, the species slightly increased in the eastern Bering Sea.
- Bering flounder and Alaska plaice both declined in the 2019 survey.
- Saffron cod increased in number in the eastern Bering Sea, but decreased in the northern Bering Sea.

Information from NOAA Alaska Fisheries Science Center

https://www.fisheries.noaa.gov/about/alaska-fisheries-science-center

SALMON

Juvenile pink, chum and sockeye salmon were more abundant in the northeastern Bering Sea during 2019.

The juvenile sockeye salmon distributed in the northeastern Bering Sea during 2019 were likely from Bristol Bay. Expansion north of Bristol Bay juveniles occurs in years with warmer spring and summer sea surface temperatures.

Pink salmon were seen spawning as far north as Utqiaġvik, for the first time in living memory.

Chinook in the Yukon River

Chinook runs in the Yukon River are predicted to decline over the next three years, based on the low abundance of juvenile Chinook in the northern Bering Sea in 2019. The Alaska Department of Fish and Game has indicated that while Yukon River adult Chinook salmon runs will likely be sufficient for spawning needs, substantial fishery restrictions may be warranted in the near future.

Photo by UAF

Information from: NOAA Alaska Fisheries Science Center; Sabrina Garcia, Alaska Department of Fish and Game; Peter Westley, University of Alaska Fairbanks

https://www.fisheries.noaa.gov/about/alaska-fisheries-science-center; kathrine.howard@alaska.gov; pwestley@alaska.edu

FUTURE RESEARCH

2020 RESEARCH & CORONAVIRUS

All NOAA vessels, US Geological Survey vessels, research and charter vessels, and aircraft surveys that were planned for March to May 2020 were canceled due to the coronavirus pandemic. For research surveys planned in June and beyond, agencies and researchers are monitoring the situation closely. If they sail, keeping crews and Alaska communities safe is the top priority.

Researchers are exploring whether some surveys can continue if they avoid risking exposure to communities. This could mean avoiding, or changing, planned ports in Alaska.

STAY CONNECTED

We are dedicated to understanding Bering Sea changes and sharing related science. That means communicating changing research plans so that scientists and community members can track the status of surveys and other activities.

You can follow monthly 2020 Research Cruise status updates on our Facebook page and website.

FOLLOW US ON Facebook

Search for us by typing Bering Region Ocean Update.

Photo by NOAA

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