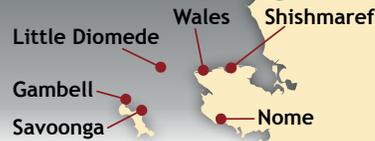


Bering Sea



Winter 2019 sea ice conditions



International Arctic
Research Center
University of Alaska Fairbanks



Who we are

This summary was brought to you by the International Arctic Research Center, Alaska Center for Climate Assessment and Policy, and Alaska Sea Grant.

IARC is a major Arctic research facility at the University of Alaska Fairbanks. One of our goals is to help Alaskans understand, prepare for and adapt to climate change impacts in the Arctic.

Questions or comments?

Please contact
Rick Thoman, ACCAP
Climate Specialist
rthoman@alaska.edu
907-474-6286

iarc.uaf.edu

Open water in the Bering Sea for the second winter in a row

Autumn 2018 began with very warm ocean temperatures in the southern Chukchi and Bering Seas. Again, this resulted in the very late formation of sea ice.

Sea ice cover in the Bering sea during November 2018 was the least extensive on record in the satellite era since 1978. Freeze-up of the Chukchi Sea was about two weeks later than the long-term average date.

Passage of storms in December 2018 and early January 2019 produced frequent north winds and seasonably cold temperatures in the Bering and Chukchi seas. This combination allowed for the rapid southerly expansion of sea ice from the Bering Strait region. Coastal communities could expect more extensive spring ice, as had been normal in years past.

Severe storms batter sea ice

The weather pattern changed dramatically in late January 2019. For the next five weeks, 15 distinct storm systems rolled across the central and western Bering Sea from the southwest to the northeast. This "parade of storms" brought seemingly non-stop south to southeast winds that decimated existing sea ice with large swells, above-freezing temperatures, and/or by pushing the ice northwards.

Impacts of this physical assault on the sea ice have been apparent in the Bering Sea, Bering Strait, and southern Chukchi Sea. February 2018 had seen sea ice extent in the Bering Sea of just 42% of the 1981–2010 average, by far the lowest of record. The February 2019 extent was 56% of average, and through mid-month, the March extent was lower than even 2018.

In February 2019, sea ice extent in the Bering Sea was roughly half of normal for that month.



Aliy Zirkle runs on the Bering Sea ice near Nome on March 13, 2019 with open water and ice floes in the background on her way to a fourth-place finish of the 2019 Iditarod. (Jeff Schultz ©2019)

Dramatic declines in sea ice



Open water off Little Diomedede, Alaska, March 1, 2019.
(E. Soolook, courtesy Alaska Sea Grant)

People must quickly alter food-gathering strategies to provide for the nutritional, cultural, and economic needs of their families.

The lack of sea ice in 2017–18—and now 2019—has had large repercussions on the northern Bering Sea marine ecosystem. With so little ice left in the Bering Sea in March 2019, this summer will feature considerably warmer than normal ocean temperatures in the Bering and southern Chukchi seas.

Environmental issues likely to result from a second year of open water conditions include changes to the entire northern Bering Sea ecosystem that may force seabirds, fish, and marine mammals to move north.

We don't fully understand the impacts of this winter's low sea ice and warmer ocean temperatures on marine mammal behavior. Coastal communities with active maritime subsistence activities will be the first to see these impacts.

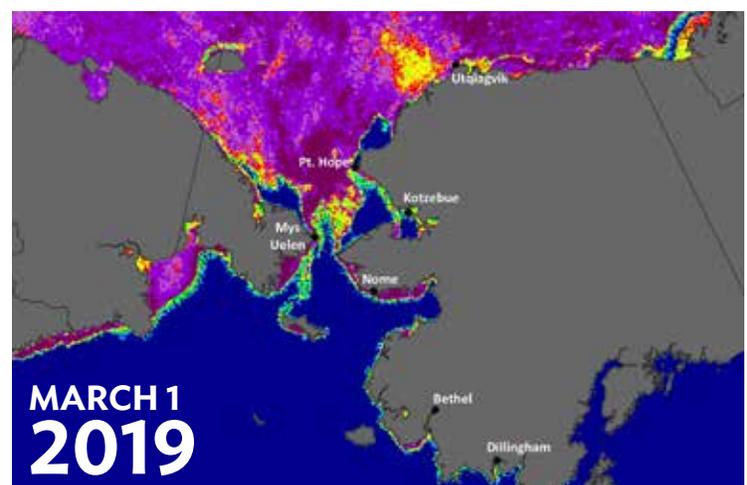
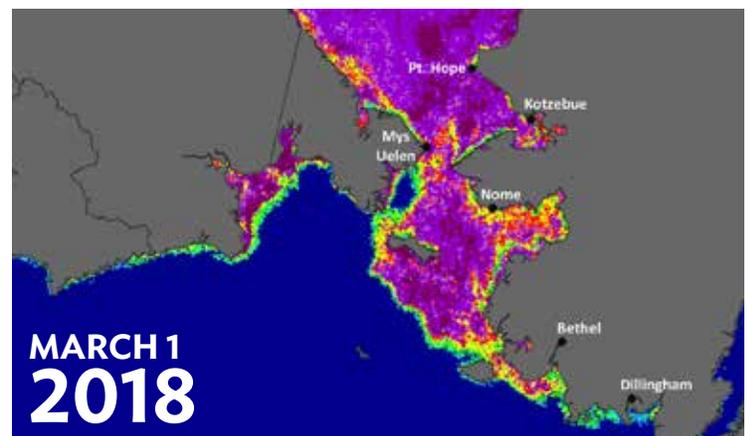
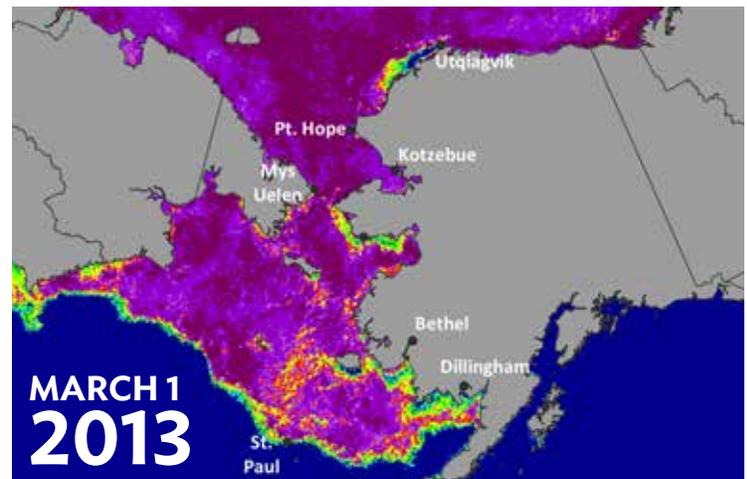
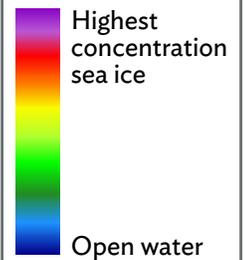


Walrus meat dries on a rack at Little Diomedede. Food resources in the Bering Strait region could face severe threats from continued loss of sea ice. (Gay Sheffield/Alaska Sea Grant)

Sea ice concentration

One tool used to determine sea ice concentration is the Advanced Microwave Scanning Radiometer 2 (AMSR-2), which measures ice concentration from aboard the GCOM-W1 satellite. Below are AMSR-2 images made in 2013 (considered normal sea ice conditions), 2018 and 2019. *Sea ice data courtesy University of Bremen. Graphics by Rick Thoman, ACCAP/@AlaskaWx.*

What do the colors mean?



Why did so little ice form?

Warmer ocean water

Right: Ocean surface temperatures were far above normal during the summer and fall 2018.

Warmer water = less ice

Warmer ocean surface temperatures resulted in very slow ice growth in November. Ice cover expanded in December and the first half of January, but was thinner than usual due to the increased heat in the underlying water.

Why is the Bering Sea warmer?

Open water absorbs more heat than ice-covered water. Less sea ice means warmer ocean water, and warmer ocean water generally means less and thinner sea ice. Also, warmer water recently traveled into the Bering Sea from the south, driven by wind patterns that caused North Pacific waters to heat up strongly.

More south wind

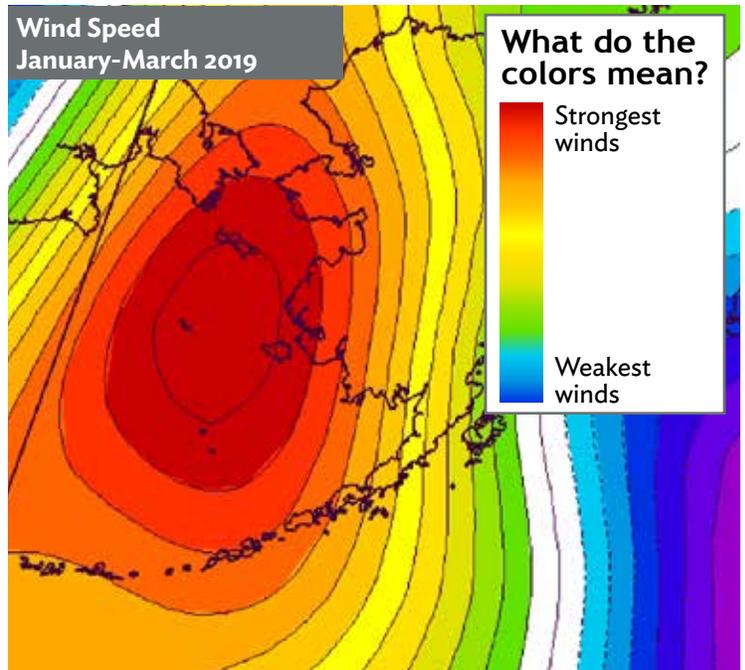
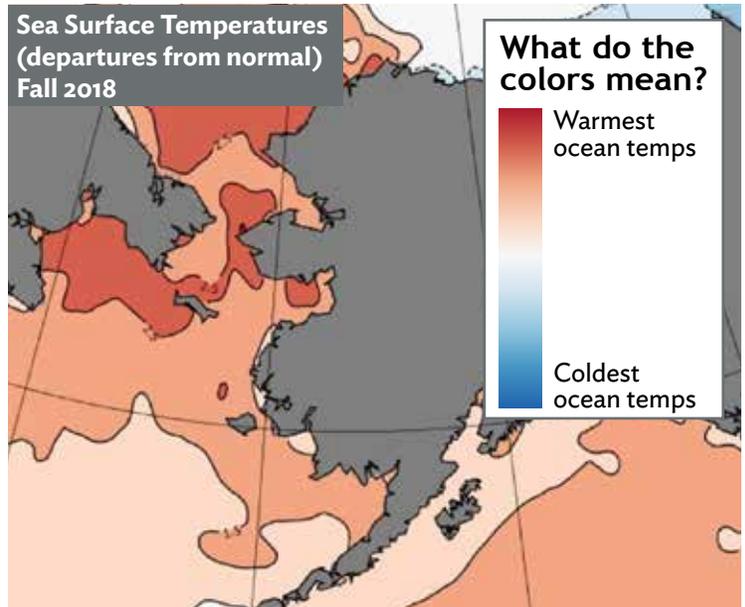
Right: South winds were much stronger than normal from late January through early March 2019.

Wind patterns shifted

December and early January saw north to northeast winds prevailing over the Bering Sea. However, the dramatic turn in the weather pattern brought nearly non-stop south to southeast winds across the eastern Bering Sea from January to March. February's dramatic shift to persistent south winds was very unusual, but not unprecedented. The winter of 1988-89 saw a similar flip-flop in the weather pattern, with strong and persistent south winds across the region.

Storms broke the ice

Because of these storms, any ice that formed quickly broke up. Community observers reported lack of or loss of shorefast ice early in the year.



Bering Strait Online

National Weather Service Alaska Region

Current weather focusing on Alaska. Find them on Facebook or at www.weather.gov/arh/

Sea Ice for Walrus Outlook

Weekly outlooks for sea ice. Check out their Facebook page, or subscribe for SIWO reports by email. www.arcus.org/siwo

Alaska Arctic Observatory & Knowledge Hub

Observations by coastal community observers. Visit their Facebook page or arctic-aok.org/



How did this past winter compare?

An extraordinarily low year for sea ice

The amount of sea ice in the Bering Sea was lower this winter than in any year since 1850, except for 2018—and March 2019's ice extent was even lower than 2018's.

This means that ice had disappeared from an area equal to one quarter of the size of the entire state of Alaska.

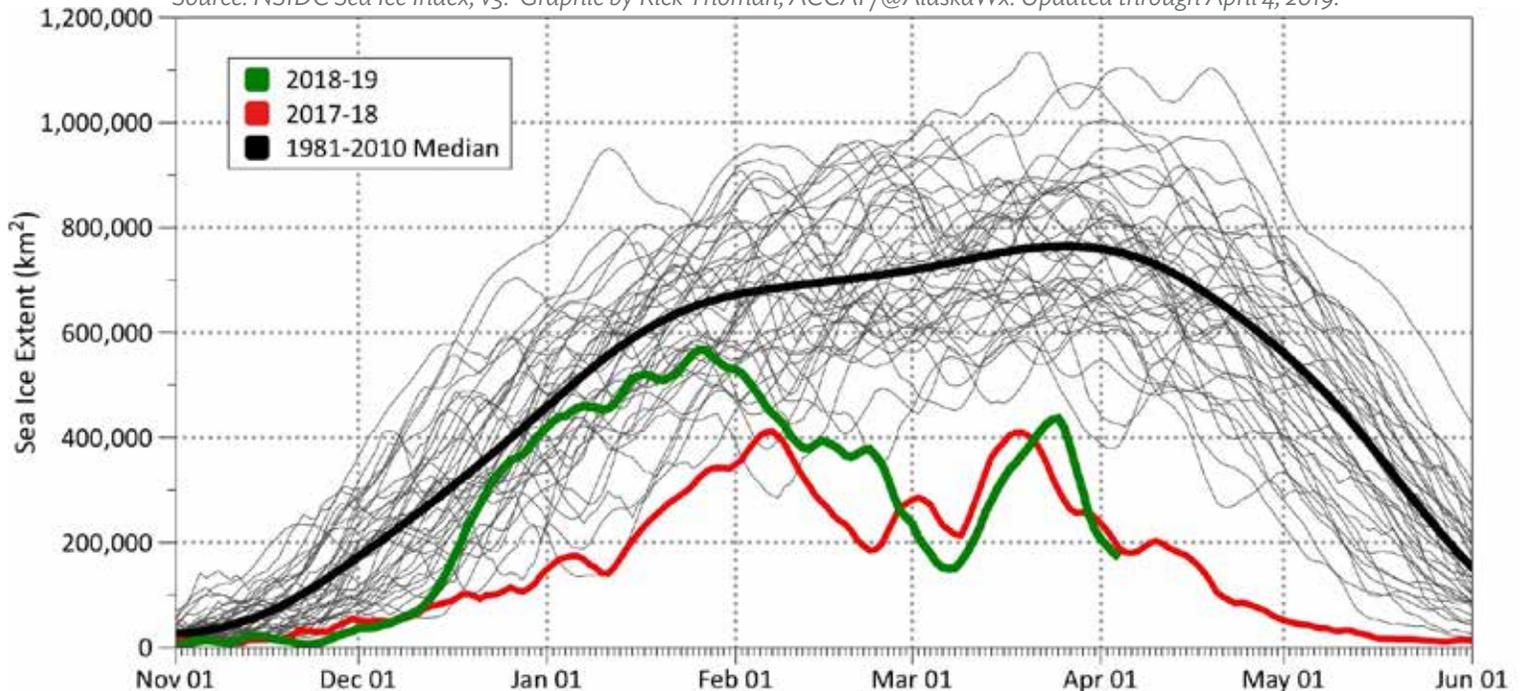
Learn more about historic sea ice conditions in the Bering Sea at seaiceatlas.snap.uaf.edu/.

Right: NASA-MODIS satellite image of Northwest Alaska, February 20, 2019. (Ben Matheson/@beringstraitbot)



Bering Sea daily ice extent, 1978–2019

Source: NSIDC Sea Ice Index, v3. Graphic by Rick Thoman, ACCAP/@AlaskaWx. Updated through April 4, 2019.



What's next: spring and summer 2019

We can expect that Bering Strait sea ice conditions will continue to change. Further reductions in sea ice, including less extensive shorefast ice, will impact travel, subsistence uses, and safety. It is therefore essential to learn to plan for and adapt to these changes.

Cooler and less stormy weather during mid-March has allowed thin ice to reform. However, rapidly increasing heating from the sun and renewed south winds will quickly melt this new ice. It is nearly certain that 2019 will see one of the earliest melt-outs of Bering Sea ice.

Outlook for future winters

Communities need to prepare for more winters with low sea ice and stormy conditions. Although not every winter will be like this one, there will likely be similar winters in the future. Ice formation will likely remain low if warm water temperatures in the Bering Sea continue.

Questions or comments?

Please contact Rick Thoman, ACCAP Climate Specialist
rthoman@alaska.edu | 907-474-6286