In 2022, AAOKH observers noted a long, warm and stormy fall. Several wintertime temperature records were set in Utqiaġvik and Qikiqtarjuaq. In several communities there were many observations of wildlife and good hunting. AAOKH students and scientists worked toward understanding changes to salmon and spotted seals in Arctic waters. Keep reading to learn more about recent AAOKH activities.

Pağlagivsi! AAOKH aitchutsuurat qanuq Inupiat uqausiqigai qanuq siḷa allanguqtuq.

In English: Welcome! AAOKH shares how Inupiat observers describe rapid environmental changes. Inupiaq translation by AAOKH program coordinator Roberta Tuurraq Glenn.
Who are we?

The Alaska Arctic Observatory and Knowledge Hub is a resource for northern Alaska coastal communities. AAOKH (pronounced A-OK) provides tools, resources and scientific information to share local expertise and observations of environmental change. Observations focus on changes in sea ice, wildlife and coastal waters.

AAOKH activities focus on these goals:
1. Support local Indigenous observers as they share their knowledge and document changes.
2. Provide services to monitor environmental change and meet community needs.
3. Create educational opportunities for the next generation of Indigenous leaders.

5 observers
AAOKH has five active observers in four coastal Arctic communities. They document the changing seasonal cycle. Observers: Billy Adams and Joe Leavitt, Utqiaġvik; Bobby Schaeffer, Qikiqtaġruk (Kotzebue); Carla SimsKayotuk, Kaktovik; Guy Omnik, Tikiġaq (Point Hope).

7 scientists
AAOKH’s science team puts local observations in the context of scientific measurements related to ice, ocean conditions and marine mammals. Scientists: Donna Hauser, Josh Jones, Roberta Tuurraq Glenn, Alexandra (Alex) Ravelo (postdoctoral researcher), Rick Thoman, Krista Heeringa, Matthew Druckenmiller, Elena Sparrow, Hajo Eicken.

Steering group
AAOKH is guided by a steering group of local Indigenous advisors and University of Alaska Fairbanks scientists: Austin Ahmasuk (Nome), Lee Kayotuk (Kaktovik), Noah Naylor (Qikiqtaġruk), Qaiyaan Harcharek (Utqiaġvik); from UAF, Hajo Eicken, Scott Rupp, Sean Asiqḷuq Topkok, Terry Chapin, Todd Brinkman.

Students
Elizabeth Mik’aq Lindley is seeking a master’s degree, learn about her salmon research on page 8.
Kimberly Kivvaq Pikok is seeking a master’s degree, she will soon begin a second year of interviews for her film on multi-generational perspectives and seasonal changes on whaling in Utqiaġvik.

Photo: The AAOKH team during an observer team meeting in November 2022.
Whale trails

The spring whaling effort in Utqiagvik was successful in 2022. Crews landed 15 whales.

As has been the case for many years, AAOKH mapped the location and ice thickness of trails used by Utqiaġvik’s whaling crews. This resource helps local hunters travel safely across the ice and keep track of who is using which areas. In spring 2022, most of the harvested whales were hauled up at the trail marked 6a (see map to right).

Recently, AAOKH received additional funding from the Alaska Ocean Observing System to continue providing whaling trail maps for Utqiagvik hunters.

Quyanaqpak to Utqiagvik whalers, the North Slope Borough and UIC Science for their ongoing support of this effort.
1 • Qikiqtağruk
Bobby Schaeffer, AAOKH observer in Kotzebue

Salmon fishery

September 7 ▶ The commercial fisheries is over. One buyer bought nearly 1.9 million pounds of salmon from their loyal fishermen. I assume the other buyer did close to the same so the total commercial catch was near 4 million pounds. Fishermen made needed cash as the cost of gas increased $2.00 per gallon from last years price of $5.50 per gallon. Heating fuel was $6.07 per gallon last year and is now $8.00 per gallon. I can’t imagine how the increase in energy [cost] will affect those in the low income bracket. The bright spot was there were a lot of salmon and folks put a lot of salmon away for the long winter ahead. My freezer is full!

Long fall, good seal hunting

October 18 ▶ It’s raining outside with temperatures in the mid 30s. We enjoyed snow since the first snow fell on Oct. 9. Since then, the temperatures climbed to the low 30s during the day with lows in the evening dropping to the low 20’s. Kobuk Lake showed signs of freezing but when the winds blow, the ice would disappear. The lakes and rivers froze with ice reaching an inch thick ... A usual long fall once again.

The fall herring run has been in Kotzebue Sound for a month. This has attracted sea mammals galore. Hundreds of seals have been entering the Kotzebue Sound as they gather to feed in front of the town. Local hunters have been harvesting spotted, ringed and ugrukchack (bearded) seals.

October 24 ▶ A pod of beluga whales came into the Kotzebue area this past week. They joined hundreds of seals who were feasting on the fall run of herring. On October 22, two hunters were successful in landing belugas. Hunters said a pod of over a hundred whales came into the Kotzebue Sound to feed.

Sea ice slow to form

November 23 ▶ Flying into Kotzebue I noticed that the entire Kotzebue Sound is ice free. The only ice I saw was the land fast ice from the hills near the old air force site straight out to the shallows near the Kobuk channel mouth then North to Sheshalik. The weather has been quite warm the past week so the ice on Kobuk Lake stayed at about 8 to 10 inches, thicker near the beach ... Snowmobile travel has been limited because of white out conditions and thin ice conditions in strong current areas. It simply has been just too warm to freeze the thin ice spots. With South East winds, overflow on the beaches and the shallows on the sand bars is occurring. The overflow under the new snow will not freeze until cooler temperatures arrive.
Smoke

July 1 ▶ Visibility about mile due to smoke. The ice finally left here on the south beach.

High waves, signs of winter, slow sea ice formation

September 17 ▶ 49°F, cloudy, rain, winds 30–35 mph southeast. High waves today, had to go through the top side trail to camp. Usually can ride the beach with my truck.

September 22 ▶ Signs of winter here in Tikiġaq, snow on the mountain tops.

October 30 ▶ Today 31°F mostly cloudy, snow. I got a late start to fishing this year due to no Snowmachine (too much snow for 4-wheelers) lot of snow this year. Still no ocean ice here in Tikiġaq.

Slow fishing

November 14 ▶ Last week we had our first freeze up of the ocean with some thin slush ice ... Slow fishing compared to few years ago, I’d have sacks of fish by now.
3 • Utqiaġvik
Billy Adams/Joe Leavitt, AAOKH observers

Lots of bears & wildlife

June 14 ▶ At Nuvuk and Nuvugaluaq there are all sorts of bears! Loners, mother with cubs and couples ... The bears are reproducing at this time and we expect to see more bears next March. Good to see more mothers with healthy cubs too.

July 27 ▶ Loose ice has drifted on to the beach, frost on the ground. Morning very wet, 1.4” rain for yesterday’s new record.

July 25 ▶ We had rain, winds, no winds and even snow this month. The tuttu (caribou) have been feeding the community with help from ugruk (bearded seal), qilalugaq (beluga whale), aiviq (walrus), natchiq (ringed seal) and some iqaluk (fish). A few qaugak (ducks) have also been taken. Let us remind each other to continue to practice what we have learned through countless generations about our values that will get us through difficult times.

Warm & windy fall

September 5 ▶ The fog and wet conditions continued till the 4th of September, now we have some sun in our lives but there are still areas of dense fog. The winds have shifted and are coming from the west and wave action have developed where we call them ingulik (rolling waves) ... A bowhead whale about 10 miles north of Nuvuk also.

September 20 ▶ Little bit of frost on the truck’s windshield and the ponds formed very young ice during the night. The typhoon weather did not reach Barrow but caused rivers to rise, the low stopped just west of Point Hope and is still west of Barrow ... 

November 21 ▶ It has been a peculiar start of a winter in Barrow, much warmer and more winds than years past. Our shores are still without ice. This is a 50 some foot whale that washed up in the last few days.
Warm, foggy, windy summer & fall

August 22 ➤ Strong winds out of the east today making it feel like 31. The ocean waters are rough and white caps with low tide. Yesterday we finally saw belugas close to shore ... The road that was eroding due to spring thaw and rains finally sunk a little couple days ago even with attempts to fix it.

September 6 ➤ It has been foggy and raining off and on for several to many days. Today it is also windy and the ocean and lagoon have white caps ... I counted with a quick scope 10 polar bears resting on the sandbar across the north island. I still see geese, mostly snow geese. The tundra is all orange, yellow and brown now ... No ice to be seen in the ocean.

October 30 ➤ Cold east wind making it feel like 0°F. 33 mph, these winds keep blowing what snow we do get away. Saw where it looks like a polar bear was trying to make a den but not enough snow.

November 18 ➤ Wow super warm today, with some rain and it’s melting snow. The roads are slippery. It is 31°F feeling like 21°F. Lots of over flow at the east old runway.

Cold blizzardy winter

December 27 ➤ The last few days have been freezing cold, -40–35°F wind chill ... blizzarding to just blowing snow and drifting the roads with hard snow. Winds gusting the other night to 45 mph ...
**Qikiqtaruk: Bobby Schaeffer**

**July and September storms** ► We had three strong storms. The July 18 storm had the strongest winds. Southwest winds to 50 mph brought in a storm surge that set the record. Brother Chuck said the water in Kobuk Lake was the highest he had ever seen. The huge waves beat on the coast of the lake for two days and took about 30 feet of coastline. The other two were remnants of typhoons that made their [way] up here but, fortunately they lost strength before they got here. The difference was the length of the storms. They were so huge that they stuck around for five days ... Wind, huge surf and a lot of rain. The second storm hit us on July 28 and Merbok on September 14 [to 18] ... I think we lost more earth to the ocean than ever before.

**October 7 storm** ► Similar to Typhoon Merbok, this strong storm we are in the path of veered to the Siberian coast. Fortunately for us, we did not get the strong winds forecasted but we are experiencing about a six foot storm surge ... Kivalina and Point Hope did get some very strong winds and huge waves that are battering the communities presently ... This storm is slowly moving northwest and the winds have been with us for over two days. Supposed to die down this afternoon. Very stressful ... southwest winds, storm surge ... I worry about the numerous camps along the Kotzebue Sound and Chukchi coast that locals use for subsistence gathering.

**Tikiŋqaq: Guy Omnik**

**October 6 storm** ► Rain, 41°F, south [wind] 40 mph gust to 55 mph. Last night winds south 50 mph with gusts to 70 mph. Luckily we had no power outages last night ... Reports of tin roofing coming off some houses. High waters almost reaching my older camp at beacon hill.

**October 9 storm** ► The storm like this reminds us the true power of nature! Erosion, west winds, waves and high water levels were key factor in this storm. The winds were not as high as we thought they were predicted to be but all the other factors were in line to cause significant damage. We hope to be much more prepared as we should take notes and learn from this. (Billy Adams)
Climate trends

Fall storms and water levels

Several water level sensors near Qikiqtarjuk help track storm surges. These gauges showed that water rose September 17, during Merbok, and again on October 6. The second storm, which several AAOKH observers mentioned, began in the northwest Chukchi Sea.

While Merbok had massive impacts in the Bering Sea region, it caused less damage in more northern communities like Utqiaġvik. Meanwhile, the October 6 storm caused considerable street flooding and severe erosion on the road to the point in Utqiaġvik.

Temperature records set

Utqiaġvik set or tied ten daily record high temperatures. The most notable occurred on November 18 when the temperature reached 35°F. This was the highest temperature ever so late in the year. Then on December 5, the temperature hit 40°F, beating the previous record. It became not only the highest December and highest winter temperature, but also the highest temperature any date between October 30 and April 22. During the June to December period, no daily record low temperatures were set.

Qikiqtarjuk set or tied five daily record high temperatures. This included four in a row during the first week of December. No daily record low temperatures were set.

What about precipitation?

Qikiqtarjuk and Utqiaġvik had more precipitation than normal in 2022, but much less than 2021. The most remarkable extreme was on July 26 in Utqiaġvik. It rained 1.42 inches, the highest 24-hour precipitation total ever recorded.

Sea ice freeze–up

Final freeze–up of the Chukchi Sea, when the ice came and actually stayed, occurred later in 2022 than in fall 2021. At Utqiaġvik it was the second latest in recent years, only 2017 saw a later freeze–up. In Qikiqtarjuk this year froze–up much later than last year, but was typical of the post-2015 era.
In early December, community members, agency and university biologists gathered to discuss how salmon and salmon harvest is changing across Alaska’s Arctic. They outlined key themes and questions. AAOKH graduate student Elizabeth Mik’aq Lindley is using the information to guide her research.

Key themes from the discussion

Perceptions of salmon vary.
- Communities in the Kotzebue region are deeply connected to salmon. Meanwhile salmon use varies widely in North Slope communities and perceptions range from appreciation to dislike.

Presence/harvest of species is changing.
- Kaktovik: more saffron cod and cisco; less Arctic char/Dolly Varden harvested in traditionally productive fishing sites; more salmon harvested in char nets
- Utqiaġvik: more salmon harvest and use in the past seven years — except summer 2022 when very few salmon were available to harvest; more killer whales; more kidney worms found in bowhead whales
- Tikiġaq: more uncommon fishes harvested or washing up on shore; very poor fish harvests in fall/winter 2022
- Qikiqtaġruk: large increase in pink salmon; increased occurrence of cyanobacteria and harmful algal blooms in Kotzebue Sound

Concerning environmental conditions happening more frequently:
- Freeze-thaw events with unknown consequences to local organisms, increased frequency of storms

“If it has a name, it’s been here” – Joe Leavitt

The historic presence of salmon across Alaska is reflected in their Indigenous names. Common Inupiaq names used are amaqtuq (pink salmon, North Slope dialect) and iqalugruaq (chum or all other salmon). Do these names reflect the history of species that were present/harvested, or just an interest in salmon?

Key questions
- How will increasing salmon in some areas impact food security and other preferred fish species?
- How does the timing of freeze-up and break-up impact spawn timing of salmon and other important subsistence fish?
- How can we improve monitoring of salmon across the Arctic to better understand where/when they are spawning, where there are established populations, and to what extent are they coexisting with Dolly Varden and Arctic char?
- How can we best uplift Indigenous sovereignty and governance while studying Arctic salmon?
- An ethical and equitable research process that includes Indigenous Knowledge and consultation/participation is needed: who are we doing this for? Why are we doing this instead of focusing elsewhere?
- Does success for salmon = success for people? How do we prioritize research questions in a way that equitably considers vastly differing relationships with salmon?

Upcoming research activities:
In fall of 2023, Mik’aq will survey streams in the Colville River system to learn more about which and how many salmon species are present..
AAOKH shares its approach with the science world

The AAOKH team wrote a scientific paper describing their approach. It will be published in the journal Arctic Science and titled, *Nunaaqqit Savaqatigivlugich – Working with Communities: Evolving Collaborations around an Alaska Arctic Observatory and Knowledge Hub.* Publishing this paper helps elevate observers’ perspectives and is an example of community-based research for scientists. AAOKH’s engagement strategies and process could help guide other researchers who are interested in working in Arctic Alaska and with Indigenous communities. To help normalize and uplift Indigenous perspectives in academia, each of the AAOKH observers and students were included as co-authors. The paper also used Iñupiaq terminology throughout.

Summary of the paper

Since time immemorial Iñupiat have been living in the Arctic (the cold land). Knowledge from Iñupiat is helpful for the future. AAOKH is a group of coastal people. They (always) observe their environment throughout the year. AAOKH is in transition. We are providing more support for observers and communities. Community members, observers and students all included together with researchers are part of what’s shown in this paper. We are planning (for the future) together. Our goals:

- Provide support to Iñupiaq observers to share their observations.
- Provide (them with) tools to observe the environment.
- Create educational opportunities for Alaska Native students and leaders.

Observations can inform decision-making. We want to learn (generate knowledge) together.

Summary in Iñupiaq


- Tunjulliliqsuglugit naipiqtuqtuqtaq aglaaqisiglun.
- Savalgașiqluglich ikayuŋniaguqvit iñuuniaŋviŋisat irrusiat.
- Aulaqisaagmilugich ilisaaqslugiiq nunaqiq ilisaaqtiŋitsalu aulariŋisalul.

Qaunakkutich atuŋqagi sivunniŋat. Atauchikun kaniqsillasisuglugu.

This graphic from the paper shows how AAOKH changed over time to focus more on holistic perspectives of changes, improve communication and information exchange, and elevate Indigenous participation and education. In the future, AAOKH would like to see increased Indigenous sovereignty over the research and data processes.
Seal monitoring

As sea ice declines, we need to better monitor marine mammals that depend on ice. Little is known about how environmental conditions, like wind speed and sea water level, and increasing human disturbance affect spotted seal distribution and behavior.

During the open-water season (about July to October), spotted seals haul out in the dozens to hundreds on barrier islands, spits, rocks and reefs of the Chukchi and Beaufort seas. Since spotted seals are sensitive to disturbance by traditional marine mammal aircraft surveys, no surveys have occurred at coastal haulouts in Arctic Alaska since the 1990s.

AAOKH marine mammal scientist Donna Hauser, Andrew VonDuyke and the North Slope Borough Department of Wildlife Management are exploring new technologies for safely surveying spotted seals. The exploratory studies use game cameras and drones to see when seals are at haulouts near Utqiaġvik, assess their behavior and count them. The data are being put into the context of observations by AAOKH’s Utqiaġvik observers.

Spotted seal survey results

Surveying seals with drones
AAOKH did a short pilot study in 2022 to see if spotted seals could be counted and their behavior and body condition assessed using small drones. The surveys took place at the mouth of Pittalukruak Lake in Dease Inlet near Utqiaġvik. About ninety seals were successfully surveyed from ~200 feet above the ground.

AAOKH may continue the research, especially with local partners. If you fly drones or are interested working with drones, email Donna Hauser, dhaiser2@alaska.edu.

Surveying seals with game cameras
Game cameras were placed at several seal haulouts in summer-fall 2020, 2021 and 2022. The cameras, and a weather station, tracked temperature and wind, behavior and the number of seals. Summer 2022 was the final summer of the project.

The haulouts were monitored:
- for 436 days total across all three years,
- at four sites, mouth of Kugruak Bay in Peard Bay, Oarlock Island in Dease Inlet, Topagoruk River mouth in Dease Inlet and Paisuq River mouth in Smith Bay.

Though the 2022 data are still being reviewed, spotted seals were observed at Peard Bay, Oarlock Island, and Topagoruk River. Many other wildlife were spotted too!

This project was funded by AAOKH, North Slope Borough Dept. of Wildlife Management and the Coastal Marine Institute and Bureau of Ocean Energy Management.

This seal research was conducted Under NOAA General Authorization No. 23546 and UAF Institutional Animal Care and Use Protocol No. 1610672-2.