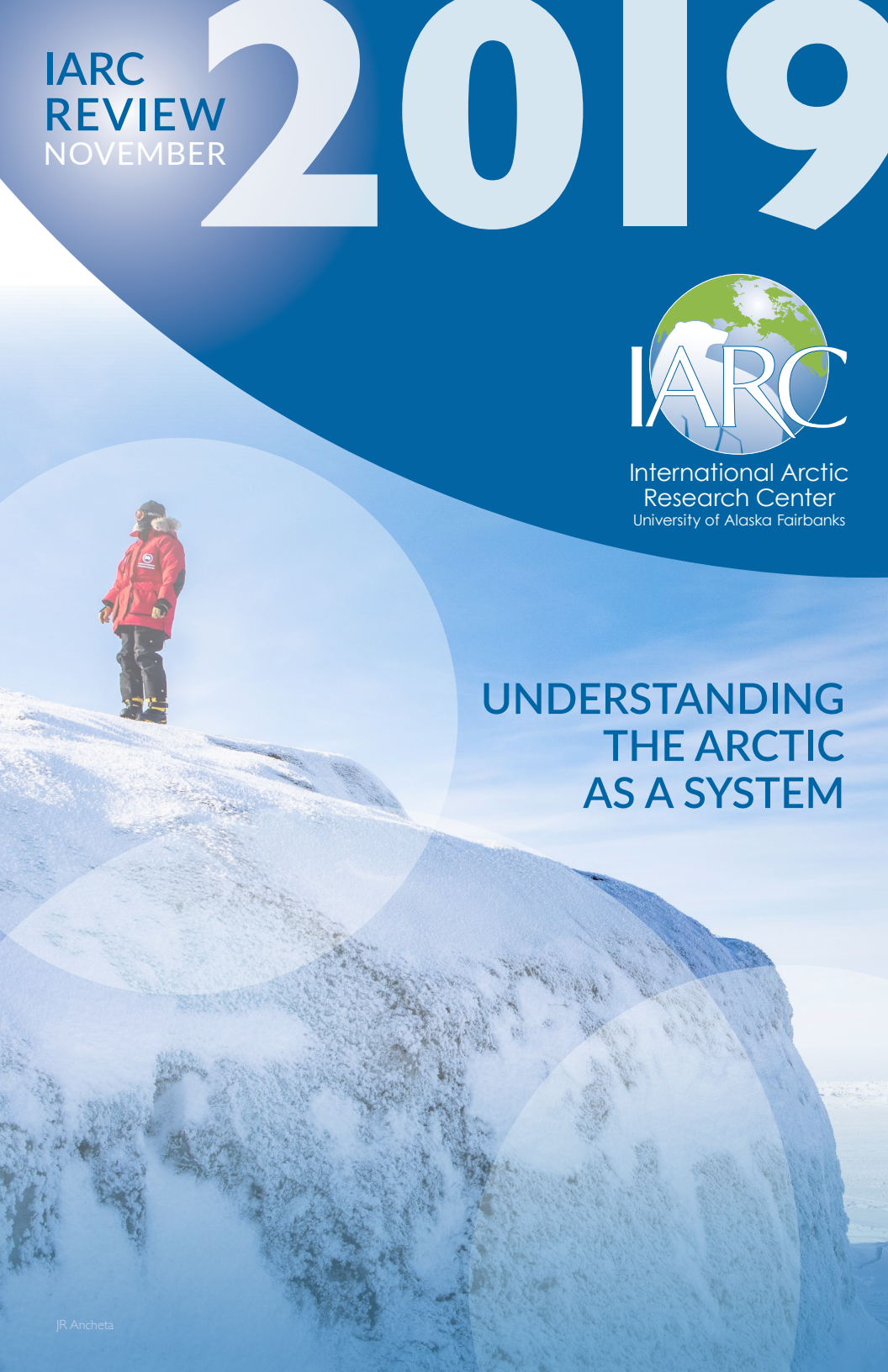
IARC REVIEW NOVEMBER 2019

International Arctic Research Center
University of Alaska Fairbanks



UNDERSTANDING THE ARCTIC AS A SYSTEM

JR Ancheta

MESSAGE FROM THE DIRECTOR

2019 was an important year for Alaska, our university, and IARC. The unprecedented loss of sea ice in the Bering and Chukchi Seas confirmed that the previous year was not a one-off event. Impacts of ice loss and ocean warming are now rippling through other parts of Alaska and the Arctic. IARC researchers are front and center in analyzing and communicating these changes, as illustrated in the pages of this report. From participation in a historic Arctic Ocean expedition to informing decision-makers, IARC is helping a range of partners and the broader public understand and respond to rapid change.

This year we also saw major cuts to State funding support from the University of Alaska. IARC is a lean, highly efficient research enterprise with broad and deep reach. We are grateful for the State's support—it is critical in helping us bring in external research funding, allowing us to multiply every dollar received by a factor of eight. Alaska's fiscal challenges and further cuts loom, but we draw on our strengths, continue to develop new partnerships, and pursue new funding sources.

For example, a large, cross-disciplinary team from IARC is partnering with Department of Energy National Laboratories to study processes at Arctic land-ocean-infrastructure interfaces. IARC's Deputy Director, Scott Rupp, is leading an effort across the University of Alaska, partnering with U.S. Army Corps of Engineers, to translate environmental data into a decision-support tool for Department of Defense and private sector infrastructure engineering design. Two new joint faculty appointments with UAF's School of Management help link research and education: Joseph Little as newly appointed Lead of IARC's Experimental Arctic Prediction Initiative, and Alec Bennett who carries IARC research and expertise into UAF's Homeland Security and Emergency Management Program. Next year, IARC will co-lead the 2020 Arctic Observing Summit in Iceland where our researchers will help build collaborative networks across the Arctic and beyond.

With all its challenges, 2019 brought out the best—ingenuity, dedication, and caring—in our researchers and staff, all of whom make IARC an institution that continues to matter.

Hajo Eicken
IARC Director
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Comments/questions

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Authors

Heather McFarland, Molly Tankersley, Robin Ellis

Review

Hajo Eicken, Tina Buxbaum, Carolyn Rosner, Rob Rember, Marc Oggier, Ana Aguilar-Islas, Molly Tankersley, Elena Sparrow, Malinda Chase, Bob Bolton, Georgina Gibson

What we do

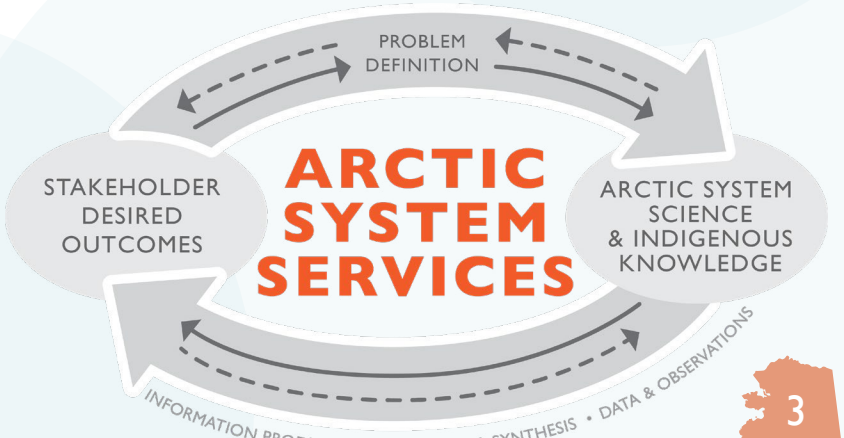
We are the International Arctic Research Center (IARC) at the University of Alaska Fairbanks. We foster Arctic research, coordination, and communication in an international setting to help the nation and the world understand, prepare for, and respond to rapid environmental change in the Arctic and beyond.

Arctic system services

The Arctic provides important services to society. They include regulating the climate system, providing sea ice as a transportation platform, supplying important cultural resources, supporting food webs, and much more. IARC research follows a framework based on this concept.

By focusing on stakeholder defined research we prioritize efforts that address these services and their benefit or harm to society. We link Arctic system science with local and Indigenous knowledge to advance more meaningful outcomes for stakeholders. To achieve these goals our team of scientists and professional staff excel in modeling and synthesis, data and observations, and producing accessible information products.

The illustration below shows how these pieces fit together and will appear throughout this report. The highlighted components illustrate how each project fits into the broader Arctic system services framework.



MAKING ARCTIC HISTORY

ARCTIC SYSTEM SCIENCE

Frozen in the Arctic sea ice

Five UAF researchers are among hundreds of scientists worldwide who are spending part of 2019 and 2020 on board a research ship frozen in the Arctic sea ice.

The 387-foot icebreaker Polarstern left Tromsø, Norway September 20, 2019 to kick off MOSAiC, the world's largest and most comprehensive expedition to the central Arctic Ocean. Polarstern is now locked in the frozen sea ice and set to drift past the North Pole until September 2020.

MOSAiC, capturing a year in the Arctic

The Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAiC) is capturing chemical, physical and biological data related to the ocean, sea ice, snow, and atmosphere. The goal of the project is to understand why the Arctic is warming faster than any other region on the planet.

Marc Oggier helping flag trails on the ice surrounding Polarstern so that scientists can find their way back to the ship even in dark and snow drifted conditions.

Sebastian Grote/Alfred Wegener Institute

More than 600 scientists from 17 nations are participating in the expedition.

Rob Rember, a researcher at IARC and UAF's science lead on Polarstern, expects that MOSAiC will multiply the amount of existing data from the central Arctic Ocean by a factor of a thousand.

"The amount of sea ice data physically collected [in the past] from October to March is very, very small," Rember said.

Rember is at sea for 100 days this year. His team is rotating through several shifts on Polarstern. IARC postdoctoral researcher Marc Oggier is spending 195 days at sea, getting through the long, dark months with 10 pounds each of good chocolate and yerba mate.

While on board, the UAF scientists share their experiences via regular blog posts, on Twitter, @ArcticMosaic and Facebook, @MOSAiCuaf.

Where the ocean, ice and air meet

The team hopes to gain a complete picture of what's happening in the Arctic Ocean, particularly where the ocean, sea ice, and atmosphere meet. "We're working at the interfaces—how does the ice interact with the snow, and how do they both interact with the water column, and how the water column interacts back with the ice?" Rember said. This is where gases and nutrients are transferred between the ocean and ice, and the ice and the atmosphere.

"Think of sea ice as a substrate where life can be and where nutrients get cycled and recycled," said Ana Aguilar-Islas, Rember's colleague at UAF College of Fisheries and Ocean Sciences. In the ocean system, these nutrients are used by phytoplankton and sea ice algae to grow and ultimately feed the rest of the food web. "It's basically the same as your garden; you need the right mixture of nutrients to be productive," explained Rember.

Accessing sea ice

If all goes as planned, Polarstern will stay attached to the same sheet of floating ice for the entire seasonal cycle, allowing Rember's team constant access to the ice.

In a late October blog post, Rember described how his team is gearing up to begin routine science operations by gathering weekly samples of sea water, snow and cores of ice drilled from the frozen sea.

"Throughout the whole year, every week, we are going to make the same set of measurements," Oggier said. Those measurements will show how nutrients in the Arctic change throughout the year.

Polarstern anchored to her ice floe. With only a few hours of twilight each day, most of MOSAiC's science is conducted in the dark.

Esther Horvath/Alfred-Wegener-Institute

Esther Horvath/Alfred-Wegener-Institute

Polar bears spotted close to Polarstern. Bears, shifting ice floes, cracks in the ice, darkness, and extreme weather create a challenging environment for MOSAiC's scientists.

Working as a team

Since space is limited on the ship, each researcher does a variety of tasks in addition to their own research, which is a dream for a young researcher like Oggier. In the initial days of the expedition, Oggier supported many researchers as they set up their installations, preparing for the long winter ahead. He even helped to set the anchor that secured the ship to its ice floe.

From a science perspective, MOSAiC is offering researchers a chance to be a part of something extraordinary, Rember said, "This opportunity will never come along again."

LOCAL CLIMATE CHANGE

INDIGENOUS KNOWLEDGE


Molly Tankersley

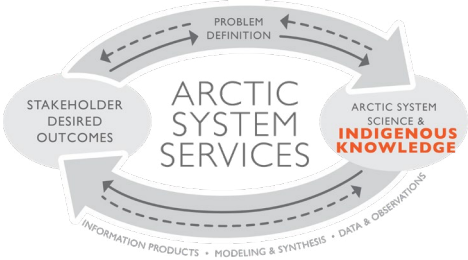
Mendenhall Glacier near Juneau, where local high school students are studying the impacts for glacial flooding on salmon.

Climate change and communities

Dragonflies swarm across an Alaska lake, scattering as buckets attached to ropes soar through the air and drop into the glittering water below. Community members and educators draw in their buckets. Under the watchful eye of IARC scientists, they perform a series of tests on the collected lake water.

The group was gathered for the Climate Change and My Community program that starts with a hands-on workshop in Fairbanks, equipping participants with the tools to monitor climate change. Fourteen teams from seven US states made up the 2019 cohort. Composed of at least one community member and an educator, teams engage youth in climate change learning and implement stewardship projects related to a local climate issue.

The project relies on a partnership between Arctic and Earth SIGNS and the Association of Interior Native Educators to incorporate multiple knowledge systems and NASA resources. Participants learn standardized science



protocols used around the world to monitor things like frost depth, snow pack, air temperature, cloud cover, and much more.

Listening to local Elders

Interweaving western and Indigenous science, culture, and ways of teaching and learning is central to the program and stewardship projects. Elders' knowledge drives the data collected by youth, ultimately providing a richer understanding of the history and future of communities. This pairing highlights climate change impacts on a personal and global scale.

"We wanted [participants] to first listen to their elders and learn what was important to their elders in their own community regarding climate change," said Katie Spellman, who ran the workshop alongside Elena Sparrow and Malinda Chase.

The program is in its third year and participants have studied everything from increased river bank erosion to the effects of climate change on berries. Each project provides students with unique science tools to study change and the opportunity to interact with their community in a meaningful way. "We wanted youth to feel empowered to be agents of change, using the tools of science," said Spellman.

Glaciers and salmon

This year, Juneau educators Kristen Wells and Adriana Northcutt are working with 90 high school students on a project they call "from glacier to sea."

Since 2011, an ephemeral glacier-dammed lake has formed each summer in Suicide Basin adjacent to the city of Juneau. The lake drains during outburst flood events, impacting several heavily populated neighborhoods. The 2016 flood, the largest to date, sent nearly 15,000 cubic feet per second of water through the Mendenhall River. This is greater than the discharge of the Colorado River through the Grand Canyon and nearly ten times greater than the average water flow of the Mendenhall River.

Local residents are concerned with how these events affect the environment. In response, Wells and Northcutt's students are studying the impacts of outwash flooding on salmon. The students began their investigation learning from local Tlingit Elders and storytellers about the relationship between salmon and glaciers. Using science protocols, they explored water properties like dissolved oxygen and water temperature that could impact salmon.

The 2019 Climate Change and My Community workshop participants gathered in Fairbanks before returning to their communities to implement, with the help of local youth, climate related stewardship projects.

Robin Ellis

High school students from Juneau examine a water sample during a field trip to gather data for their salmon and glaciers stewardship project.


Molly Tankersley

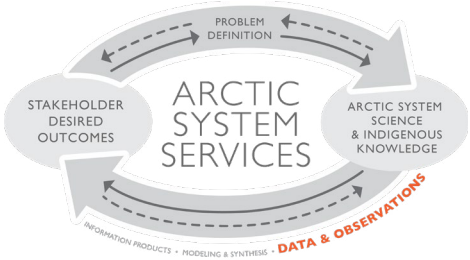
IMPROVING CLIMATE MODELS

DATA & OBSERVATIONS

IARC's Bob Busey digs a snow pit near Nome, Alaska while Katrina Bennett, Los Alamos National Laboratory scientist, measures the snow depth in the background.

Missing link for climate models

Rapid warming is transforming the Arctic, triggering a cascade of changes across entire ecosystems. Scientists are grappling with how to incorporate degrading permafrost, the expansion of northern shrubs, and disturbances such as wildfires into global climate models.



To improve predictions of Arctic environmental change, IARC researchers are collaborating with U.S. Department of Energy national laboratories and international research groups on a project called Next-Generation Ecosystem Experiments Arctic (NGEE Arctic).

Wetter or dryer?

One important question NGEE Arctic is exploring is where, when, and why the Arctic is becoming wetter or drier, and what the implications are for the climate system. The answer could improve how models represent carbon, energy, and water processes in the Arctic.

"Current global climate models aren't built to transition from a very wet environment to a very dry environment," said IARC hydrologist Bob Bolton. "They currently don't represent these big landscape transitions."

In some areas of the Arctic, that is exactly what is happening. Degrading permafrost can cause the ground to slump and ponds to form, making the environment wetter. In other places, the permanently frozen ground thaws, the ground more easily drains, and the landscape becomes drier.

Although it sounds counterintuitive, thawing permafrost isn't just a summer problem. Winter's snow plays a role too. "It's all about insulation," said Bolton. Snow makes the ground either warmer or colder. The amount depends, in part, on how early and deeply the snow accumulates each autumn and how rapidly it melts each spring.

An early snowfall in autumn may trap summer heat in the ground, giving permafrost more time to degrade even as outside temperatures drop. The opposite is true with a late snowfall in spring. If the ground refreezes after the snowfall, additional cold can be trapped in the surface soils, delaying summer thaw.

However, snow is extremely variable across the Arctic. As winter travelers know, snow depths can be difficult to predict and a hiker may suddenly plunge from knee-deep to waist-deep snow in only a few steps.

Nome's Kigluaik Mountains frame IARC's Bob Busey as he surveys the snow pack to understand how snow accumulates on the landscape and in turn impacts permafrost thaw.

Where does the snow accumulate?

What makes snow accumulate in some areas but not others? To find out, Bolton and his colleagues are painstakingly inventorying the snow pack and the underlaying vegetation at study sites near Nome, Alaska.

It is becoming clear that shrubs play a big part. They trap snow, and that deeper snow adds insulation, impacting the permafrost below. "We have hints that in shrubby areas the permafrost is either completely degraded or degrading much more rapidly than in non-shrubby areas," said Bolton.

An interdisciplinary team

The interconnected nature of the Arctic makes NGEE Arctic's multidisciplinary expertise essential. With researchers across the national laboratories, as well as UAF, the team is well prepared to explore the complexity of vegetation ecology, biogeochemistry, and hydrology across the Arctic system.

"We knew going in that we were going to study certain processes, such as vegetation dynamics and the microbial production of carbon dioxide and methane. But, as it turns out, all of those processes are coupled and interconnected," explained NGEE Arctic director Stan Wullschleger.

The multidisciplinary environment gets Bolton excited about field work. "I enjoy spending time in the field talking science and bouncing ideas back and forth," he said. "Stan's a veg guy. We have different perspectives. He looks at a shrub much differently than I do. I just see it as a thing on the landscape that traps snow."

DEEP SEA FISH MODELS

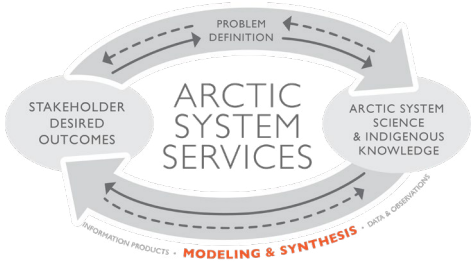
MODELING & SYNTHESIS

Surviving the gauntlet

Each year, the success of one of Alaska's most lucrative commercial fisheries depends on a journey that took place years prior. Sablefish, commonly known as black cod, are a highly sought-after deep sea fish in the Gulf of Alaska. Adults spawn when they are five to seven years old by releasing up to one million eggs at depths of up to 800 meters. It is the journey of these tiny eggs to their coastal nurseries hundreds of miles away that greatly determines the success of future commercial fishing activities.

IARC scientist Georgina Gibson refers to it as the "gauntlet." Once spawned, eggs hatch into larvae that sink as they consume their yolk sacs. If conditions are right and they mature fast enough, the young fish drift along ocean currents toward the continental shelf. As they develop, larvae swim toward the surface where they feed on zooplankton. Provided enough food, the young fish grow and move inland toward the safety of shallow coastal nurseries. The whole journey takes several months. If the substrate in these nurseries is just right, the young fish remain

A NOAA fisheries scientist holds a sablefish, also known as black cod, an important fisheries resource in Alaska.



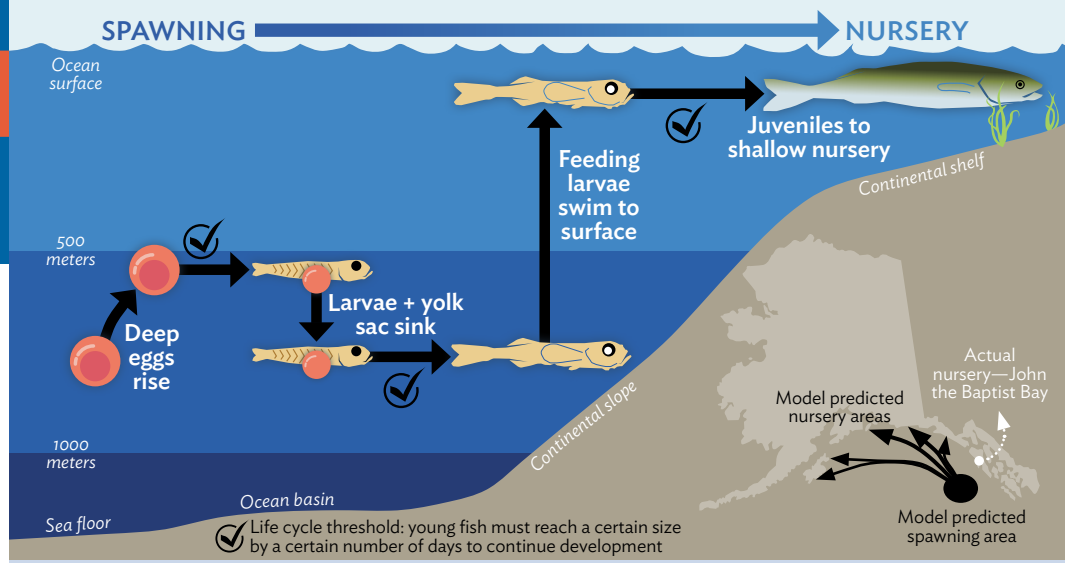
for another two years before returning to the deep sea to complete the rest of their life cycle. At this time, they are considered fishable and "recruited" into the fishery.

Understanding population trends

Bringing about $4 per pound dockside, sablefish are worth more than most salmon species. Yet catch is extremely unpredictable. "Sometimes the sablefish population completely crashes and we aren't sure why," said Gibson. Scientists think these population fluctuations are due, in-part, to the gauntlet endured by young fish. That's where Gibson, a marine modeler, comes in.

"It's really challenging for the observational scientists to get comprehensive data," said Gibson. The cost and logistics of studying a species that spawns so far from shore and at such depths are too high. Even if they weren't, tracking tiny eggs as they drift through the open ocean would be nearly impossible. "So that's where we are trying to help fill the holes, incorporate all the information [fisheries scientists] can tell us and put that in the model."

Gibson created a model using ocean currents to predict the location of sablefish nurseries. She hoped to learn how off-shore eggs are passively transported toward the continental slope, and in doing so, understand the



Simplified conceptual diagram, not to scale, showing life stages depicted in Gibson's sablefish transport model.

dynamics that control sablefish populations. Her model recreates sablefish life stages, with several thresholds requiring young fish to reach a certain size by a certain number of days to continue toward successful recruitment into the population.

According to the model, young fish that successfully reached nursery areas in the Gulf of Alaska were most likely spawned in the eastern Gulf. However, the model missed one of the most productive and well known nurseries at John the Baptist Bay. As a result Gibson said, "the model showed us that current drift alone is not enough to explain the observed behavior."

Building a better model

Despite this shortcoming, Gibson's initial model gained the attention of NOAA stock assessment scientists. The group uses commercial fishing data and scientific observations to determine the status of the sablefish fishery and how much catch the Gulf of Alaska population can sustain. "Our initial study was seen as important and something that contributes to understanding fisheries dynamics," said Gibson.

With additional input from this group, Gibson is creating an updated model that incorporates more parameters thought to be important to sablefish recruitment. The team is adding a temperature cutoff for various life stages along with a model depicting where zooplankton and phytoplankton are most abundant. Since not all coastal waters make good nurseries, the model also ranks coastal areas based on the quality of habitat they provide.

Supporting commercial fisheries

This new development is particularly exciting for Gibson. "It is kind of cool because it is related to real world problems and we're helping the fisheries managers figure out why their fishery is responding the way it is." If this new model performs well it could even help set catch limits in the future. "Down the road, it might be that if we predict with the model that a particular year class is not going to do well, the currents are not right, the temperatures aren't right, we can advise [managers] to allow less fishing," said Gibson.

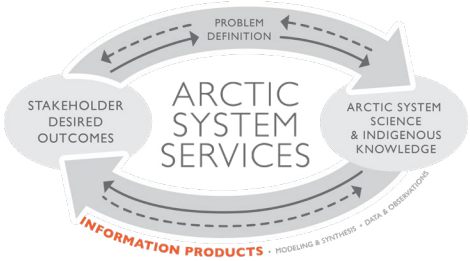
The model could also help direct future research on sablefish. A better understanding of critical points in the life history could guide where to focus observational studies.

ACCESSIBLE SCIENCE

INFORMATION PRODUCTS

Alaska's changing environment

Alaska is experiencing profound environmental change related to extreme weather events and deviations from the historical climate. These changes are impacting the daily lives of Alaskans around the state.

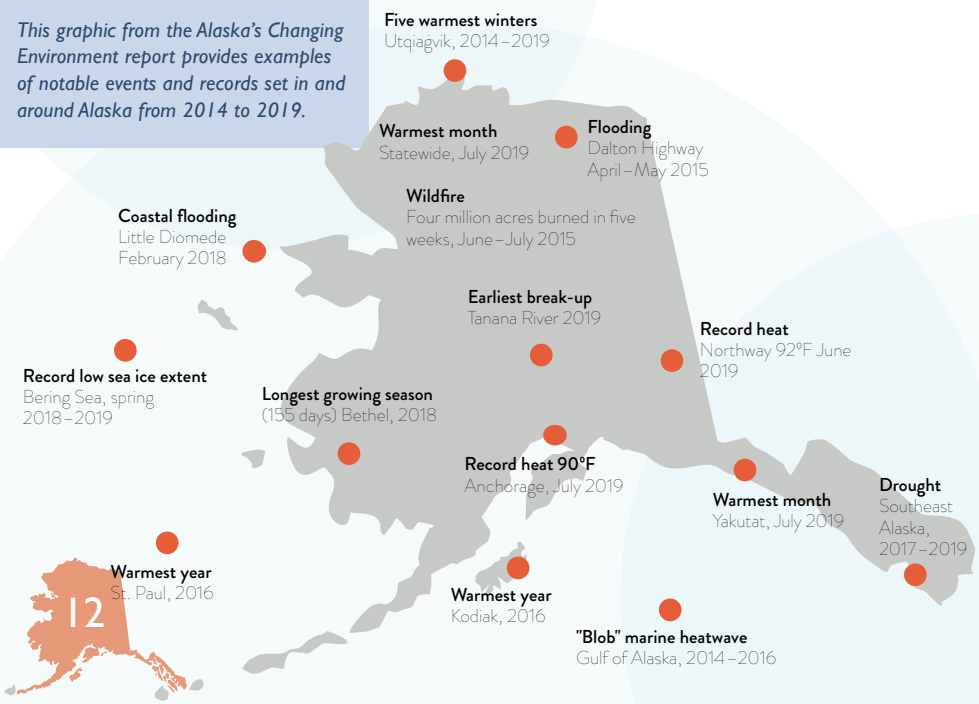


Over the past five years, air temperatures have been consistently warmer than at any time in the past century. The growing season has increased substantially in most areas, and the snow cover season has shortened.

The ocean around Alaska is now regularly warmer than at any time in the past 150 years, affecting everything from algae to fisheries and human health.

Coastal flooding during the autumn storm season has occurred on the Bering Sea coast throughout history, but recent winters have brought record low ice, which in the past has served as a buffer to big storms. Out-of-season flooding now occurs in places expecting stable sea ice.

This graphic from the Alaska's Changing Environment report provides examples of notable events and records set in and around Alaska from 2014 to 2019.



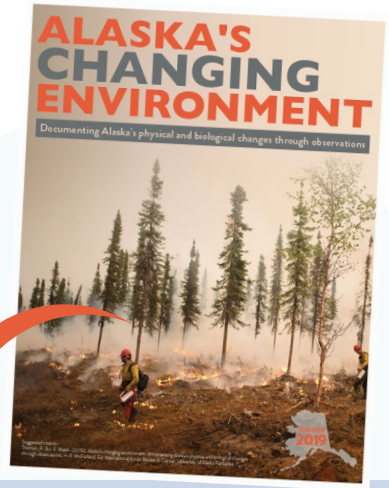
Sharing observations of change

IARC supports individuals, communities, and agencies struggling to understand and prepare for these changes. In 2019, we compiled observations of major changes affecting Alaska's physical and biological systems. The publication focuses on the past five years, though it also provides information from earlier decades for historical context. Although not comprehensive, Alaska's Changing Environment serves to highlight the monumental shifts occurring in the state.

The booklet contains many illustrations, is written for a general audience, and has been well received. Paper and electronic copies continue to be distributed broadly across Alaska and the nation. In only three months, it has been read over 5,000 times online and 700 hard copies have been distributed.

This response, along with extensive interest from media, agencies, research groups, and the Alaska Native community, illustrates the need for easy to digest synthesis documents. IARC will regularly update Alaska's Changing Environment as a resource for Alaskans as they adapt to and prepare for the future.

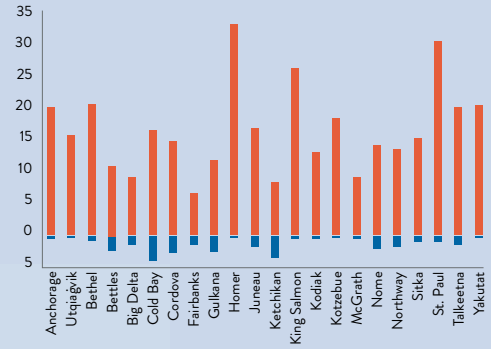
You can read Alaska's Changing Environment online where many of the graphics are available for download.



Examples of observations and associated explanations from the new Alaska's Changing Environment publication.

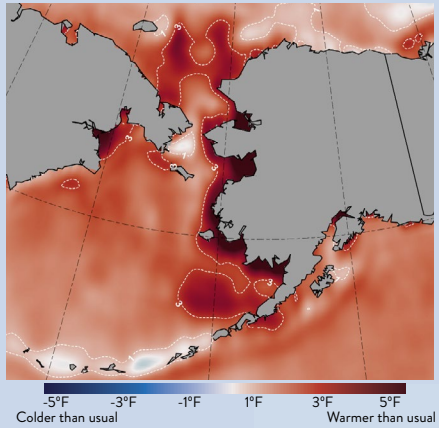
RECORD HIGHS OUTNUMBER LOWS

Daily high and low temperature records are a widely reported measure of extreme weather. Given a stable climate (i.e., no warming or cooling trend) we would expect fewer than 10 percent of both high and low daily temperature records, for the period 1953–2018, to have been set during the past five years. However, since 2014, there have been five to 30 times more record highs set than record lows. This graph shows the percent of record warm (red bar) or cold (blue bar) daily temperatures since 1953 that occurred in 2014–2018.



WARM SURFACE WATERS

Summer sea surface temperatures in Alaska waters have been much warmer (colored red below) than average (colored white) during 2014–2018, especially along the west coast, where the surface waters were 4–11°F warmer than average in the summer of 2019.



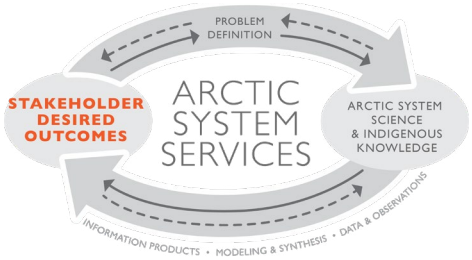
SUPPORT FOR ADAPTATION

STAKEHOLDER DESIRED OUTCOMES

Supporting adaptation planning

Alaska has 229 unique tribes, nearly all are grappling with the impacts of climate change. Communities are experiencing the loss of birds, animals, and fish that they have relied on for generations. Permafrost thaw is damaging infrastructure and dangerous spring conditions impede travel. As erosion eats away at their shores and smoke from wildfires impacts community health, they are coming together to share solutions and learn about tools available to them.

Fourteen representatives from five tribes are participating in a new workshop series that provides tailored resources to plan and adapt for uncertain futures. Hosted by IARC's Alaska Climate Adaptation Science Center (AK CASC) and the Aleutian Pribilof Islands Association, the workshops focus on using local and traditional knowledge and climate science in adaption planning.



Participants had already started adaption planning when they signed up for the program, but said they needed additional support to complete them. "We're not looking at a full adaptation plan but a slice of it," said program lead and AK CASC tribal liaison Malinda Chase. "Communities often times are going through training but need additional support to take on the planning process."

The project, called Looking Forward, Looking Back: Building Resilience Today, uses UAF trainings, remote check-ins and on-site visits to provide manageable and long-term support for participating communities.

Flooding from permafrost thaw damages a 4-wheeler trail in the community of Kotlik.

Malinda Chase

Molly Tankersley

Tribal Liaison Malinda Chase works with community members on a climate change visualization exercise during a training in Fairbanks that launched Looking Forward, Looking Back: Building Resilience Today.

Collaborating for a better future

Jerilyn Kelly, the mayor of Quinhagak, was looking for a way to get a head start on climate adaptation planning for her community. The request for representative leadership teams made up of city, tribal, and corporation members piqued her interest. "There are not many opportunities for municipalities and especially corporations to get information on climate change," said Kelly.

"With the people [who we represent] as our focal point, we can put our differences aside and collaborate toward a better future," said Kelly.

Looking forward with climate science

Increasing knowledge about Alaska's warming climate and raising awareness of local to global responses is a primary goal of the project. As tribal liaison, Chase is uniquely position to facilitate dialogue among Indigenous communities and between tribes and climate scientists.

Chase said she hopes to "increase the use of the existing resources that we have here at IARC and available through climate science work for planning and decision making at the local level."

The program's first workshop focused on extreme events and harmful environmental trends. Chase said participants "were exposed to future climate projections which relates to the first part of the title of the project—*Looking Forward*—what's coming down the pipe."

At the workshop, climate scientists described what communities should expect in the future. "Today's extremes will not be tomorrow's extremes," said Rick Thoman, Alaska climate specialist with the Alaska Center for Climate Assessment and Policy. As he shared trends and projections in temperature, permafrost, and more across the state, Thoman painted a picture of a future when events considered atypical today, such as the astounding decrease in sea ice in the Bering Sea, may be the norm. Conditions people rely on, like winter travel across frozen landscapes, may be rare in the future. If the monumental shift in conditions is mind-boggling from a hypothetical standpoint, it's nearly unimaginable from the perspective of communities who are watching it happen before their eyes.


Malinda Chase

Malinda Chase and Jeremy Littell meet with community leaders in Quinhagak during the site visit for the Looking Forward, Looking Back: Building Resilience Today project.

Witnessing change

Scientists also had the opportunity to hear from the people witnessing the changes they study. Community participants illustrated impacts through a series of visual exercises. They drew changes to familiar landscapes and mapped connections from drivers of change to impacts. The exercise facilitated knowledge sharing and a personal connection to climate change while providing valuable tools for participants to share information with community members at home.

The workshop also covered how institutions and nations are addressing climate change on a global scale. Defining the Arctic and Alaska's role in climate change is an important conversation for rural communities to participate in. "We might see the Arctic as one way, but the rest of the world who are making decisions about emissions might be thinking another way," said Chase.

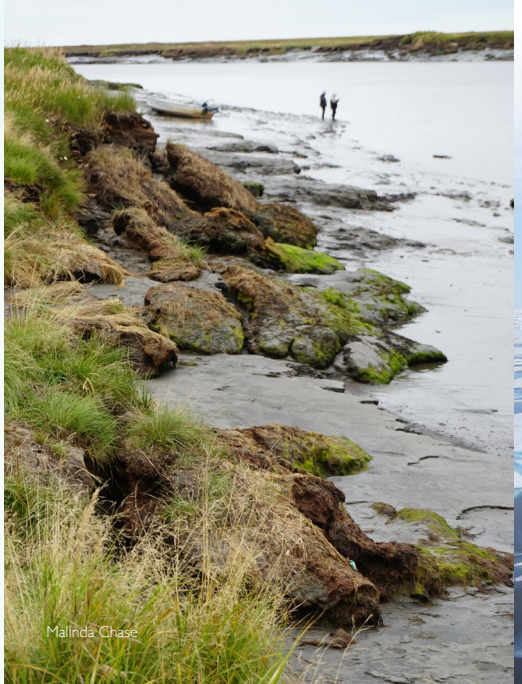
Tailoring support to communities

Following the initial meeting in Fairbanks, the workshop organizers traveled to each community individually to implement the *Looking Back* part of the project. The on-site visits with tribal, city, and corporation leadership aimed to help synthesize local knowledge, and identify important subsistence species, resources, and areas for each tribe.

"Many communities are starting to experience multiple impacts, with some coming at once," said Chase. The site visits identified current and future climate projections along with traditional knowledge that can guide adaptation strategies about a specific area of adaption such as "local lands, waters, and fish and wildlife," said Chase.

The workshop series will culminate with another all-participant training in Fairbanks.

A river bank erodes in front of the village of Kwigillingok.


Malinda Chase

NEW SINCE 2018

122 PEER REVIEWED PUBLICATIONS & TECHNICAL REPORTS

For **every dollar invested** in IARC from the state of Alaska we earned eight dollars through competitive **research grants**, **partnerships** and other **contracts** **1:8**

SCIENTISTS STUDENTS STAFF AFFILIATES **110**

110 **RESEARCH PROJECTS** that investigate many elements of the arctic system, including ocean, ice, atmosphere, land and society.

IARC welcomed new faces

Amy Macpherson data manager and analyst, Scenarios Network for Alaska + Arctic Planning

Cory Whiteley fiscal professional

Dustin Elsberry legislative liaison, Center for Arctic Policy Studies

Joanna Young director, Inspiring Girls Expeditions Alaska

Joe Little director, Experimental Arctic Prediction Initiative

Kyle Redilla research programmer

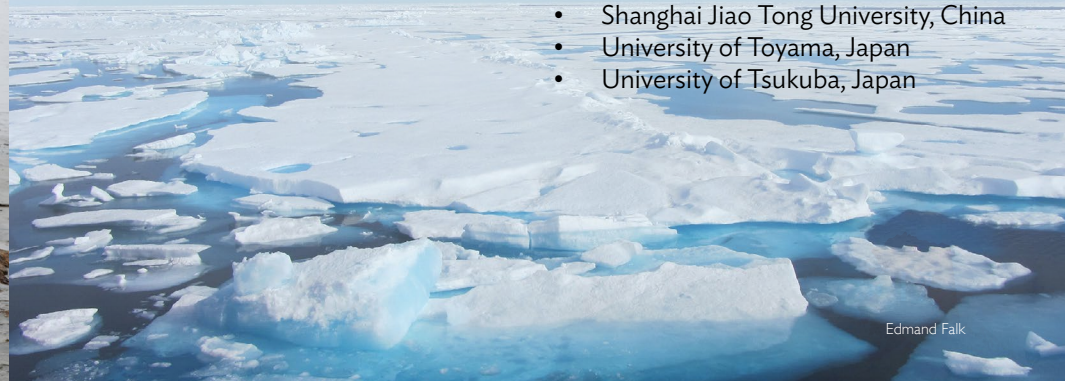
Sarah Clement program coordinator, Inspiring Girls Expeditions Alaska

Zav Grabinski science communication specialist, Alaska Fire Science Consortium

New & continuing agreements

IARC collaborates with organizations in the US, Canada, Europe, Russia, and Asia to make international research more relevant in an Arctic context. Our formalized collaborations include:

- Aleutian Pribilof Islands Association
- Alfred Wegener Institute, Germany
- Arctic Research Center, Hokkaido University
- Chinese Academy of Sciences
- Japan Agency for Marine-Earth Science & Technology
- Korea Polar Research Institute
- National Institute of Polar Research, Japan
- NOAA Fisheries Alaska
- Russian Academy of Sciences, Far Eastern Branch
- Shanghai Jiao Tong University, China
- University of Toyama, Japan
- University of Tsukuba, Japan


Edmand Falk

NEW! Bringing prediction science to the Arctic

In 2019, IARC officially launched the Experimental Arctic Prediction Initiative (EAPI) under the leadership of economist Joe Little. Moving forward, EAPI aims to catalyze programs of interdisciplinary research while leveraging capabilities within IARC and the University. The initiative focuses on innovation related to prediction science, stakeholder and community engagement, public outreach, research funding, and science education.

According to Little, a primary goal of the initiative "is to provide actionable information that helps Alaskans plan for the near future."

EAPI works to meet the needs of Alaska and Arctic stakeholders through tailored subseasonal to multiyear forecasts. On sea ice, EAPI promotes a novel technique called analog forecasting to increase on-the-ground decision-making power. For wildfires, another important Arctic issue, EAPI supports the development of seasonal fire weather outlooks and tools for fire managers.

Joe Little, the new director for the Experimental Arctic Prediction Initiative. Little is an economist in a joint position with the UAF School of Management and IARC. His research focuses on applied economics and improving our understanding of the changing Arctic.

NEW! Home to Inspiring Girls Expeditions Alaska

The Alaska Climate Adaptation Science Center at IARC is excited to be the new home of Inspiring Girls Expeditions Alaska. The program empowers young people to lead and succeed through science, art, and wilderness exploration. Since expanding to Alaska in 2012, almost 100 individuals have experienced wilderness science through the program. Looking forward, AK CASC and IARC will help to expand the program and develop a new expedition, "Girls in the Forest," about wildfire regimes in boreal ecosystems.

The 2019 team poses in front of Gulkana Glacier during Girls on Ice Alaska, an Inspiring Girls Expedition.

CONSORTIUM

Our scientists work on independent research as well as through larger initiatives. The following are groups and collaborations at IARC that build connections between research and stakeholders within and outside the United States.

Alaska Arctic Observatory and Knowledge Hub
Provides northern Alaska coastal communities with the tools, resources, and scientific and administrative support to share their expertise. arctic-aok.org

Alaska Center for Climate Assessment and Policy
Partners with stakeholders to inform realistic community plans and climate adaptation strategies. accap.uaf.edu

Alaska Climate Adaptation Science Center
Provides scientific information, tools and techniques that managers can use to anticipate, monitor and adapt to climate change. casc.alaska.edu

Alaska Fire Science Consortium
Promotes communication and collaboration between fire science research and managers. frames.gov/partner-sites/afsc

Alaska Global Learning and Observations to Benefit the Environment
Provides students the opportunity to participate in science. globe.gov

Arctic & Earth SIGNS
Connects youth and adults to climate change learning. sites.google.com/alaska.edu/arcticandearthsigns

Center for Arctic Policy Studies
Brings together knowledge and expertise of University of Alaska scholars to more readily serve policy makers in the Arctic. caps.uaf.edu

Community Partnerships for Self-Reliance
Partners with rural communities as they work toward their vision for self-reliance. snap.uaf.edu/projects/cps

Cooperative Institute for Alaska Research
Facilitates research, education and outreach in ecosystem function, coastal hazards, climate change and variability. cifar.uaf.edu

Nansen and Amundsen Basins Observational System
Studies climatic changes in the eastern Arctic Ocean. uaf-iarc.org/nabos

Next Generation Ecosystem Experiments
Seeks to quantify the physical, chemical and biological behavior of terrestrial ecosystems in Alaska. ngee-arctic.ornl.gov

Scenarios Network for Alaska + Arctic Planning
Helps people plan in a changing climate by exploring possible futures based on the best scientific knowledge and data available. snap.uaf.edu

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