2025 Arctic Report Card

Hannah-Marie Ladd (Indigenous Sentinels Network)
Veronica Padula (Bering Sea Research Center)
Abagael Pruitt (U.C. Davis)
Rick Thoman (ACCAP)

ACCAP
Alaska Center for Climate Assessment and Preparedness
A NOAA CAP/RISA team

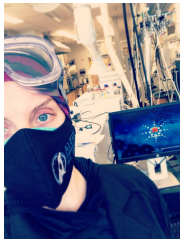
January 27, 2026

Speakers

Rick Thoman
Alaska Climate Specialist
ACCAP

Abagael Pruitt
Postdoctoral Scholar
UC Davis

Hannah-Marie Ladd
Program Director
Indigenous Sentinels Network



Veronica Padula
Chief Science Officer
Bering Sea Research Center

Okpilak River, Alaska
Photo credit - E. Plumb

Today's Agenda

Webinar Introduction

Arctic Report Card Video

Background and 2025 Headlines (Rick)

Rusting Rivers (Abagael)

BRAIDED Food Security and ISN (Hannah-Marie, Veronica)

Wrap-Up (Rick)


1918
1922
1928
2024
2024
2024

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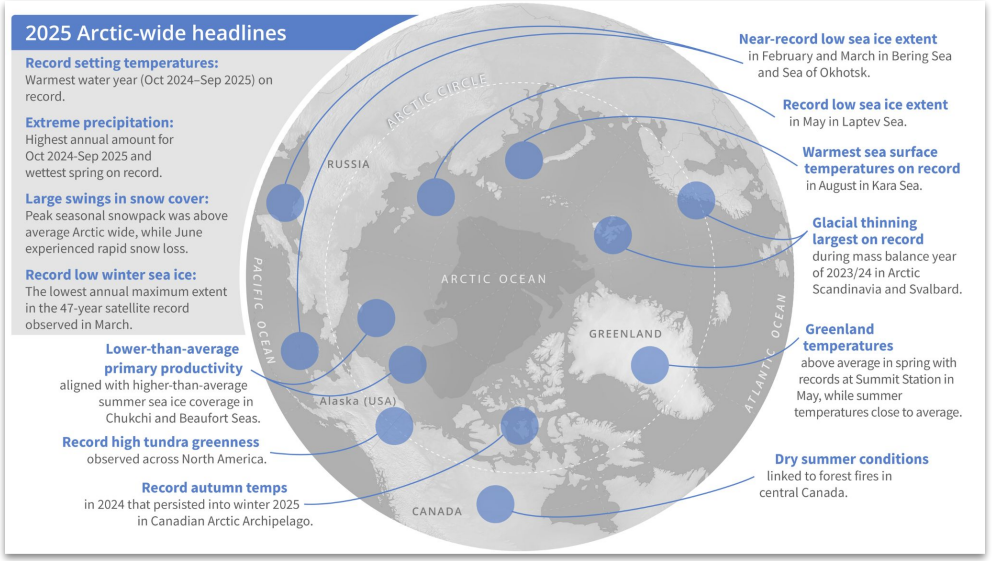
Arctic Report Card Basics

Timely & peer-reviewed source for clear, concise & reliable information on the current state of Arctic environmental system

Intended for a wide audience: teachers, students, decision makers and scientists

- Annually since 2006
- Supported by NOAA's Arctic Program Office…but NOT focused on NOAA activities
- Evolving content & format



Arctic Report Card Structure

- Authors
  - Diverse backgrounds
  - Volunteer their time
- Web and Video
  - Integral to today's Arctic Report Card
  - Led by NOAA experts
  - Help support essay author teams
- NOAA Communications
  - Coordinates AGU Rollout
  - Media
  - Agencies

2025 Arctic Report Card Editorial Team

- Coordinating Editors
  - Cindy Garcia (NOAA/Arctic Program Office)
  - Mary-Beth Armstrong (NOAA/Arctic Program Office)
- General Editors (2021-present)
  - Matthew Druckenmiller (NSIDC)
  - Twila Moon (NISDC)
  - Rick Thoman (UAF)





Arctic Report Card Content

- Vital Signs
  - Annual updates on eight recurring topics
- Indicators
  - Topics updated every 3-5 years
    - Glaciers, permafrost, marine & terrestrial mammals
- Frostbites
  - New, emerging and newsworthy items
- 2025 Bonus: 20th edition extras

Rick Thoman ● Alaska Center for Climate Assessment & Preparedness
International Arctic Research Center

Arctic Report Card 2025

Vital Signs

Surface Air Temperature

Precipitation

Terrestrial Snow Cover

Greenland Ice Sheet

Sea Ice

Sea Surface Temperature

Arctic Ocean Primary Productivity: The Response of Marine Algae to Climate Warming and Sea Ice Decline

Tundra Greenness

Other Indicators

Glaciers and Ice Caps Outside Greenland

Atlantification of the Arctic Ocean

Warming Waters and Borealization: Restructuring Ecosystem Dynamics in the Northern Bering and Chukchi Seas, 2002-2022

Frostbites

Weaving the Seen and Unseen: Stewarding the Arctic Means Sustaining Indigenous Monitoring

Rusting Rivers: Assessing the Causes and Consequences in Alaska and Across the Arctic

20th Anniversary

Assessing the State of the Arctic Observing Network: Strengths, Gaps and Risks to Systems that Track Arctic Change

AMAP and the Arctic Report Card: A Collaboration that is 20 Years Strong

Arctic Report Card 2025

- Vital signs focus: October 2024 through September 2025
- Released at AGU December 16, 2025
- 14 essays
- Rapid production
  - First drafts mid-Sept, internal & external reviews
  - Final essays by mid-November
- 112 authors from 13 countries

2025 Arctic Report Card Headlines

Physical components

Warmest year (Oct-Sep) since before 1900

Precipitation for the year (Oct-Sep) highest since before 1950

Sea ice: annual maximum in March lowest on record (since 1979)

Sea surface temperatures Atlantic sector up to 13ºF above normal

Alaskan glaciers have lost an average of 125 vertical feet of ice since the mid-20th century

Two decades of Arctic Report Cards

Sustained by a wide network of partnerships: Indigenous communities, regional organizations, national institutions, and international science networks that together strengthen our understanding of a rapidly changing Arctic

Despite a robust Arctic observing network, gaps in coverage hinder scientists' ability to monitor key environmental changes

People

Indigenous knowledge and leadership are vital to understanding the changing Arctic. This year reports on BRAIDED Food Security and ISN projects lead by Aleut Community of St. Paul Island Tribal Government

2025 NOAA ARCTIC REPORT CARD
TWENTY YEARS

Two decades of covering **emerging topics in Arctic research**.

Declining populations of caribou reported

2008

Sub-Arctic fish species reported in Arctic waters

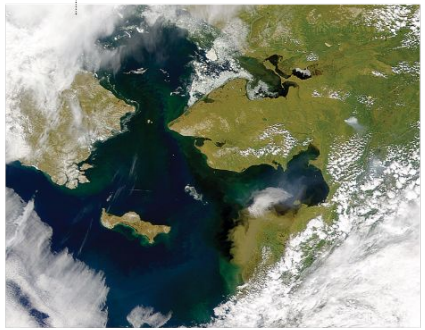
2013

Bering Sea Elders share perspectives on rapid regional warming

2019

2007

Ecological structure of Bering Sea questioned after 6 years of sustained warming



2014

Polar bear reproductive rates linked to sea ice cover duration

2020

Bowhead whales resilient amid ecological and human impacts

2024

Arctic tundra reported as net carbon source

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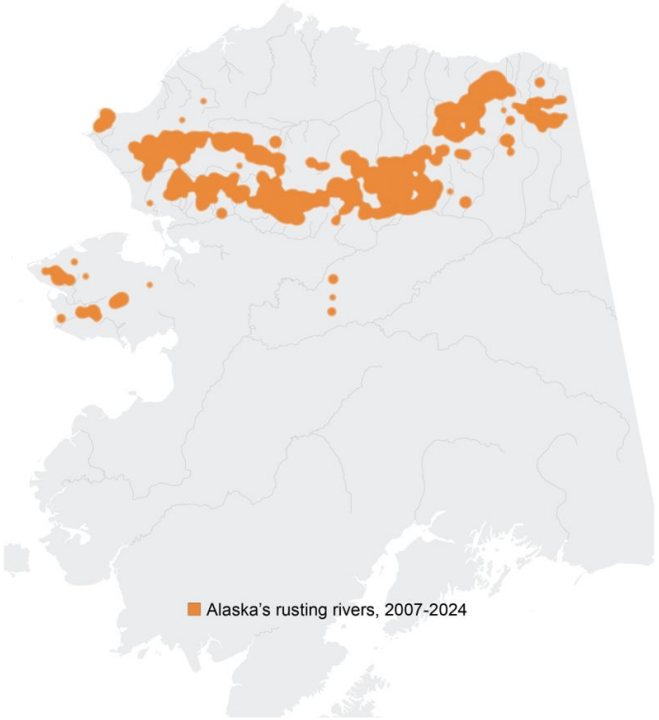
Rusting Rivers: Assessing the Causes and Consequences in Alaska and Across the Arctic

J. A. O'Donnell, M. P. Carey, J. C. Koch, C. Baughman, K. Hill, T. Evinger, A.N. Pruitt, C. Thompson, E. Graham, and B. A. Poulin

Photo Credit: Ken Hill
(National Park Service)

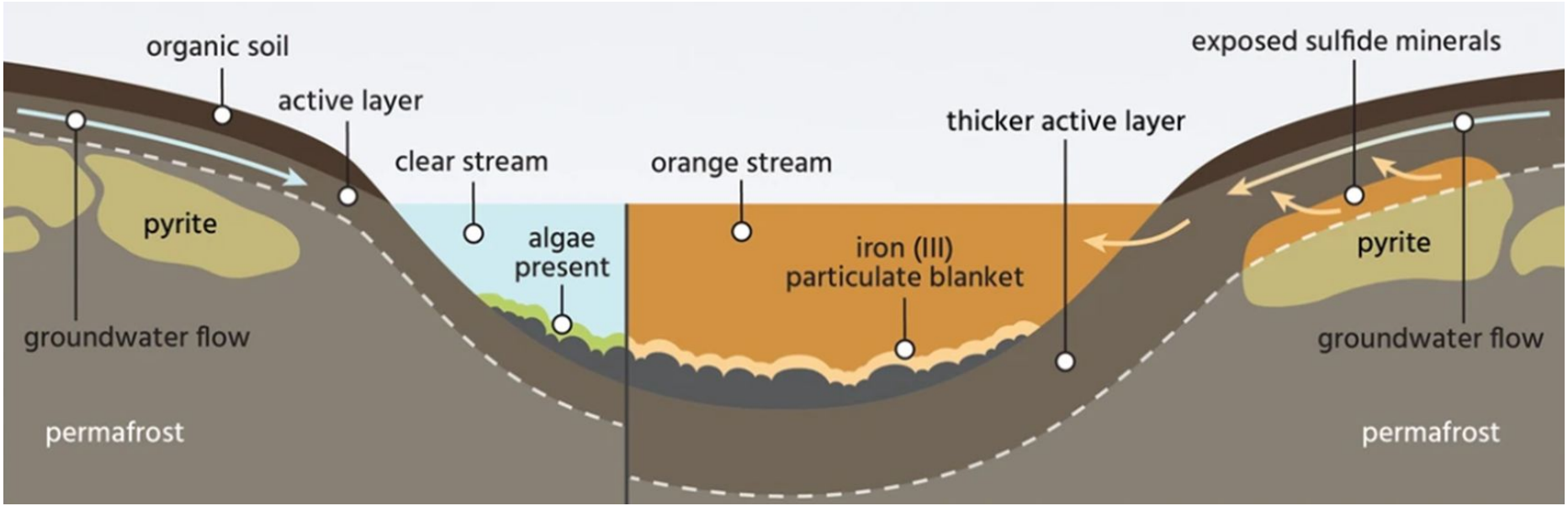
In Arctic Alaska**, over 200 streams and rivers** have turned a rusty orange.



August 2025, tributary of the Kelly River

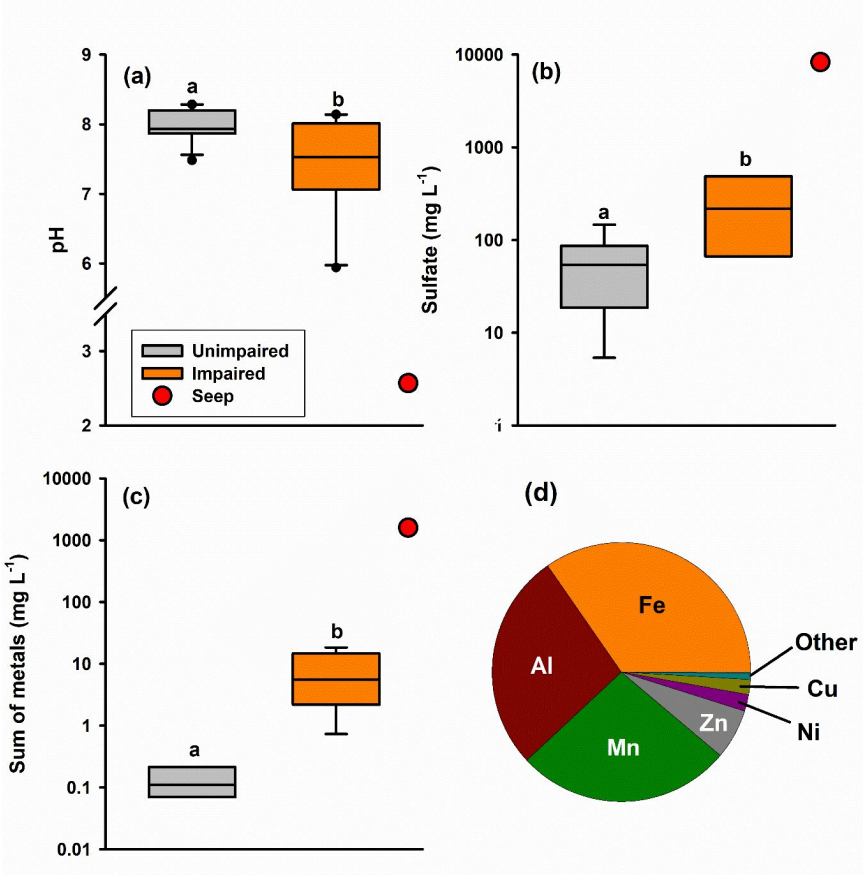
Photo Credit: Abagael Pruitt

Acid rock drainage



ARC O'Donnell et al. 2025

Rusting elevates acidity, sulfate, and toxic metal concentrations.



ARC O'Donnell et al. 2025

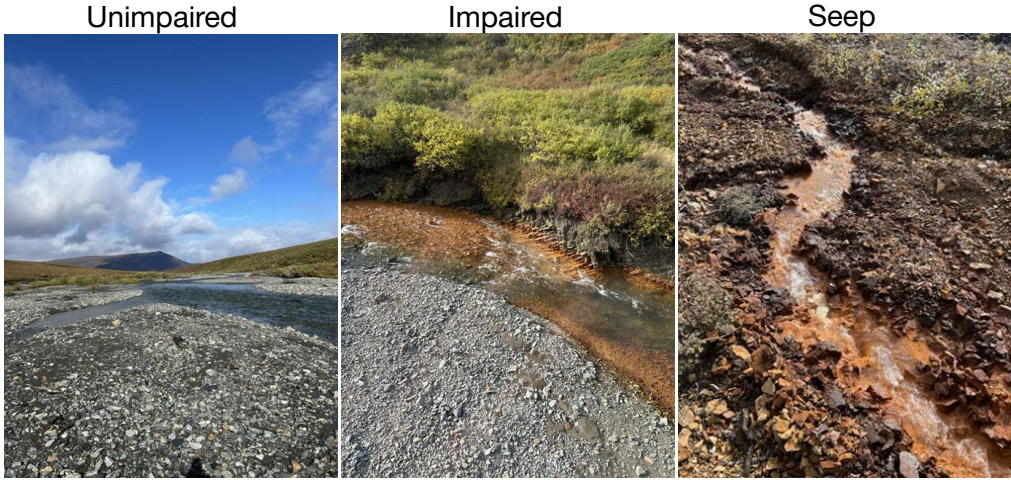


Photo Credit: Abagael Pruitt

Photo Credit: Ken Hill
(National Park Service)

Arctic Grayling

© Joseph R. Tomelleri

Chum Salmon

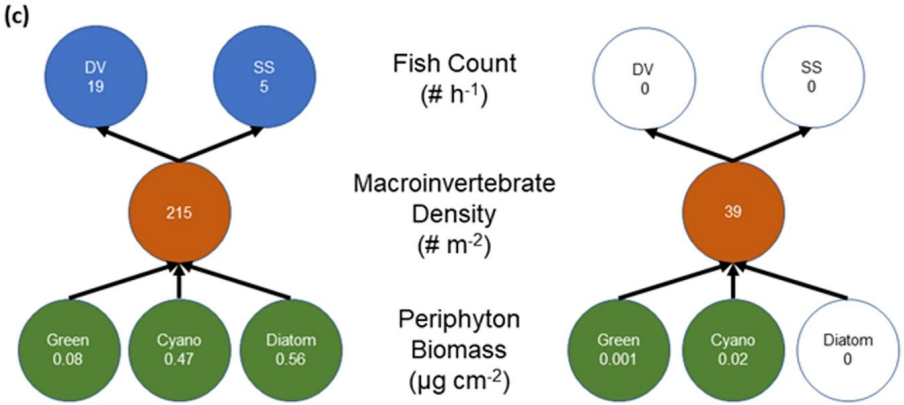
National Parks Service

Dolly Varden

© Joseph R. Tomelleri

Rusting rivers can have significant consequences for **water quality, aquatic life, and communities.**

Rusting can impact aquatic food webs, including fish, invertebrates, and algae.



O'Donnell et al. 2024

Next steps…

- Rusting permanence
- Watershed resilience
- Biodiversity consequences
- Human health implications

Photo Credit: Josh Koch

Thank you

UAF UNIVERSITY OF ALASKA FAIRBANKS

USGS science for a changing world

NATIONAL PARK SERVICE

National Park Foundation

UCDAVIS UNIVERSITY OF CALIFORNIA

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B.R.A.I.D.E.D. Food Security

Building Research Aligned with Indigenous Determination, Equity, and Decision-making

Indigenous, Community-Led Mercury Monitoring in Traditional Foods

CIVIC INNOVATION CHALLENGE

POWERING SMART & CONNECTED COMMUNITIES

Benjamin Barst, Veronica Padula, Stephanie Crawford, Ruby Fried, Hannah-Marie Ladd, Angela Gastaldi, Lorrie Rea, Dallas Roberts, Bruce Robson, Amy Bishop

UNIVERSITY OF CALGARY

ALEUT COMMUNITY OF ST. PAUL TRIBAL GOVERNMENT

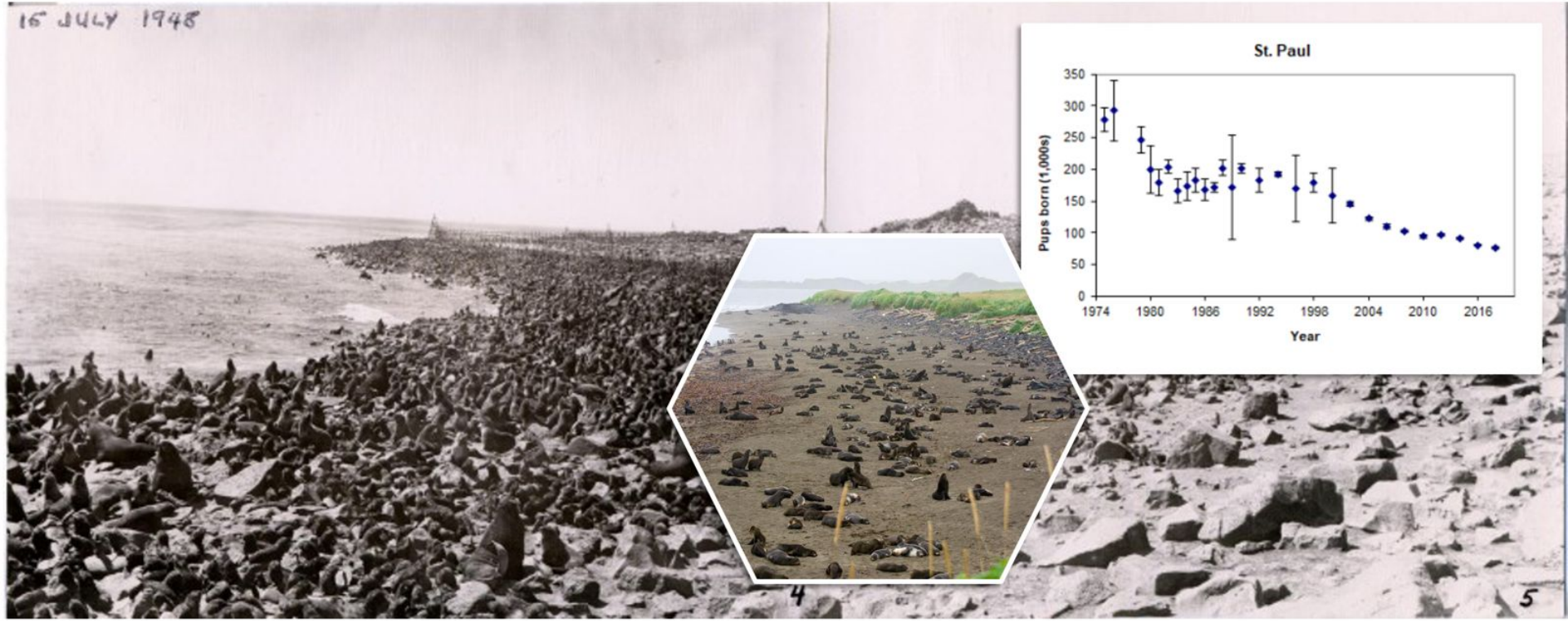
UAA

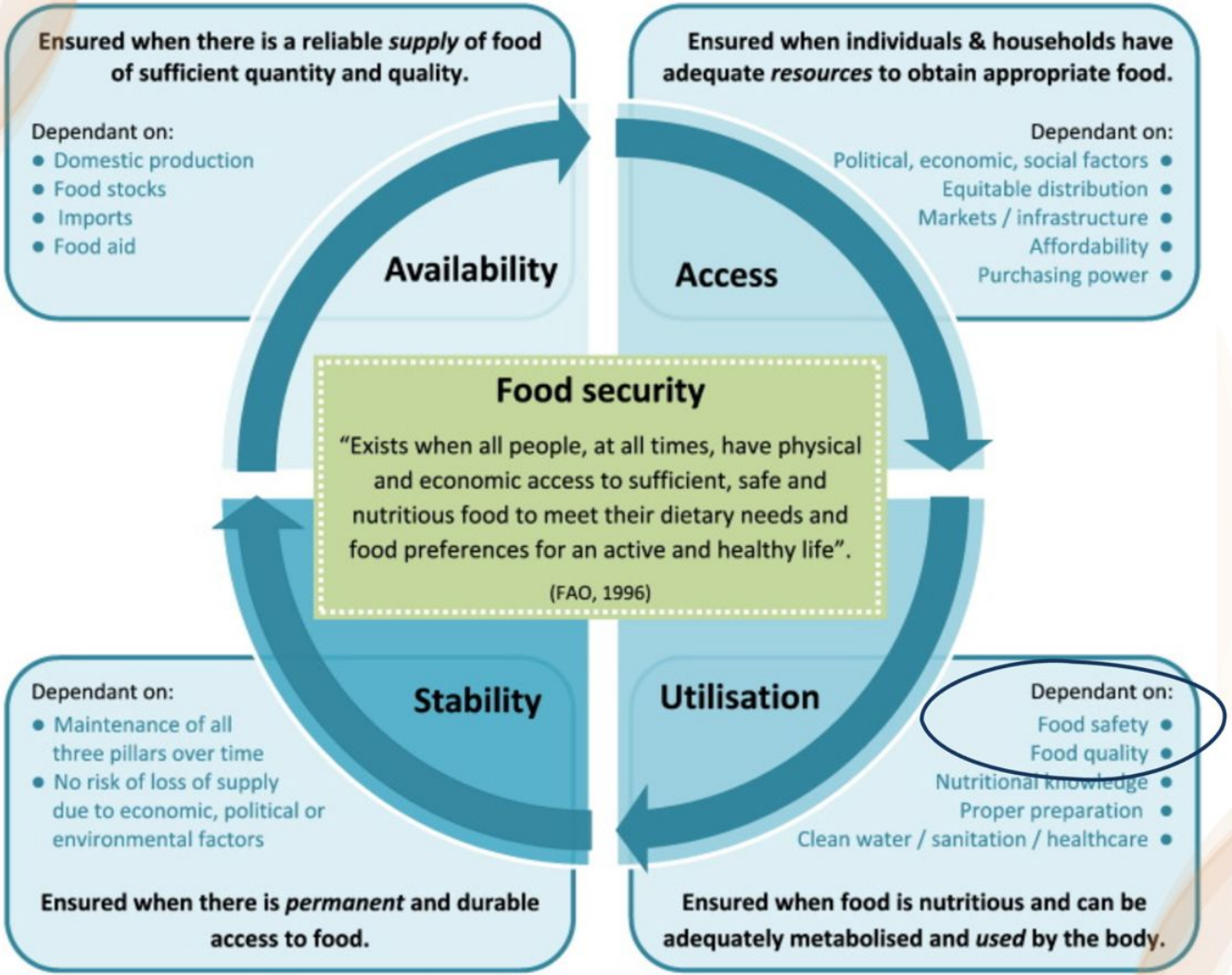
INDIGENOUS SENTINELS NETWORK

UAF UNIVERSITY OF ALASKA FAIRBANKS

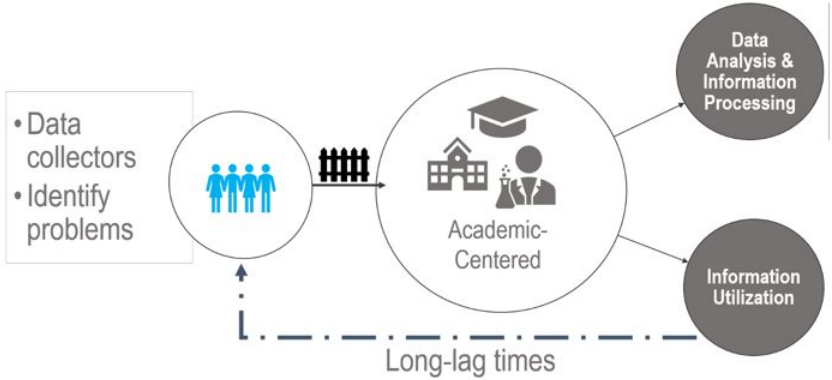

1
Tasamanna
North Point
Rush Hill
North Hill
High Bluffs
Northeast Point
Crater Hill
Cone Hill
Southwest Point
Bogoslov
Big Lake
Sea Lion Point
Polovina
Zapadni Point
Airport
Tolstoi Point
Salt Lagoon
St. Paul, Alaska
Lukanin Bay
Reef Point
Kitovi Point
Sea Lion Rock
N
0 1 2 3 miles
0 1 2 3 km
Arctic Circle
2
Atan
Angatuŝ
Bering Sea
Alaska
St. Paul Island
Tanaŝ Amiŝ
Unangam Tanangin
Anĝaaxchaluŝ
Qisxa
Sitignaŝ
Unyax
Amchixtaŝ
Ananguŝiŝ
Kanaga
Tanaŝax
Adaax
Atŝaŝ
Amlax
Niilsanam Alĝuudaa
Udaamagax
Unimax
Akutanaŝ
Tanaŝ Angunaŝ
Umnax
Isanaŝ
Agdaaĝuŝ
Qagun Tayagungin
Achan-ingiiga
Iluuluŝ
Chalukaŝ
Nawan-Alaxsxa
Sanaĝax
Saĝuugamax
Yunaŝsxa
0 100 200 miles
0 100 200 km

Environmental and Climate Change



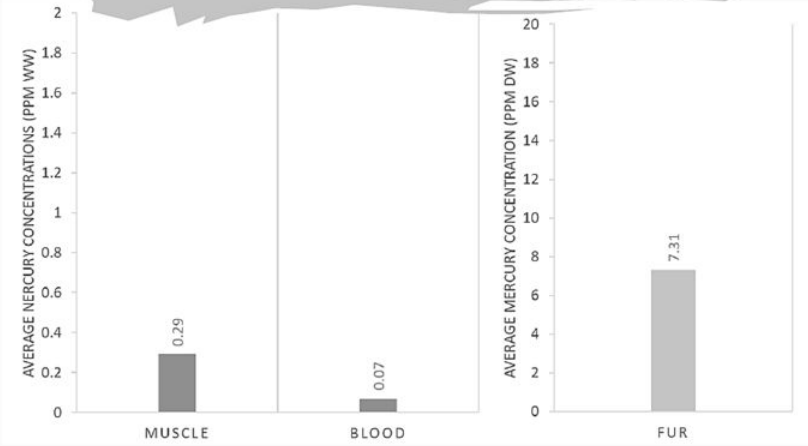

Ensured when there is a reliable *supply* of food of sufficient quantity and quality.
Dependant on:
Domestic production
Food stocks
Imports
Food aid
Availability
Ensured when individuals & households have adequate *resources* to obtain appropriate food.
Dependant on:
Political, economic, social factors
Equitable distribution
Markets / infrastructure
Affordability
Purchasing power
Access
Food security
"Exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".
(FAO, 1996)
Stability
Dependant on:
Maintenance of all three pillars over time
No risk of loss of supply due to economic, political or environmental factors
Ensured when there is *permanent* and durable access to food.
Utilisation
Dependant on:
Food safety
Food quality
Nutritional knowledge
Proper preparation
Clean water / sanitation / healthcare
Ensured when food is nutritious and can be adequately metabolised and *used* by the body.

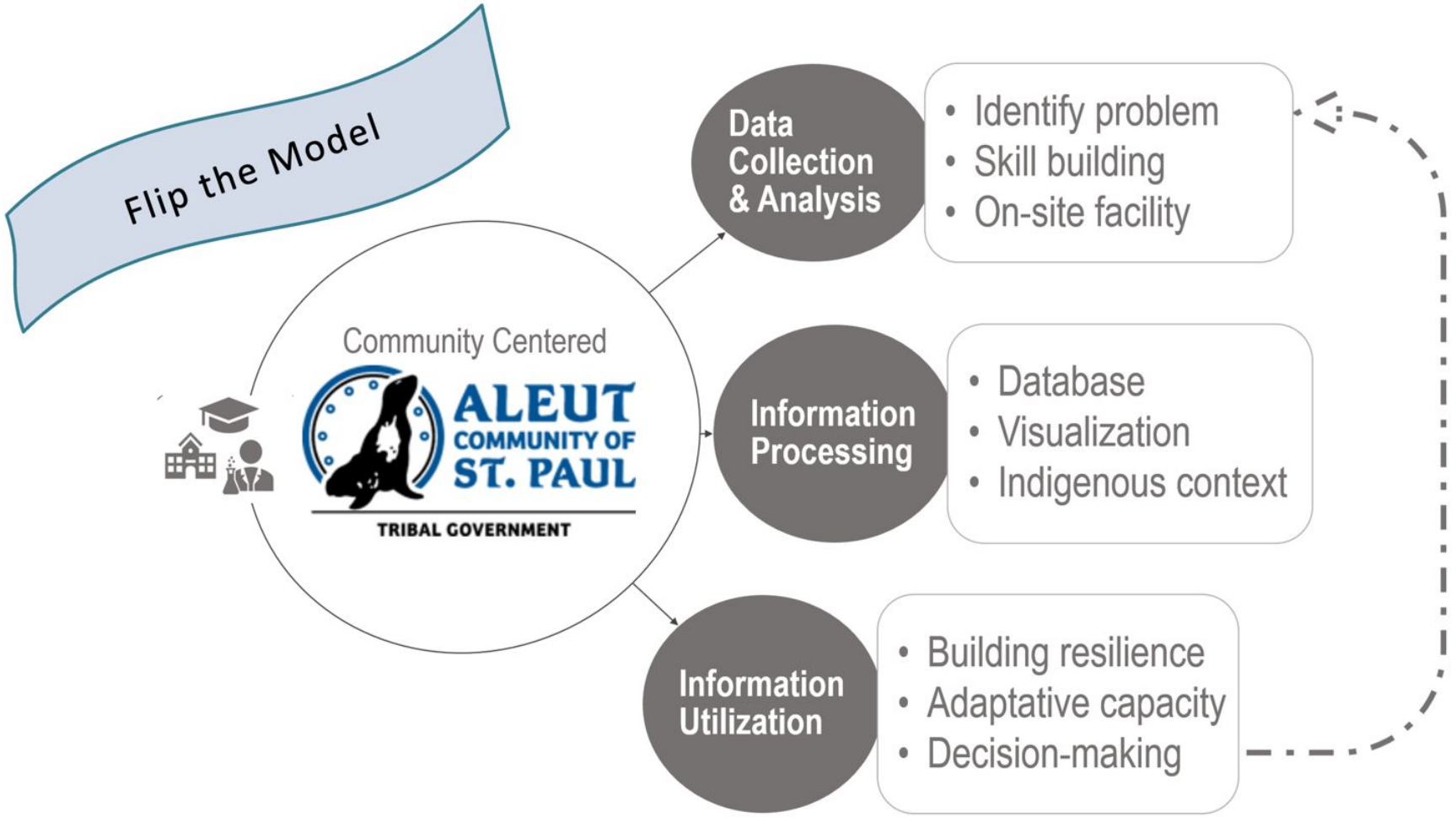
Conventional model for "Un-Seen" Monitoring of Food Safety

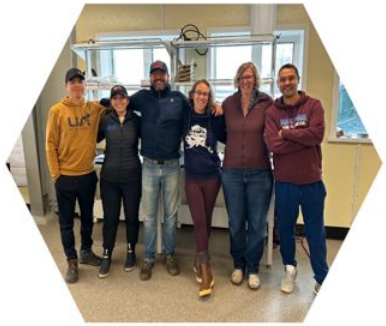


Mercury
Harmful Algal Bloom Toxins
Microplastics

From 2014-2019 METAL received muscle, whole blood, and fur samples collected from harvested subadult male laaqudan




Flip the Model
Community Centered
ALEUT COMMUNITY OF ST. PAUL
TRIBAL GOVERNMENT
Data Collection & Analysis
• Identify problem
• Skill building
• On-site facility
Information Processing
• Database
• Visualization
• Indigenous context
Information Utilization
• Building resilience
• Adaptative capacity
• Decision-making



EVALUATION
Shaffer Group

BRAIDED
Core Team

UNIVERSITY of ALASKA
Many Traditions One Alaska

ALEUT COMMUNITY OF ST. PAUL
Ecosystem Conservation Office

MONITORING TEAM

DALLAS ROBERTS
ACSPI Community Program Coordinator

ANGIE GASTALDI
UAF Research Professional

Barst, Padula, Ladd, Divine

Lorrie Rea
UAF Professor

TRAINING TEAM

AMY BISHOP
UAA Professor

LORRIE REA
UAF Professor

STEPHANIE CRAWFORD
UAF Research Professional

Fried, Padula, Barst, Divine

DATA DASHBOARD TEAM

Fried, Barst
Ladd, Bishop

BRUCE ROBSON
ISN Technical Director

HANNA-MARIE LADD
ACSPI-ISN Coordinator

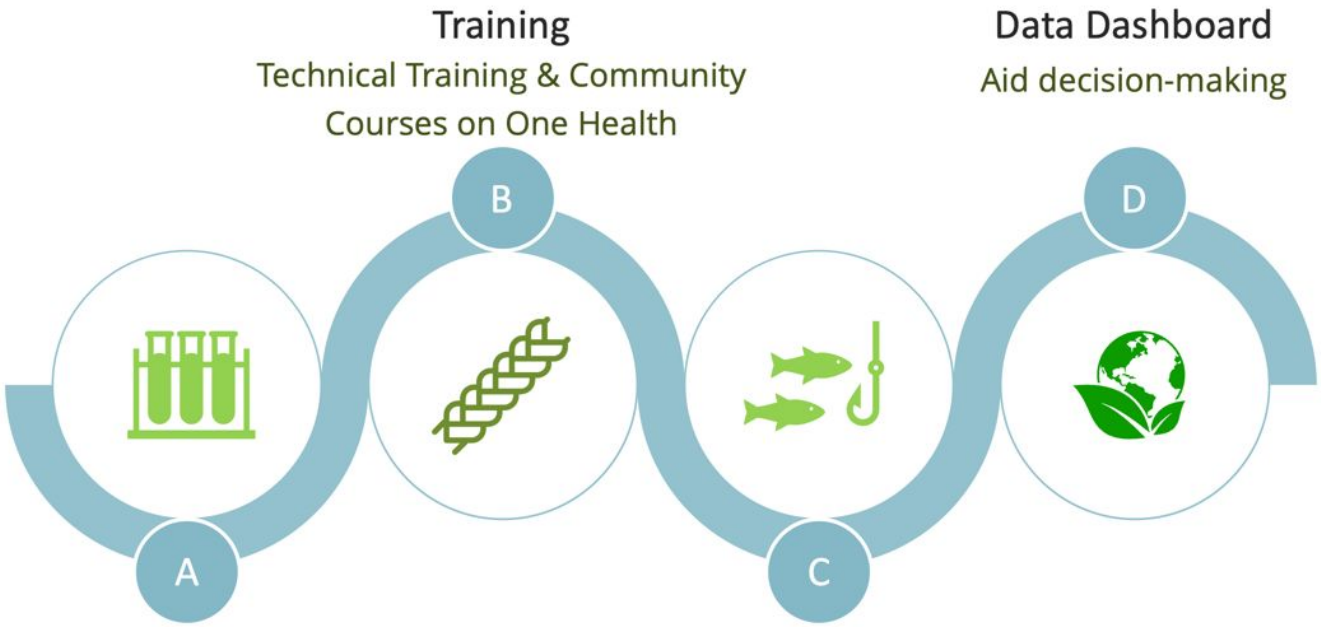
PARTNERSHIPS & SUSTAINABILITY TEAM

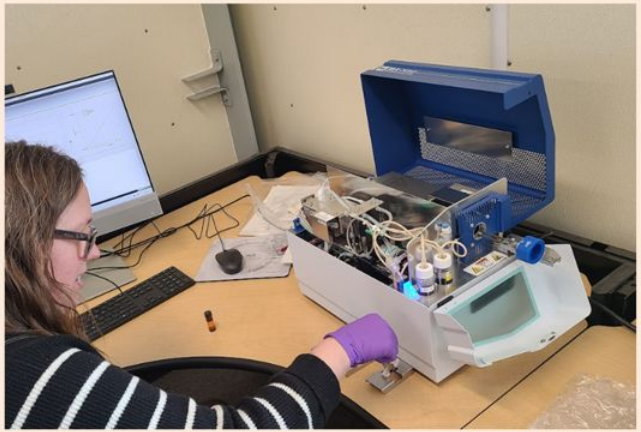
Divine, Ladd, Barst, Bishop

RUBY FRIED
UAA Professor

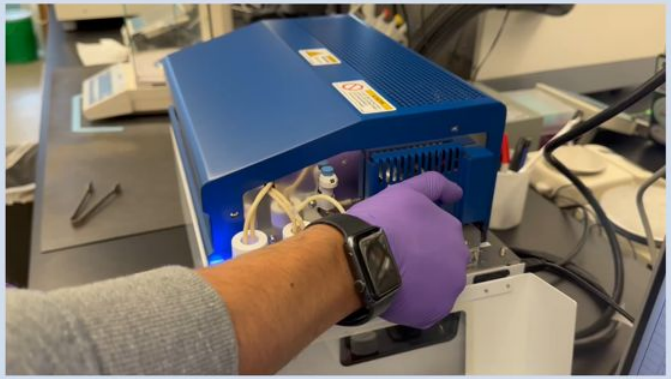
INDIGENOUS SENTINELS ADVISORY ASSEMBLY
ACSPI-led

VERONICA PADULA
ACSPI-Chief Science Officer


Training
Technical Training & Community
Courses on One Health
Data Dashboard
Aid decision-making
B
D
A
C
Infrastructure
Create a lab on St. Paul Island
Voluntary Sampling
Traditional Foods

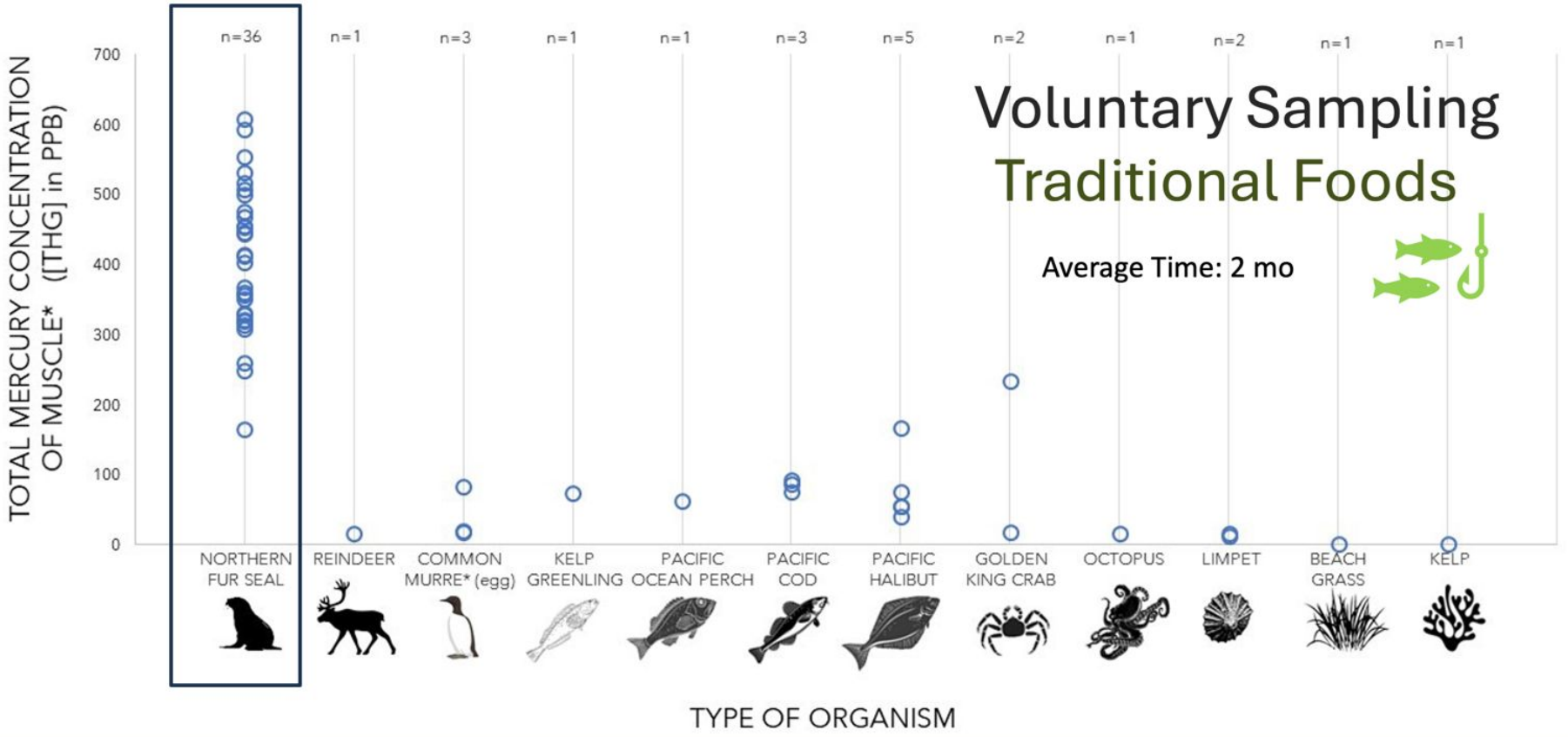


Infrastructure



TRAINING

COMPARISON OF TOTAL MERCURY CONCENTRATIONS MEASURED IN SUBSISTENCE FOOD ITEMS PRIBILOF ISLANDS, ALASKA (2024)



Voluntary Sampling

Traditional Foods

Average Time: 2 mo

Data Dashboard

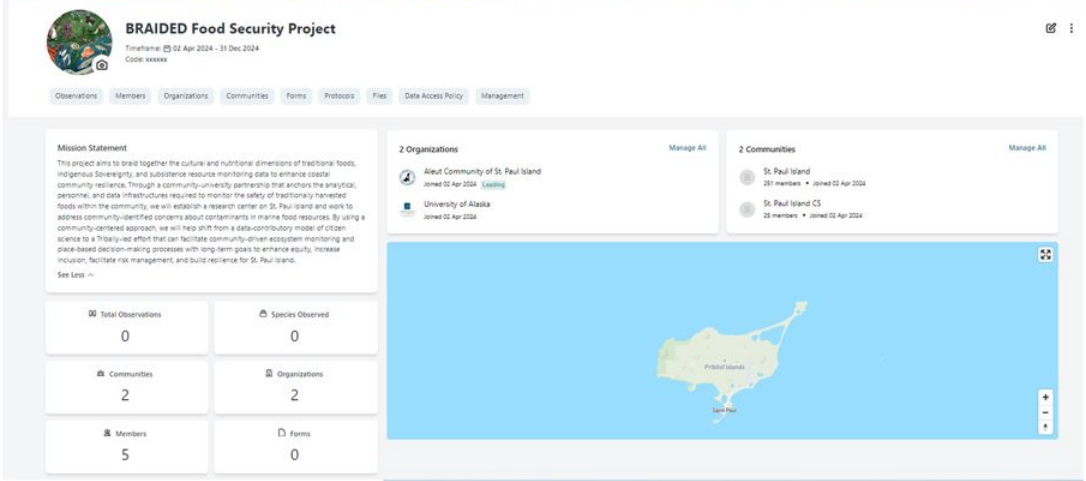
Aid decision-making

Data Quality control mechanisms for community-driven monitoring that can support robust data collection quality assurance, review and analysis.

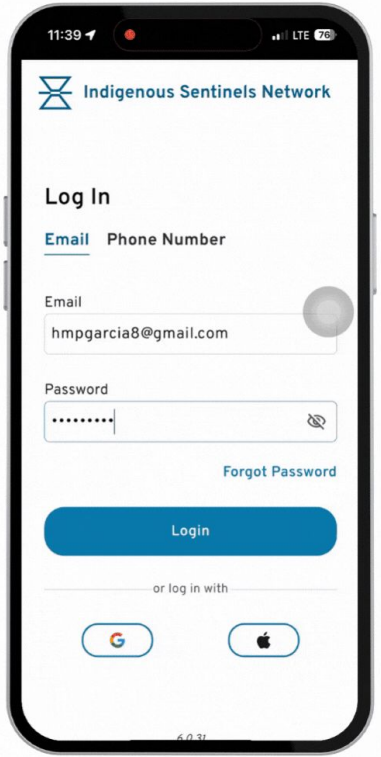
Accessible and easy-to-use software for communities to gather environmental and biological data.

Data sovereignty and ownership of information (proprietary, sensitive, confidential) is central to the ISN Platform design, ensuring that there are secure and flexible layers of protection for storing, exporting, and importing data. Following **CARE Principles**.

Data at local and regional scales that can be collected in a coordinated manner and aggregated from multiple communities. Through the Network, ISN offers the ability to scale information and connect to other databases to support local and regional management needs.



Example of Logging an Observation in ISN



BRAIDED ONE HEALTH COURSE

Ilisagvik College & Bering Sea Campus

Explore the interconnections between human, animal, and environmental health through hands-on experience with monitoring being done in the Bering Sea Research Center

- ✓ Environmental health & fooc
- ✓ Mercury and nutrition
- ✓ Fish bio-sampling
- ✓ Laboratory analysis
- ✓ Discussions and field trips!

YOU DON'T HAVE TO REGISTER TO JOIN! WE'D LOVE TO SEE YOU ONE DAY, OR BOTH DAYS!

Campus case managers

Louis Bonner (lcbonner@aleut.com /(907)615-5202)
Shannon Merculief (smerculief@aleut.com /(907)615-5352)

LESSON TITLE: Photovoice - What does food mean to you? **CATEGORY:**

DESIRED RESULTS (Stage 1)

BIG IDEAS / ENDURING UNDERSTANDING(S):
Students will understand that…

- *Our everyday lives, culture, and environment shape what we eat*
- *Everyone has a unique connection/stories centered around food*
- *There can sometimes be fear associated with food*

ESSENTIAL QUESTION(S):

- What aspects of your everyday life affect what you eat and how much you have to eat
- What does food mean to you?
- What are the potential challenges, opportunities, and approaches for addressing food safety?

STUDENT OBJECTIVES (OUTCOMES):
Students will be able to:

- What key knowledge and skills will students acquire as a result of this unit?
  - Students will develop a baseline understanding of the issue of food safety
  - Students will learn that there are different types of pollution (environmental, physical, biological) that impact food resources
  - Students will gain experience in critical thinking and oral communication
- What should they eventually be able to do as a result of such knowledge and skill?
  - Students will be able to appreciate and acquire insights about food safety from other cultures without diminishing the integrity of their own
  - Students will be able to consider the inter-relationships between local circumstances and global context.
  - Students will be able to identify potential approaches for addressing food safety

CULTURAL CONCEPTS:

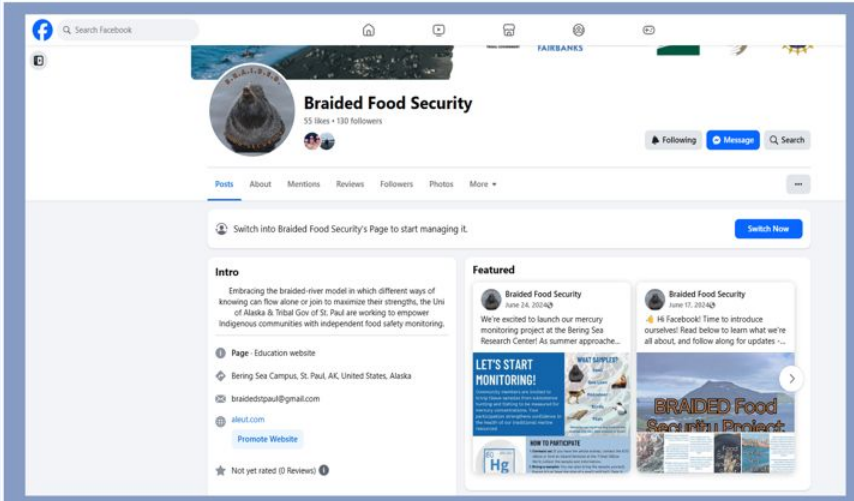
This lesson addresses the following traditional values and/or concepts: [This might be a traditional Unangan value, shared Alaska Native cultural value, or simply an explanation of how the lesson relates to traditional practices or beliefs]

Unangan Values

- *Tana}nangin l}ayuusalix an}a}iimchin a}na{txichin*. Live with and respect the land, sea, and all nature.
- *Qaqamii}u{ qalgadam ukulganaa ngiin ugutaasakun*. Subsistence is sustenance for the life.
- *Aniqdun ngiin aqaa}an a}nangin qulingiin aku{ gumalgaku{*. For the coming generations that we don't see yet, for their time here.
- *Tutada*. E & W / Listen.

Shared Alaska Native Cultures:
All Things Are Related

Training



Northern Fur Seal Report

BRAIDED

This report provides a summary of mercury levels in male Northern Fur Seals that were harvested on St. Paul Island. This is part of the BRAIDED project (**B**uilding **R**esearch **A**ligned with **I**ndigenous **D**etermination, **E**quity and **D**ecision-Making), a partnership between the Aleut Community of St. Paul Island (ACSPI) and University of Alaska, during which we are monitoring traditional foods and subsistence resources to provide the St. Paul Island community with helpful information about food safety. The Aleut Community of St. Paul Island Tribal Council has reviewed and approved this report.

There are many benefits to harvesting and eating northern fur seal

- It is a great red meat alternative, supporting high-protein, low-carb, and low-fat diets.
- Seal meat boosts energy, strengthens muscles, and supports immune health. It is also rich in iron, calcium, and vitamins (especially B12), and has key minerals like zinc &potassium.
- It's natural and wild-caught, with no antibiotics, hormones, or preservatives, and contains less than 2% fat—far less than beef (about 23%).
- For the St. Paul community, harvesting seals is not only a nutritional tradition but also an opportunity to connect with family and friends, and the community.

There is no evidence people should worry about eating northern fur seal

Communication

Working with Tribal Council, Elders, and Health Providers

Next Steps

- Evaluation of model
- Community-led publications
- Continue communication & training
- Data sharing & continuous collection
- Scalability & Sustainability


Thank you!
USDA
NIFA
NSF
ALEUT COMMUNITY OF ST. PAUL
TRIBAL GOVERNMENT
UAA
UAF
UNIVERSITY OF ALASKA FAIRBANKS
UNIVERSITY OF CALGARY
INDIGENOUS SENTINELS NETWORK
Check out our video>

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BRAIDED Food Security and ISN (Hannah-Marie, Veronica)

Wrap-Up (Rick)

Chin’an ● Quyana ● Dogidinh ● Gunalchéesh
Basi’ ● Thank You

Get the Arctic Report Card

Arctic Report Card Landing Page (includes links to every ARC since 2006)

https://arctic.noaa.gov/report-card/

2025 Arctic Report Card

https://arctic.noaa.gov/report-card/report-card-2025/

2025 Arctic Report Card video

https://www.youtube.com/watch?v=t2PF6uk3tqA

Go to the 2025 Arctic Report Card