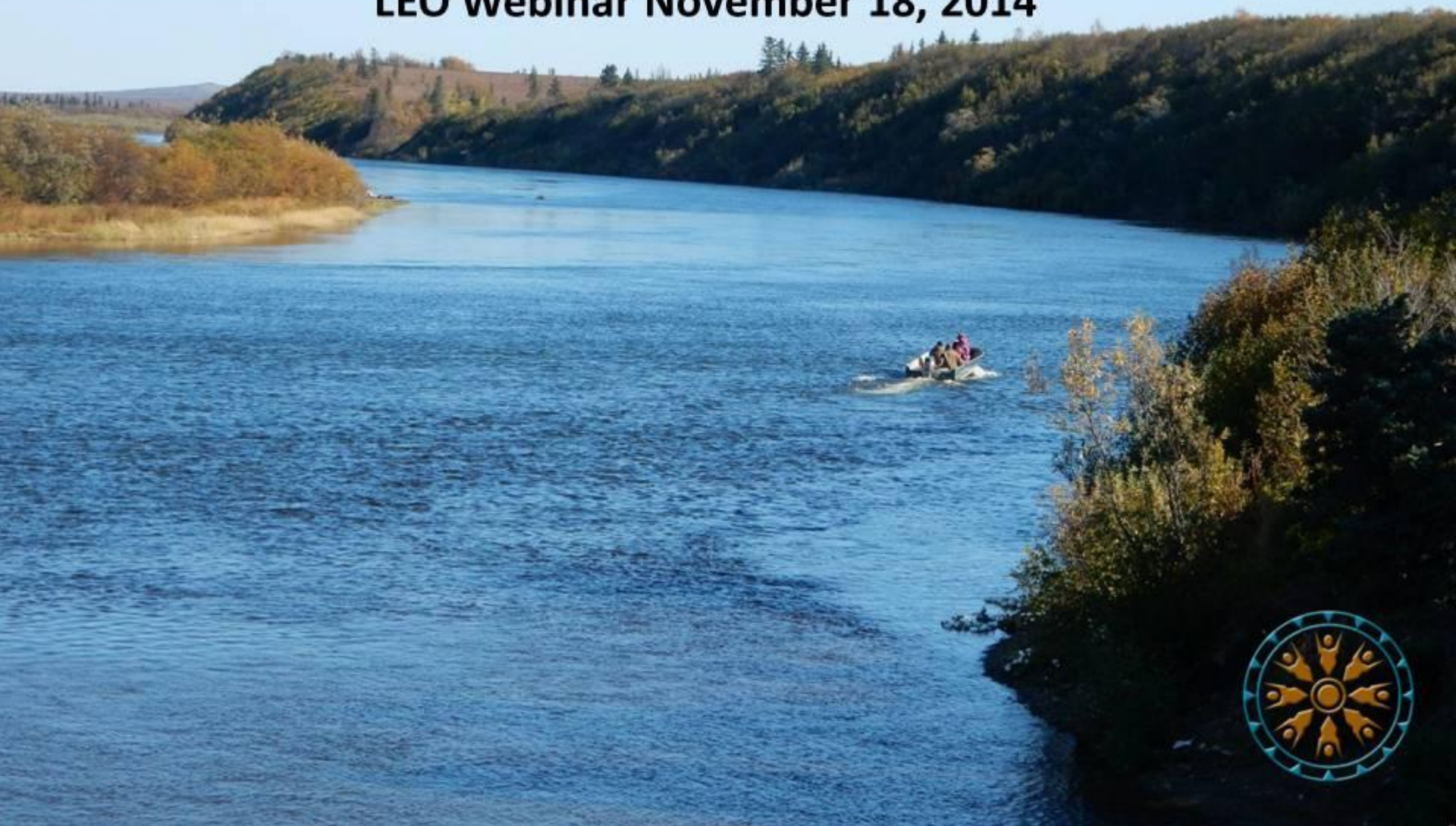


RAMP - The Rural Alaska Monitoring Program

**Food and water safety in a changing Arctic
LEO Webinar November 18, 2014**



RAMP Participants Include:

ANTHC Center for Climate and Health

ANTHC Division of Environmental Health and Engineering

Norton Sound Health Corporation

Kawerak Inc.

Native Village of Kotzebue

Native Village of Golovin

Native Village of St. Michael

Native Village of Shishmaref

Native Village of Wales

Native Village of Teller

Sea Grant Marine Advisory Program

University of Colorado School of Veterinary Medicine

University of Alaska Fairbanks Wildlife Toxicology Lab

University of Alaska Anchorage, School of Engineering

State of Alaska Department of Environmental Conservation

United States Geological Survey –



RAMP Participants Include:



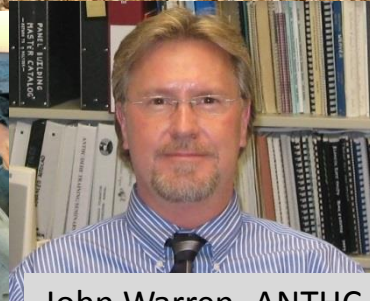
Kevin Zweifel - NSHC



James Berner - ANTHC



Jake Bell - ANTHC



John Warren- ANTHC



Anahma Shannon -
Kawerak



Jennifer Demir - NSHC



Mike Brubaker - ANTHC



Alex Whiting NVK



Gary Ferguson, ANTHC



Todd Ohara UAF



Karsten Hueffer, UAF



Aaron Dotson, UAA



Gay Sheffield, UAF

ANTHC
Water Center



Bob Gerlach, ADEC



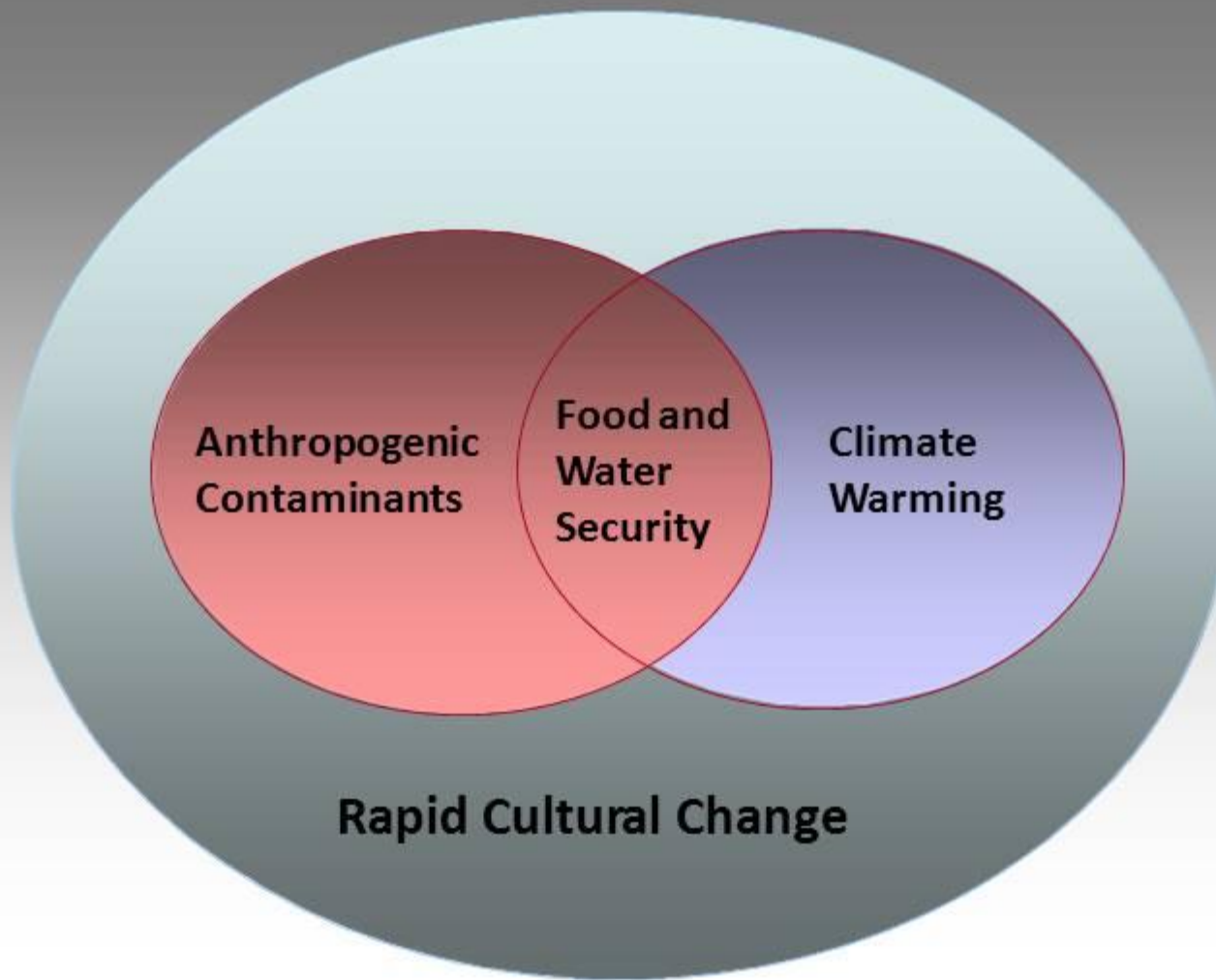
With support from the U.S. EPA



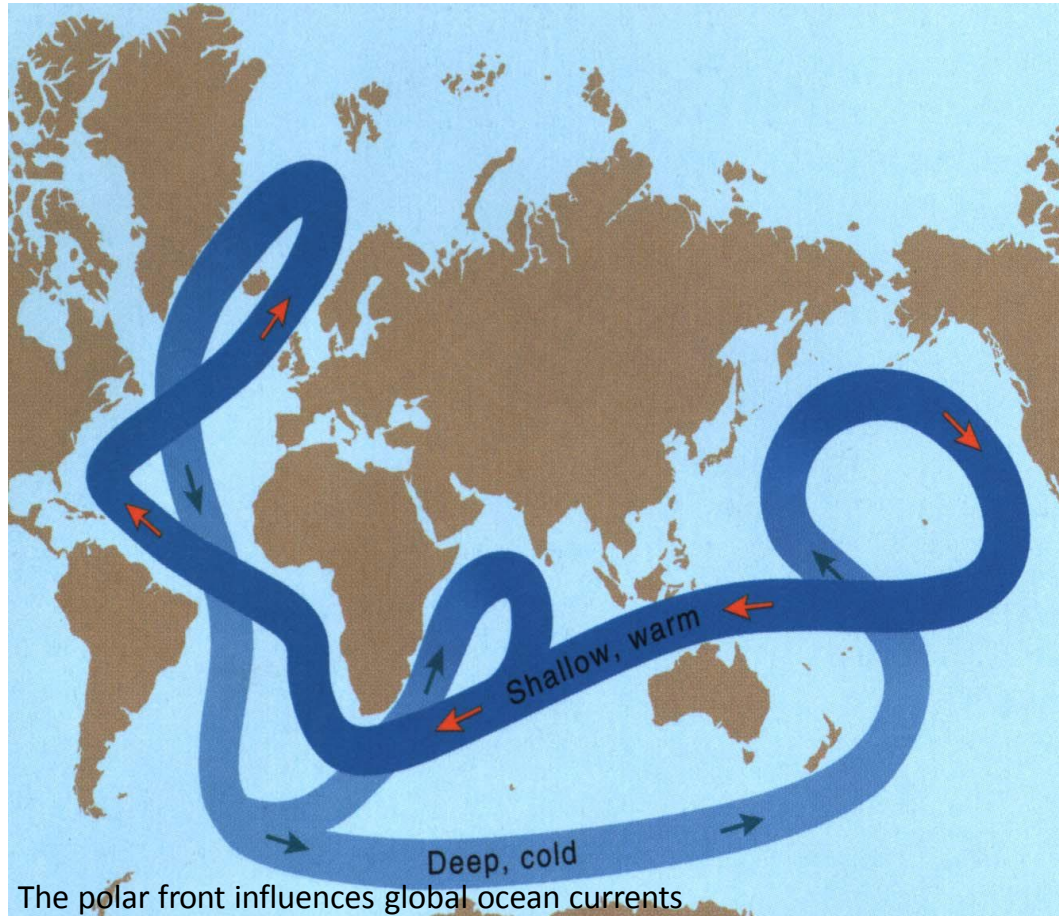
Climate change is causing many impacts on the environment .



Major Threats for Rural Alaska Natives



Arctic Influence on Ocean Circulation



The Arctic plays a fundamental role in circulation of water in the oceans of the world. When warm, salty North Atlantic water reaches the cold Arctic around Greenland and Iceland and in the Labrador Sea, it becomes denser as it cools, and therefore sinks to deeper layers of the ocean. This process of forming deep water is slow, but takes place over a huge area. Every winter, several million cubic kilometers of water sink to deeper layers, which move water slowly south along the bottom of the Atlantic Ocean.

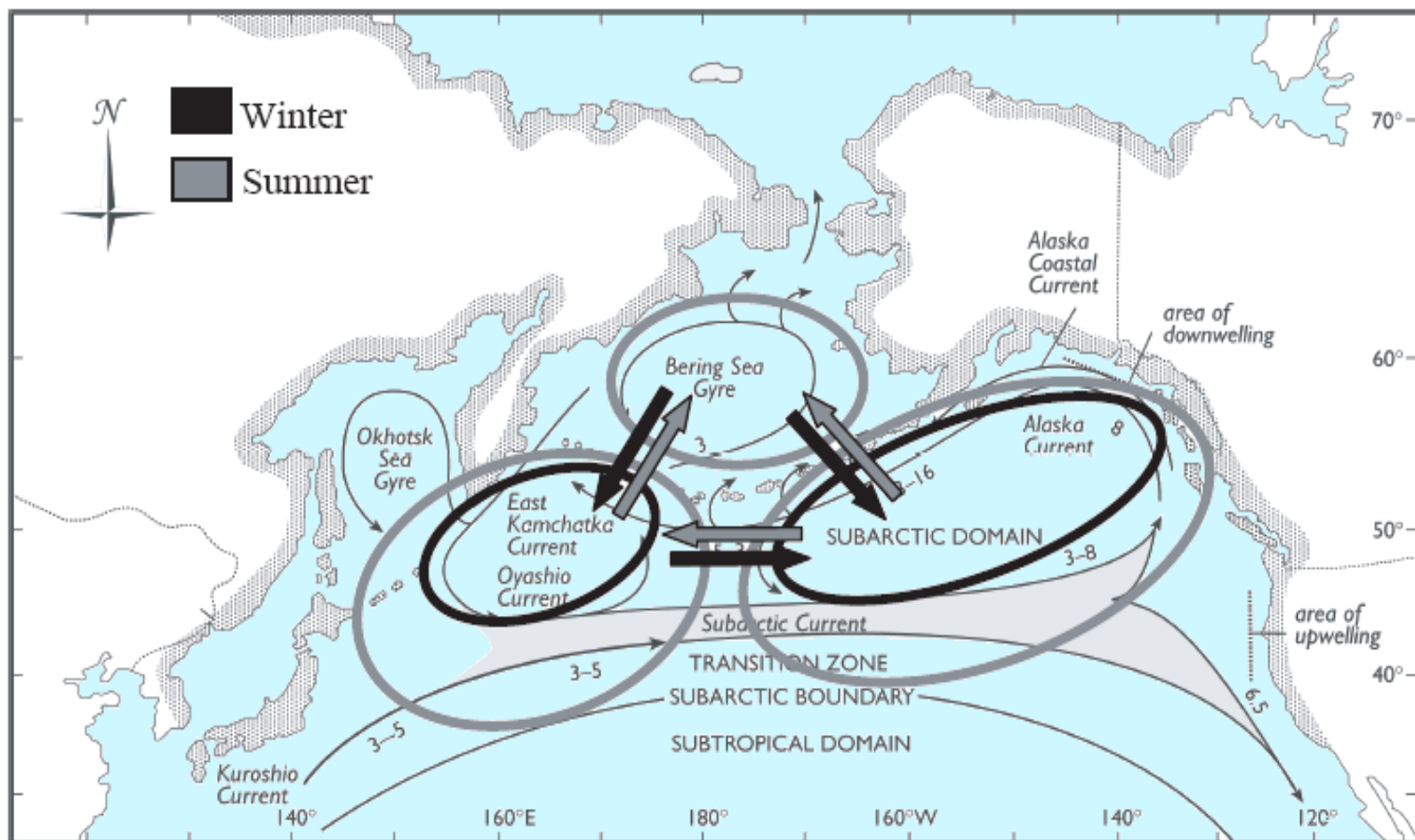
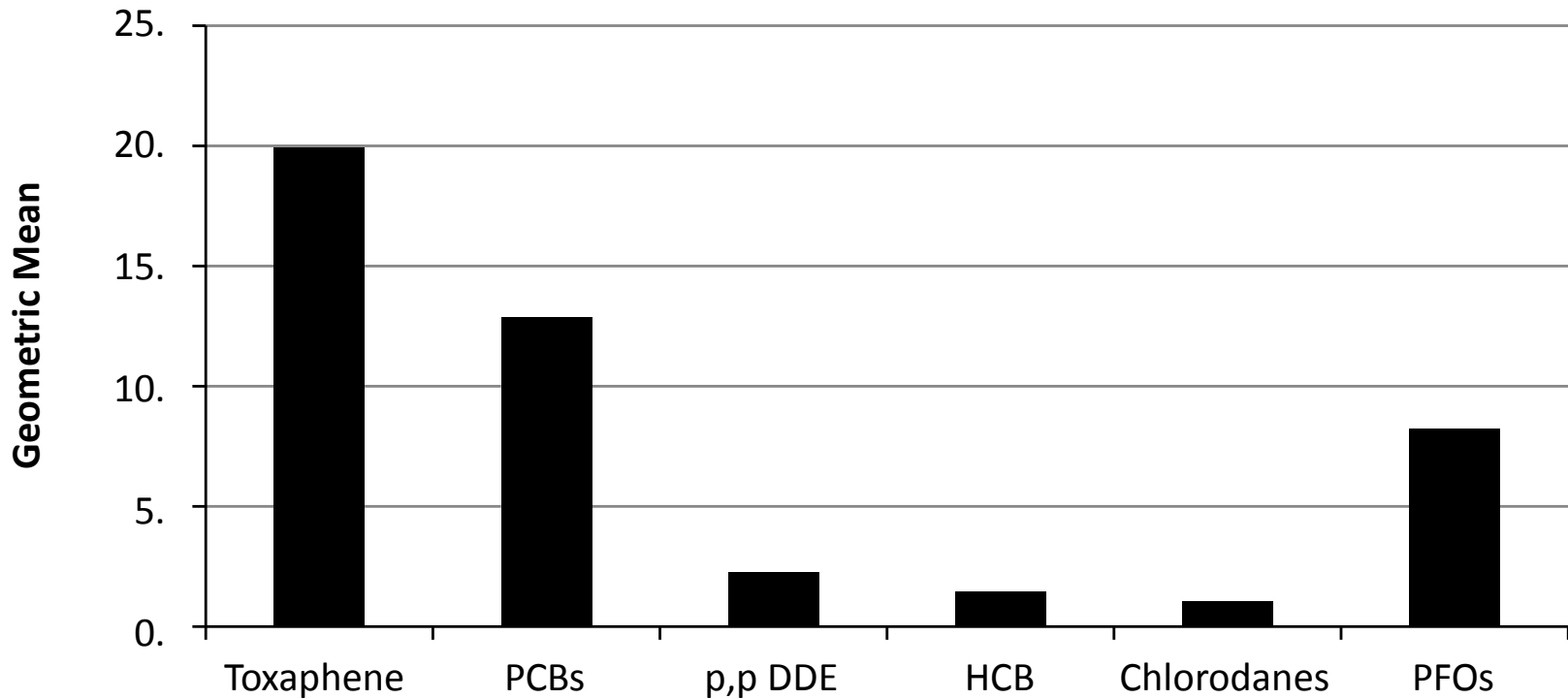


Fig. 1. A general conceptual model of seasonal distribution and movements of Pacific salmon in the open ocean. Salmon are distributed in both the Bering Sea and North Pacific Ocean in the summer and primarily in the North Pacific Ocean in the winter. Immature salmon generally move to the south and east in winter (black arrows) and to the north and west in summer (grey arrows). Base map showing oceanographic features and approximate current speed (km/d) is from Quinn (2005).

Yukon River Chinook and Chum Salmon Muscle Contaminant Levels (ppb, wet weight)

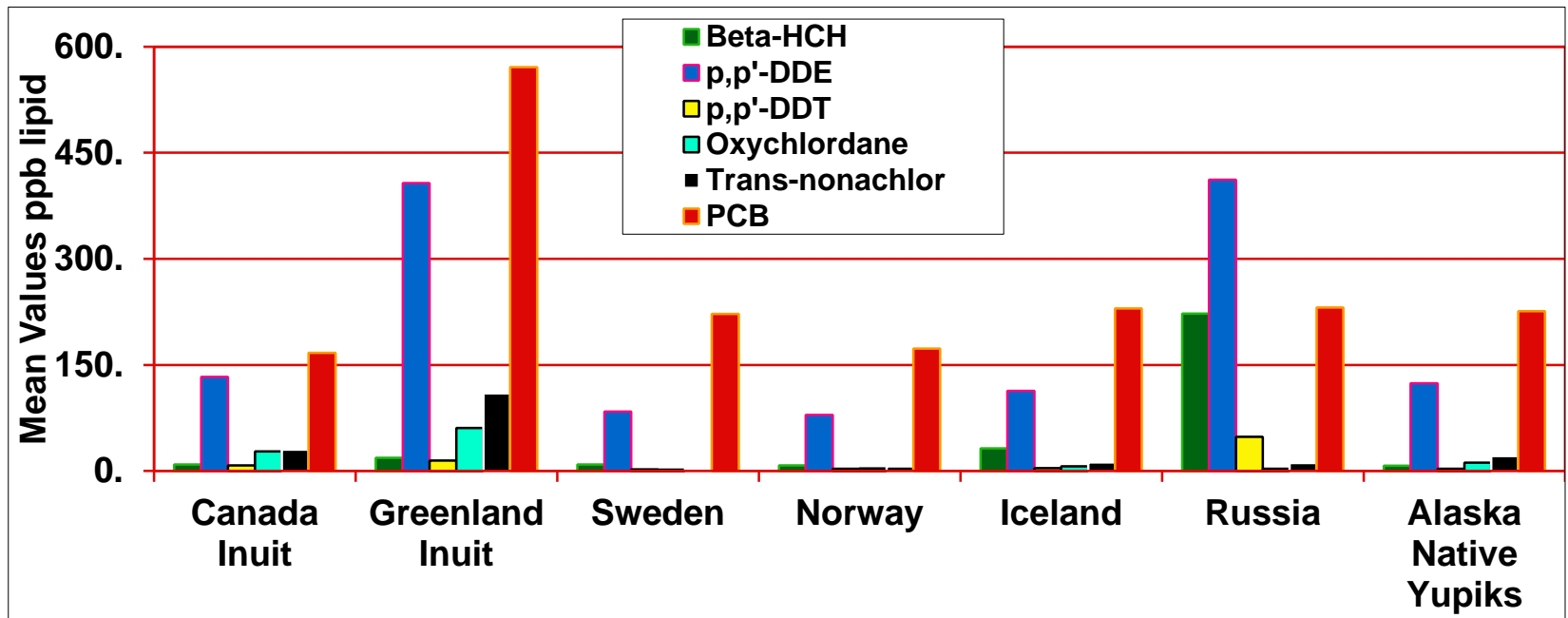


Personal Communication A. Matz, FWS, 2010

Biomonitoring Programs

Alaska Native MOM STUDY 1999-2006

Blood Levels of Persistent Organic Compounds in Circumpolar Pregnant Women



1 Alaska Native Traditional Food Safety Monitoring Program

2 Arctic Monitoring and Assessment Program, The Human Health Assessment - 2009

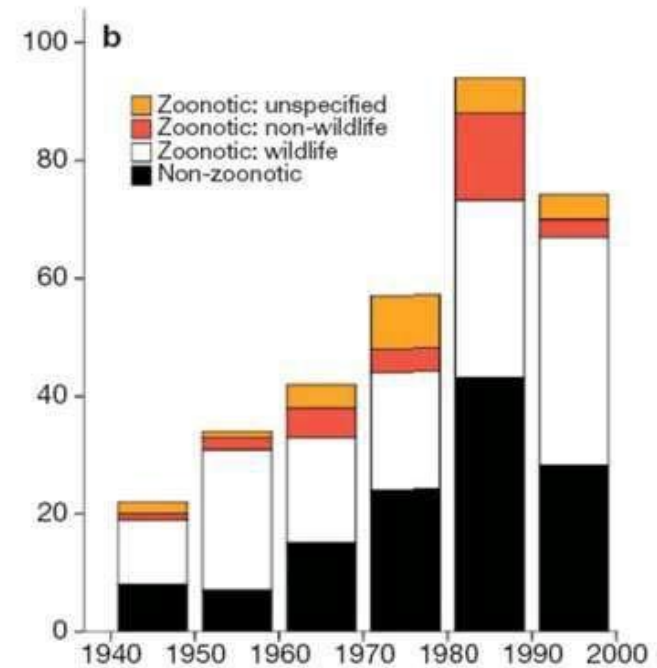
People wonder if climate change is affecting wildlife.



ZOONOSSES

Zoonoses are diseases (including parasites) that can be transmitted from animals to man

- ~60% of emerging infectious diseases in humans are zoonoses
- ~70% of zoonotic infections in humans are from contact with wildlife



Jones *et al.* 2008

AN Biomonitoring Programs

RAMP Study

Zoonotic	Diseases
Toxoplasmosis	6 – 10% Caribou ≈ 50% of harbor seals
Trichnosis	Very common in polar bear, walrus
Brucellosis	10 - 25% Caribou
Tularemia	Northward movement -beaver, muskrat, snowshoe hare, ticks; it can also be water-borne, and is carried by mosquitoes, ticks
Q-Fever (coxiella burnetti)	75% Northern Fur Seals similar prevalence in Stellar Sea Lions on St. Paul Island 25-30% Caribou

And if climate change is affecting food.



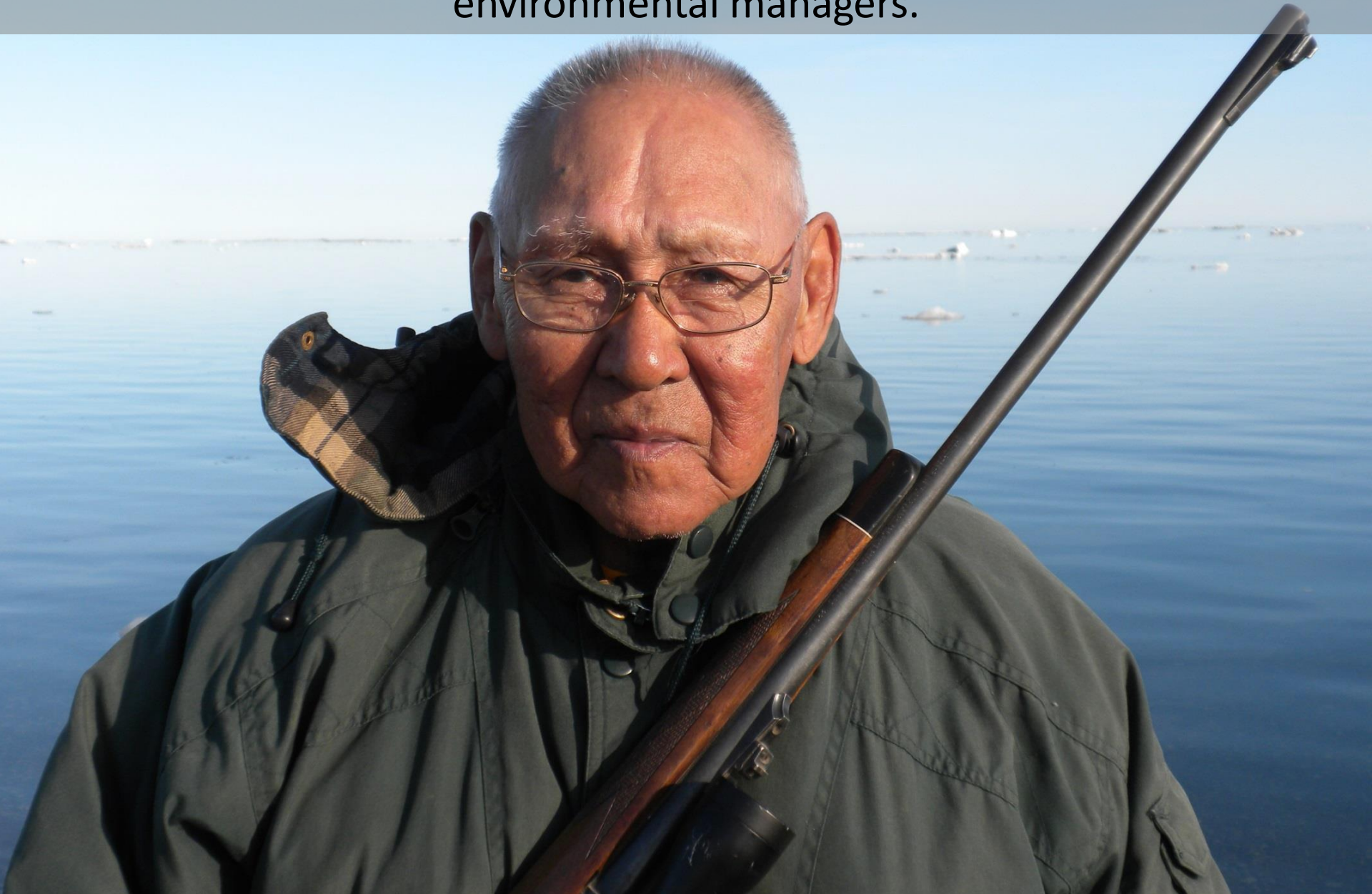
or the safety of water resources.



Vulnerable Village Residents

- Some people are at special risk for certain environmental health threats, including pregnant mothers, infants, elders, residents with chronic diseases like diabetes.
- Residents on medications that affect the immune system like, cancer chemotherapy, or steroid medications for diseases, like asthma.

Local hunters and harvesters donate small amounts of subsistence harvested resources for testing. The results are shared with local environmental managers.



RAMP is a about monitoring local harvest for known and emerging contaminants (like metals) and pathogens (like parasites).



Water



This photo of an algal bloom in Hotham Inlet near Kotzebue, was taken by Alex Whiting. Changing environmental conditions such as longer warmer summers, and increases of nutrients from melting permafrost can incite algal and other blooms. Some blooms can be toxic to people, shellfish and other wildlife.



Range expansion of beaver and the potential of new carriers of giardiasis, cryptosporidium and tularemia are other concerns for water quality.



Water is testing is performed in two ways: by direct reading instruments and by collecting water samples. Samples are tested for the following parameters:

Direct Measurements: temperature, pH, conductivity

Water Samples: nitrogen, phosphorus, mercury, cyanobacteria, giardia and cryptosporidium.

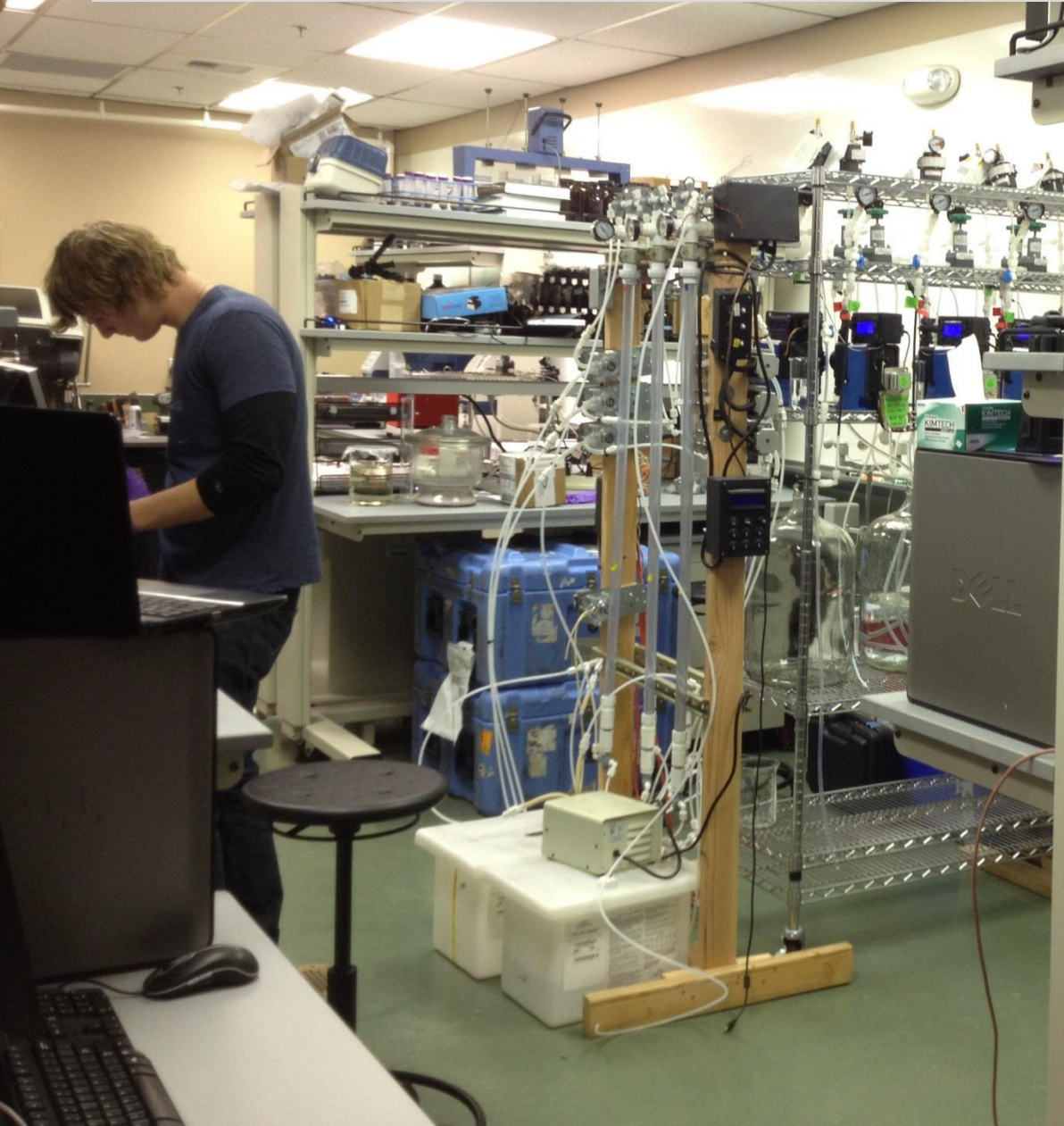
Data from direct reading instruments like this can be down loaded periodically onto a lap top computer.



Water samples collected from traditional water sources including tundra ponds, lakes, streams will be tested at several labs.



Waters sample analysis for nutrients, metals, and data recovery from data loggers will be performed at Dr. Aaron Dotson's water lab at UAA.



There are Five Basic Steps in RAMP:

- 1. Interested communities authorize participation in RAMP by having their tribal council complete a resolution of support. ***
- 2. A point of contact (usually at the tribal council) is designated for assisting in the collection of harvested food and water samples.**
- 3. Training on sampling methods is provided and a schedule is developed with community representatives for annual collection of samples.**
- 4. Samples are collected during harvest events and send to appropriate laboratories at UAF, UAA, ADEC, and others for analysis.**
- 5. Sample results are provided in meetings with regional and local partners to assist in understanding changes in food and water conditions, and to provide information for healthy consumption and development of adaptation plans to reduce potential risk to vulnerable residents.**

*** Other communities may be added as resources allow.**

AN Biomonitoring Program

AN RAMP Biomonitoring Initiative

- Village-based, resident-operated monitoring program. Program metrics are based on an individual village assessment of environmental change, after the community prioritizes the findings.

FOOD

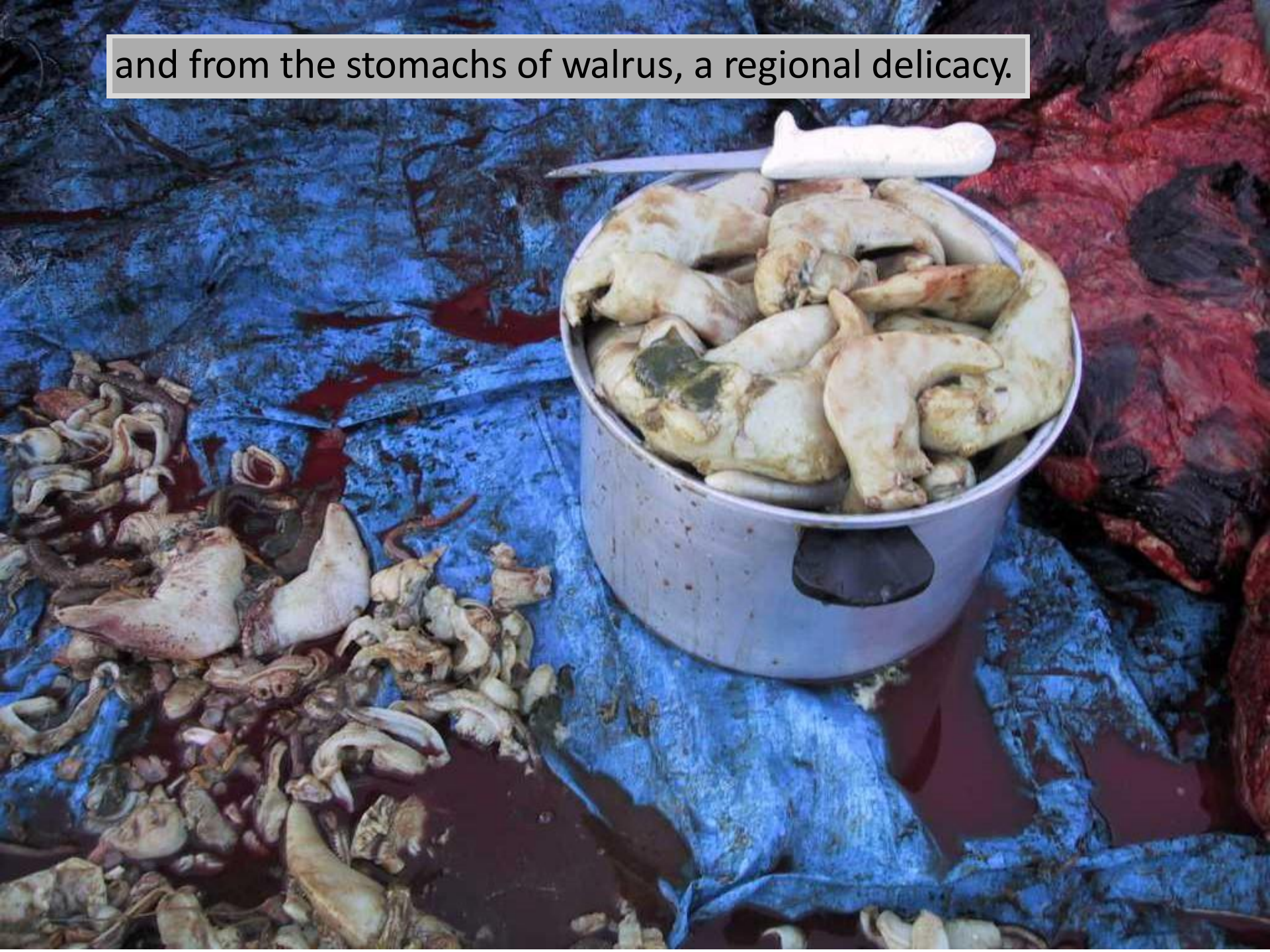


Climate change and increasing incidence of illness in subsistence species has raised concerns about environmental contaminants and disease.



The parasite Myxobolus squamalis; influenced by environmental conditions, harmless to people.

and from the stomachs of walrus, a regional delicacy.



Shellfish



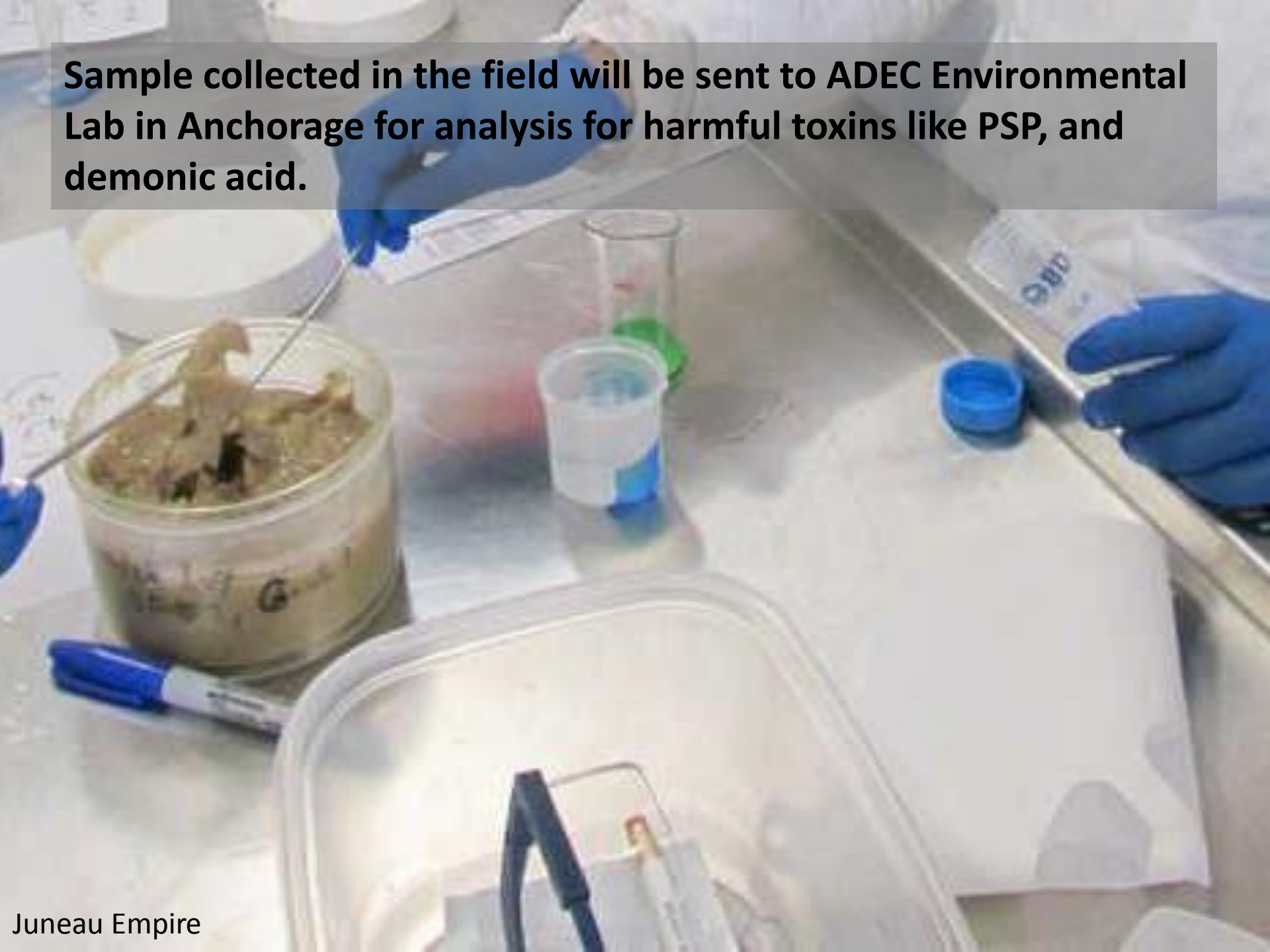
Collecting butter and clams in
Wales October 2014

Shellfish is a subsistence resource and vulnerable to changing ocean conditions. Clams and mussels are harvested from beaches in Northwest Alaska, and have historically been free of PSP.



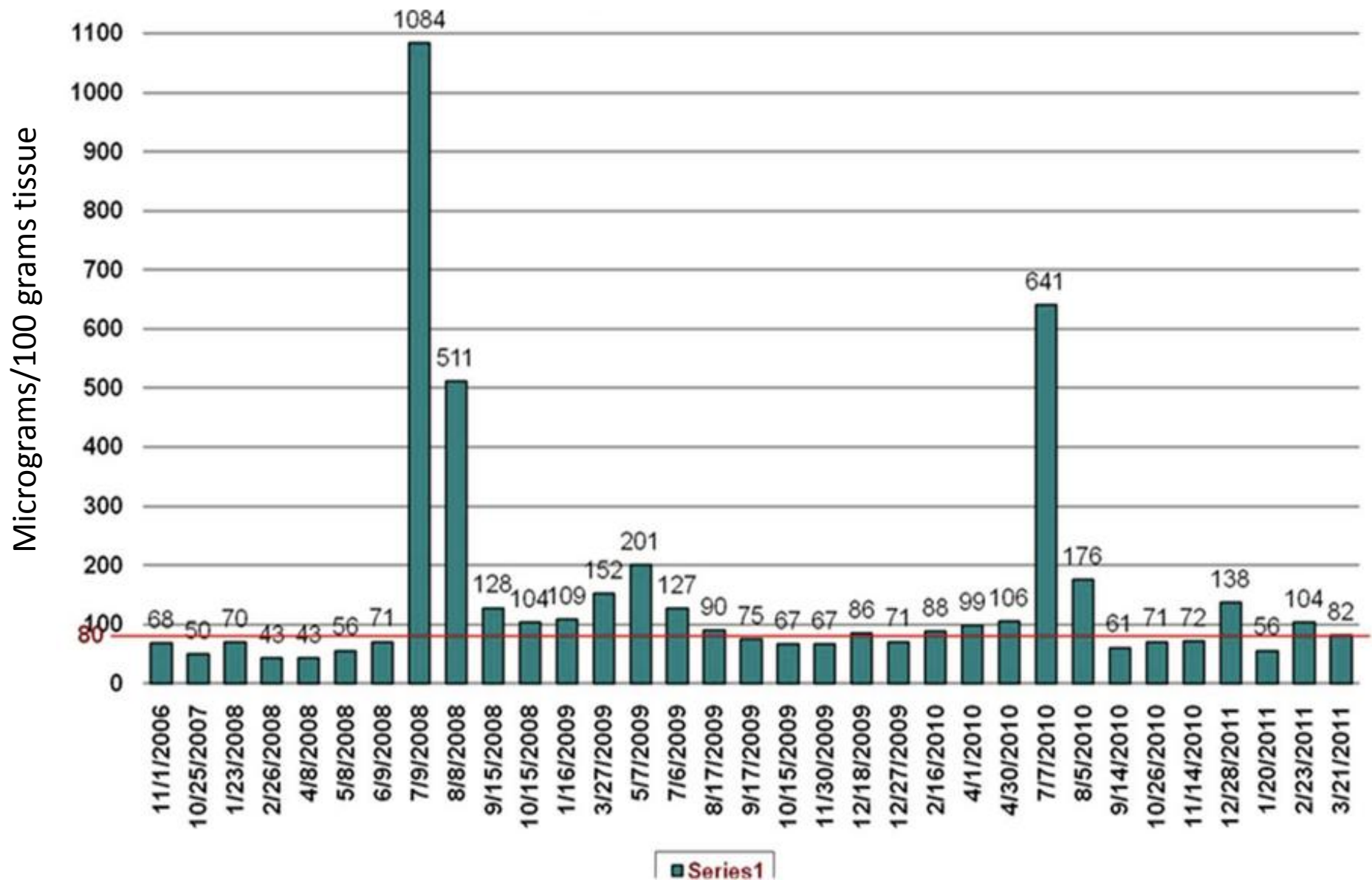
Photo: Nome Nugget

Sample collected in the field will be sent to ADEC Environmental Lab in Anchorage for analysis for harmful toxins like PSP, and demonic acid.



AN Biomonitoring Program RAMP Study

King Cove PSP Results





The paper strips are simply dipped in the animal blood,





To test the exposure history of an animal to certain contaminants and disease, RAMP uses a paper blood test strip method developed in Canada. Paper is dipped in the blood of a harvested animal. Each paper tab can be used in the lab for a different test.

There are only a few materials needed for this kind of sampling, which makes the field work easy.

Note Book



Blood Collection/Filter Paper
Return to: WTLUAF
Cristina Hansen/Todd O'Hara
(907)474-5908

WTL ID: FP 152
Sewalik ID: 02
Species: Scrub
Date collected: June 3, 2017

Blood Collection/Filter Paper
Return to: WTLUAF
Cristina Hansen/Todd O'Hara
(907)474-5908

WTL ID: FP 153
Sewalik ID: _____
Species: _____
Date collected: _____

And dried in the field by waving or air drying.



Sample species type, date, location and time are recorded. The sample is then put in a labeled envelope. Samples can be stored in a refrigerator until ready for shipping.



Other environmental threats

Mosquitoes
Mosquito Larvae
Ticks

Permits and Requirements

Only Alaska Natives have permission to harvest sea mammals under federal laws. Sampling of sea mammals outside of subsistence harvest requires special permits. Only sea mammals harvested by Alaska Natives as a food resource will be sampled during the project, thus no federal permits are required.

Blood which is not used as a food resource, is the only specimen that will be collected from land or sea mammals. Thus no food waste will occur as a result of the project.

Permission in the form of tribal council resolutions will be required from each participating community and a local environmental manager will be identified as a project contact.

No state or federal permits are required for sampling of traditional water resources, nor for sampling of insects. The project team will defer to local and regional government and advisory groups for guidance on meeting other sampling requirements.

AN Biomonitoring Program Data Application

- Track trends in contaminant levels
- Track trends in zoonotic pathogen prevalence Share data with other communities, regions, and agencies Improve knowledge about impact of climate regime change on contaminant and pathogen circulation in the circumpolar north.
- Raise awareness in regional medical providers

AN Biomonitoring Program

Village Adaptation Planning

- The most immediate application of RAMP data is the creation of a community-specific adaptation plan, allowing residents to reduce exposure to the subset of vulnerable residents, including pregnant mothers, infants, elders, immunosuppressed residents, and those with chronic diseases.

