

AKOATS and Minimum Standards



Where We are and Where We Need to be to Understand
Regional Water Temperature Trends

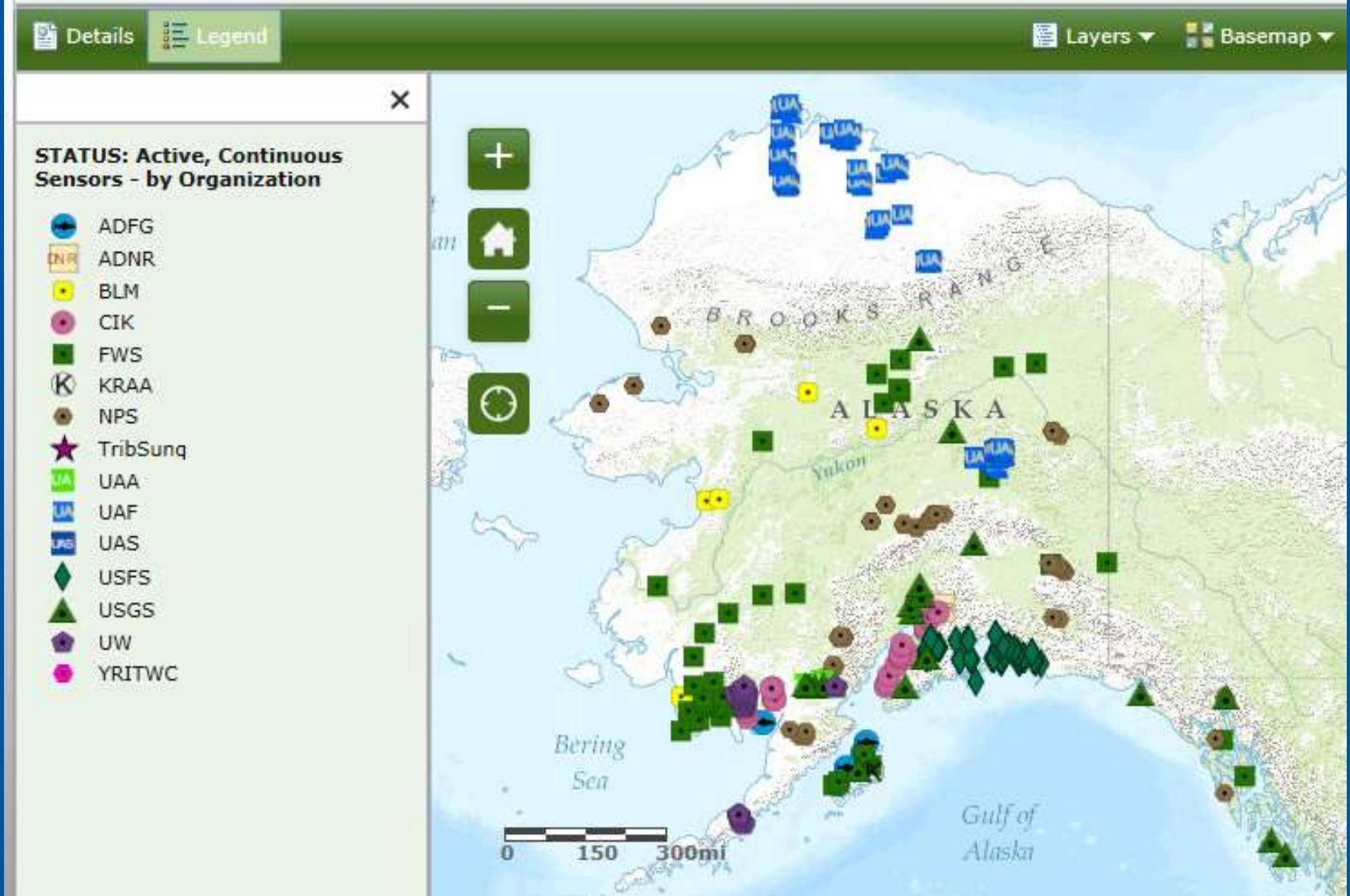
Marcus Geist

Sue Mauger

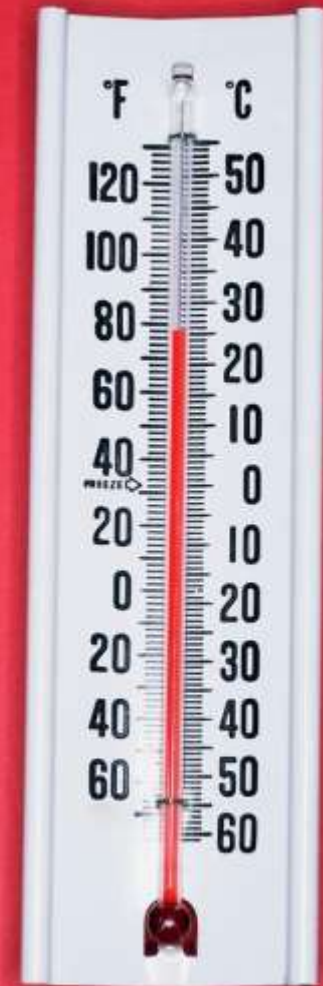


AKOATS

AKOATS - Alaska Online Aquatic Temperature Site



Does Temperature Matter to Salmon?



Methods - Sensor Attributes

Who

Where

What

When

How

Methods - Sensor Attributes

Who	ID , Agency_ID, SourceName, Contact_person, Contact_email, Contact_telephone
Where	Latitude, Longitude, Coordinate_Datum Location_Method, Sensor_Placement Location_Description, Waterbody_name
What	Waterbody_type, Temp_unit, Other_Air Other_Parameters, Other_Bio, Other_Flow
When	Initial_date, End_date, Active, Status Sample_frequency, Sample_interval, Season
How	Sensor_accuracy, Sensor_QAQC, Sensor_access Duplicate_Sensor, Install_type, Notes

METHODS

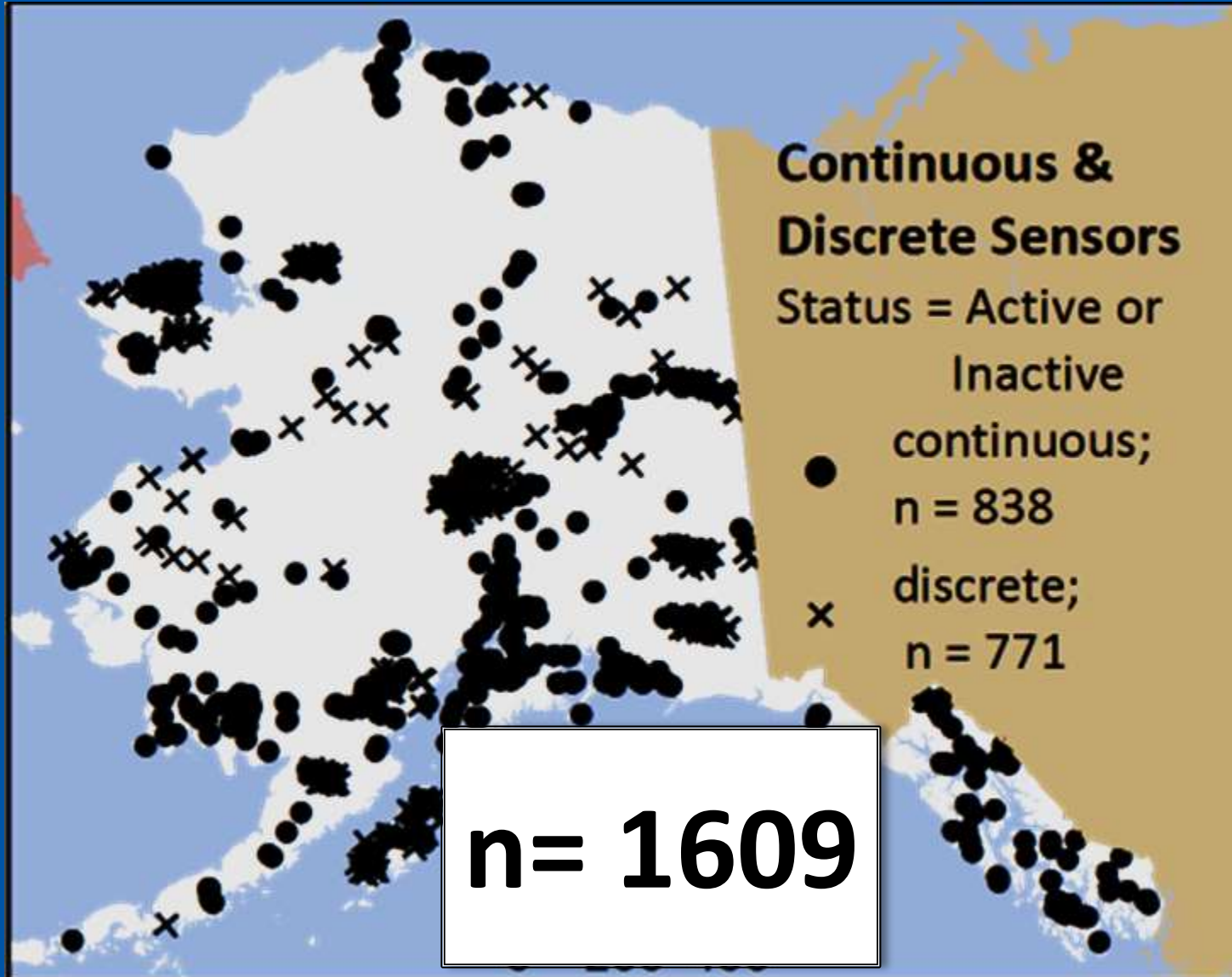


Need to Sort “Apples”

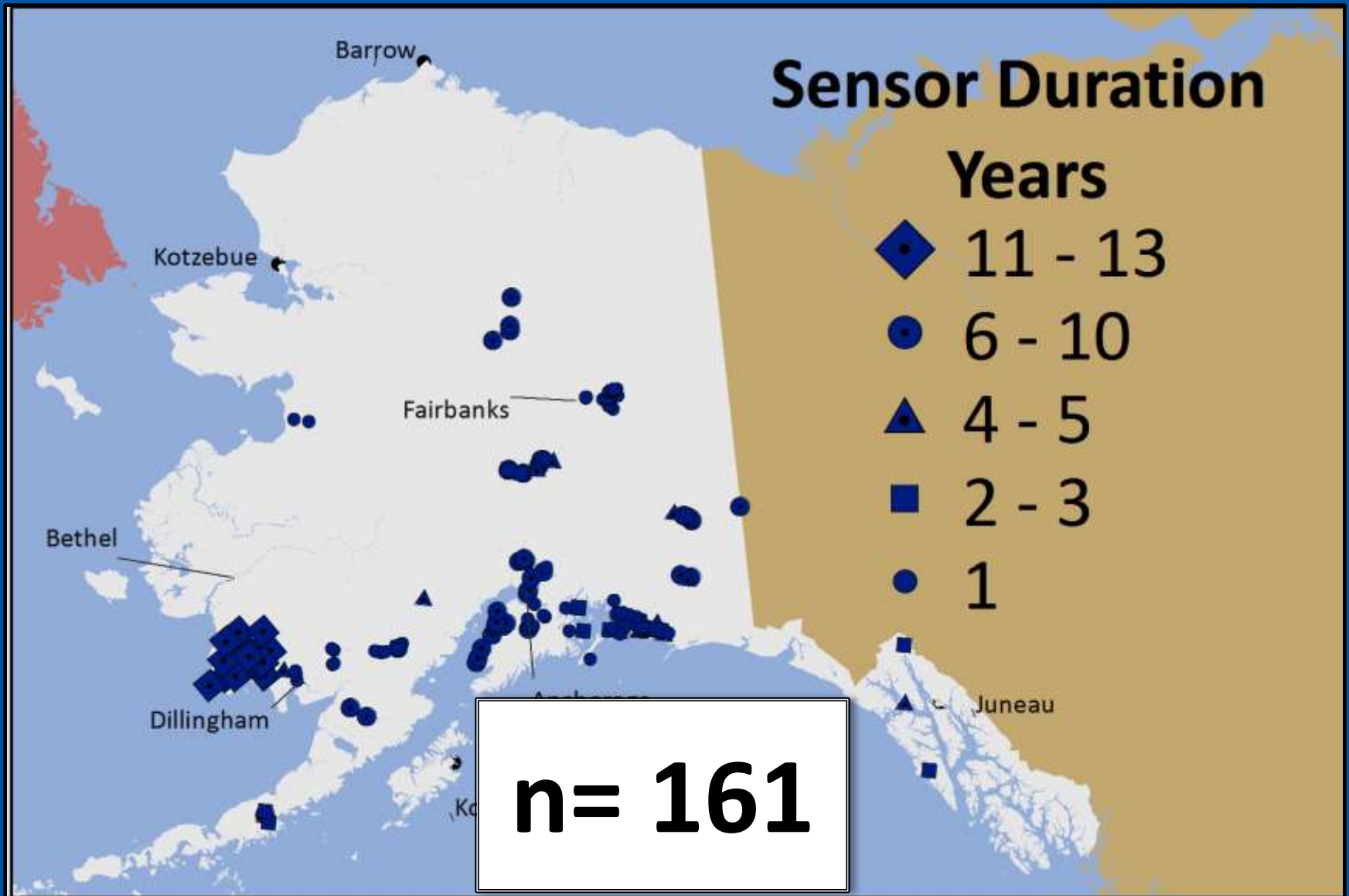


From the “Oranges”

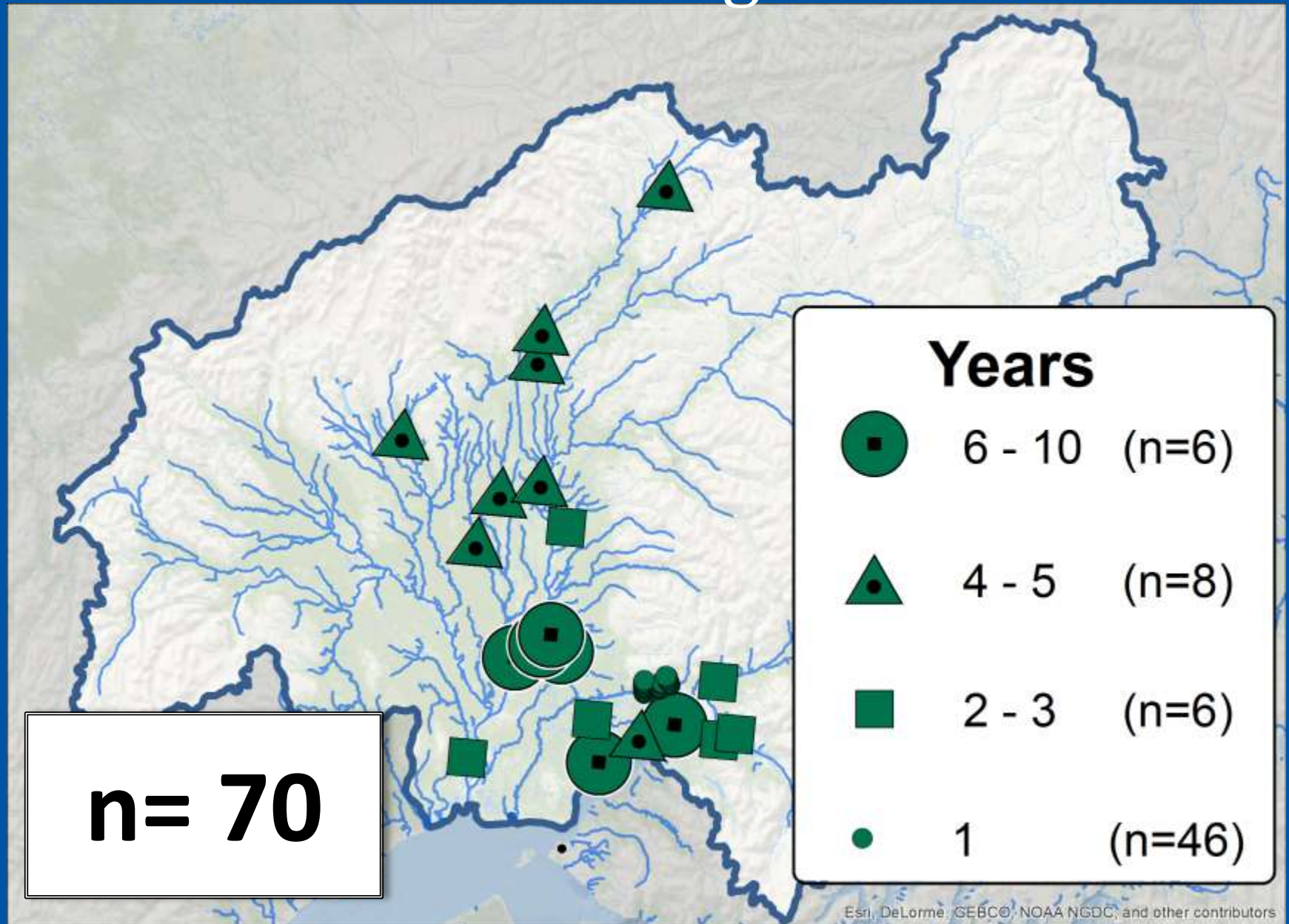
Where have we monitored?



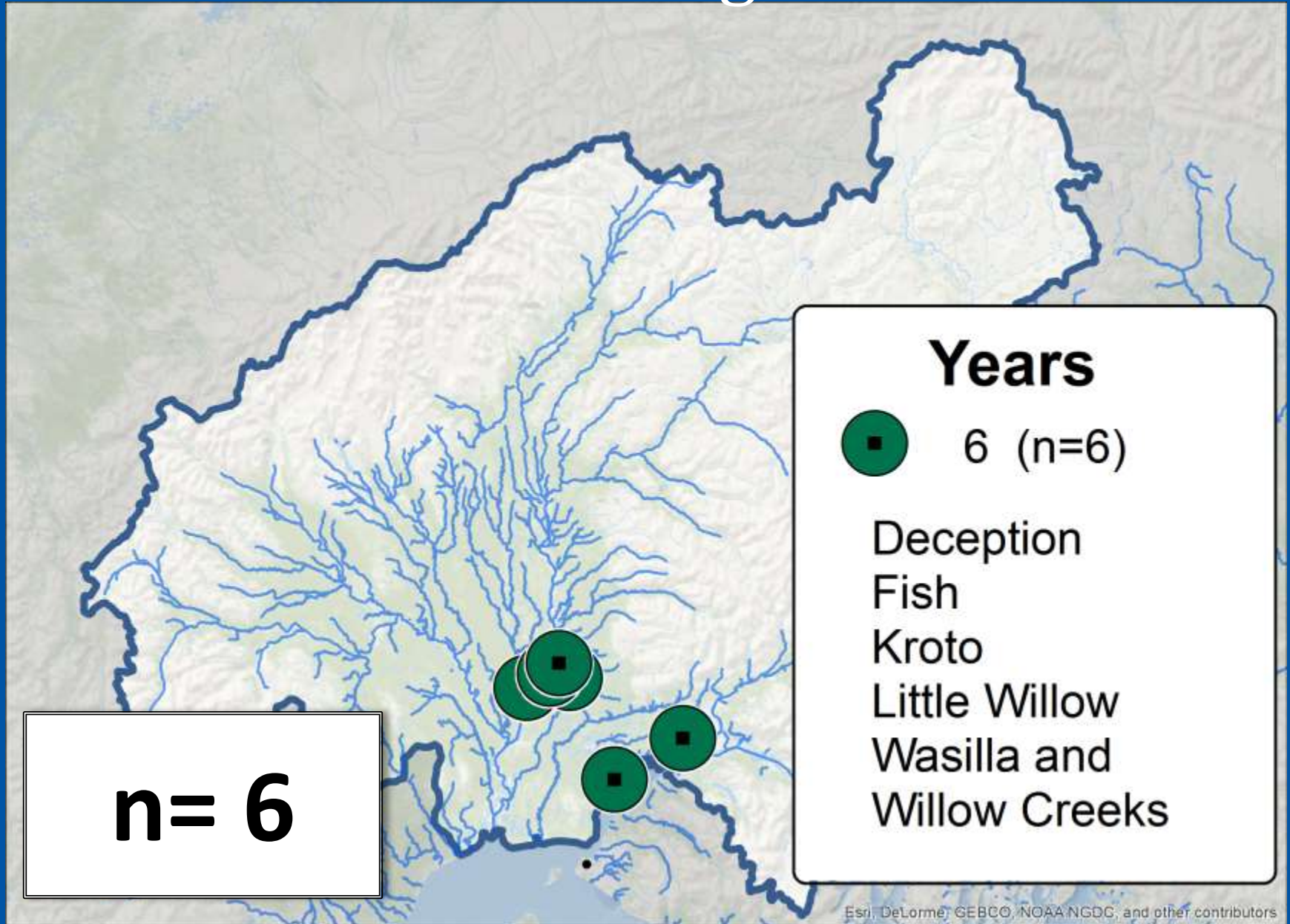
Where (are we monitoring now)?



Historic sites meeting min standards



Current sites meeting min standards



AKOATS – Website

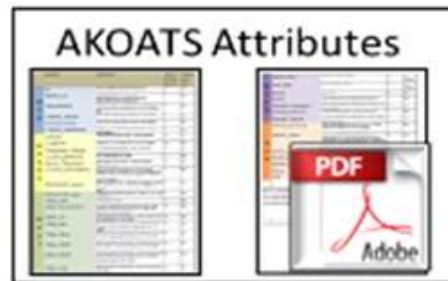


Aquatic Ecology

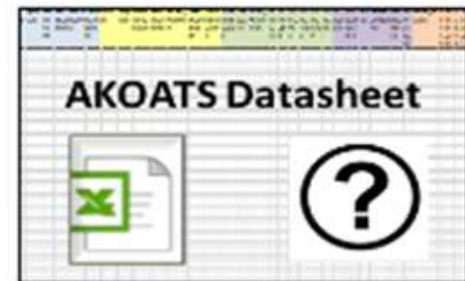
AKOATS Products



[Temperature Monitor Web Map](#)



[Metadata Attributes](#)



[Blank Data Table](#)



[AKOATS in ArcMap](#)



[AKOATS Report](#)



[Instructions: Enter New Data](#)

Stream Temperature Data Collection Standards and Protocols for Alaska

Minimum Standards to Generate Data Useful for
Regional-scale Analyses



Sue Mauger, Cook Inletkeeper
Rebecca Shaftel, Dr. E. Jamie Trammell, Marcus Geist, and Dan Bogan
Alaska Natural Heritage Program, UAA

Existing Protocols

USGS
United for a changing world

Guidelines and Standard Procedures for Continuous Water-Quality Monitors: Station Operation, Record Computation, and Data Reporting

EPA
United States Environmental Protection Agency

MS-600-B-12-109 | September 2014 | www.epa.gov/owow

Best Practices for Continuous Monitoring of Temperature and Flow in Wadeable Streams



National Center for Environmental Assessment
Office of Research and Monitoring

National Park Service
U.S. Department of the Interior

Natural Resources Program Center

Shallow Lake Limnology Monitoring Protocol
Central Alaska Network (CAN) and Arctic Network (ARCN)
Version 2.0

Natural Resource Report NPS/ARNDORR—2011/347

National Park Service
U.S. Department of the Interior

Natural Resources Program Center

Freshwater Water Quality Monitoring Protocol
Version FQ-2013.1, Southwest Alaska Network

Natural Resource Report NPS/ALADDER—2012/93

U.S. Department of the Interior
National Park Service

Natural Resources Program Center

Southwest Alaska Freshwater Flow System Monitoring Protocol Narrative
Southwest Alaska Network

Version 1.0, January 2015

Natural Resource Report NPS/ALADDER—2011/700



WATER TEMPERATURE DATA LOGGER PROTOCOL FOR COOK INLET SALMON STREAMS

USGS
United for a changing world

Prepared in cooperation with the U.S. Fish and Wildlife Service

Guidelines for the Collection of Continuous Stream Water-Temperature Data in Alaska

Open-File Report 2014-1182

U.S. Department of the Interior
U.S. Geological Survey



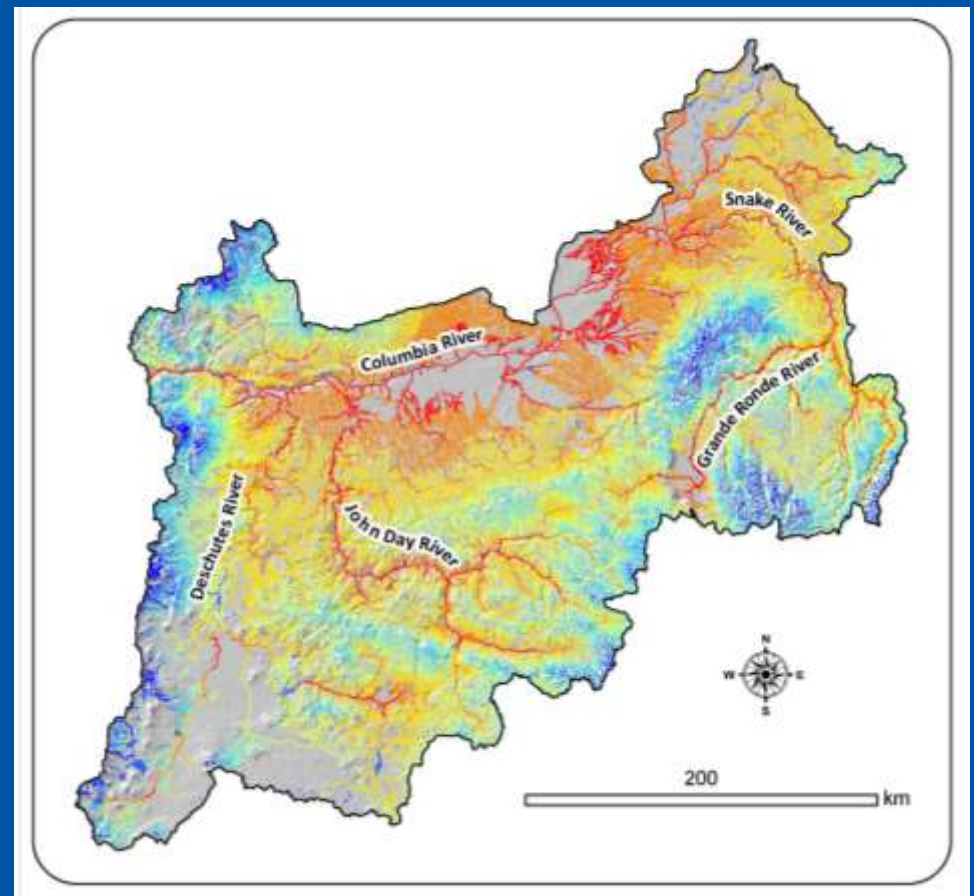
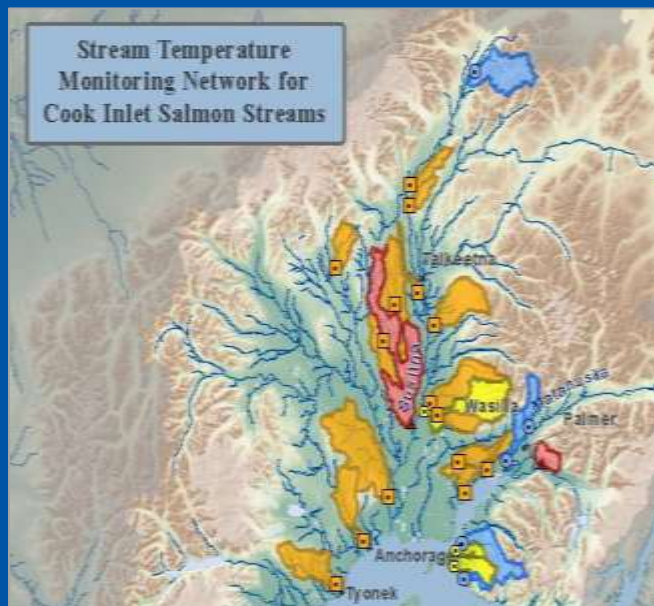
Our goal is to establish the minimum requirements necessary to make stream temperature data collected in Alaska useful for understanding regional-scale patterns and climate-related trends.

By identifying minimum standards, we hope to encourage rapid, but structured, growth in comparable stream temperature monitoring efforts in Alaska that will be used to understand current and future trends in thermal regimes.

Minimum standards address: data loggers, data collection, QA/QC, and data storage.

MatSu Network

NorWeST Regional Database



Minimum Standards

Data Logger:

Accuracy

$\pm 0.2^{\circ}\text{C}$

Measurement range

-4° to 37°C

(24° to 99°F)



Minimum Standards

Data Collection:	Sampling frequency	1 hour interval
	Sampling period/duration	1 calendar month

Recommendations:

- year round data collection or as much of the open water season as possible
- at least 3 years



Minimum Standards

Quality Assurance and Quality Control

Accuracy checks

water bath at two temperatures: 0°C and 20°C before and after field deployment to verify logger accuracy (varies $\leq 0.2^\circ\text{C}$ compared with a NIST-certified thermometer)

Site selection

ten measurements across the stream width to verify that the site is well-mixed (i.e. varies $\leq 0.2^\circ\text{C}$) horizontally and vertically

Recommendations:

- Deploy a backup logger at each site in the event that one logger fails or is lost during deployment

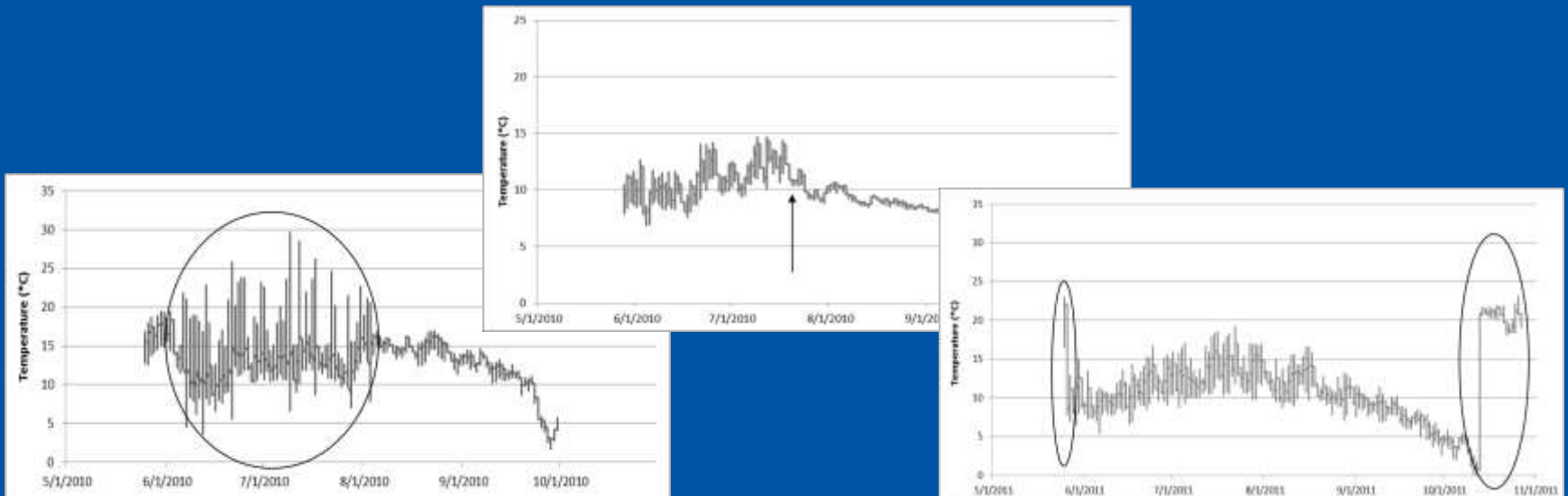


Minimum Standards

Quality Assurance and Quality Control

Data evaluation

remove erroneous data from the dataset



Minimum Standards

Data Storage	File formats	CSV format in 2 locations
	Metadata	unique site identifier agency/organization name and contact latitude and longitude sample frequency stored with temperature data
	Sharing	quality-controlled hourly data

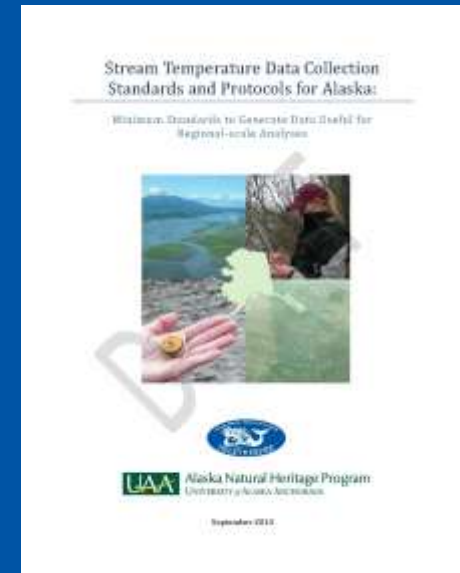
Recommendation:

- generate daily summaries of minimums, maximums, and means

Draft Report

Table 1. Minimum data collection standards for regional analysis of stream thermal regimes.

Minimum Standards		
Data Logger	Accuracy	$\pm 0.2^{\circ}\text{C}$
	Measurement range	-4° to 37°C (24° to 99°F)
Data Collection	Sampling frequency	1 hour interval
	Sampling period/duration	1 calendar month
Quality Assurance and Quality Control	Accuracy checks	water bath at two temperatures: 0°C and 20°C before and after field deployment to verify logger accuracy (varies $\leq 0.2^{\circ}\text{C}$ compared with a NIST-certified thermometer)
	Site selection	ten measurements across the stream width to verify that the site is well-mixed (i.e. varies $\leq 0.2^{\circ}\text{C}$) horizontally and vertically
	Data evaluation	remove erroneous data from the dataset
Data Storage	File formats	CSV format in 2 locations
	Metadata	unique site identifier
		agency/organization name and contact
		latitude and longitude
sample frequency	stored with temperature data	
Sharing	quality-controlled hourly data	



Send comments to
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by Friday December 5th

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Western Alaska Landscape Conservation Cooperative

- Technical Working Group

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Sanjay Pyare - UAS

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Trey Simmons – NPS

Acknowledgements - Standards

- Funding and Guidance:
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- Technical Working Group

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Brock Tabor – ADEC

Steve Frenzel – USGS

Ryan Toohey – USGS

Karen Murphy - WALCC

John Trawicki – USFWS

Alan Peck – BLM

Links – more info

AKOATS Website:

<http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/>

Cook Inletkeeper Stream Temperature Website:

<http://inletkeeper.org/healthy-habitat/stream-temperature-monitoring-network>

Western Alaska LCC:

<https://westernalaskalcc.org/projects/SitePages/allprojects.aspx>