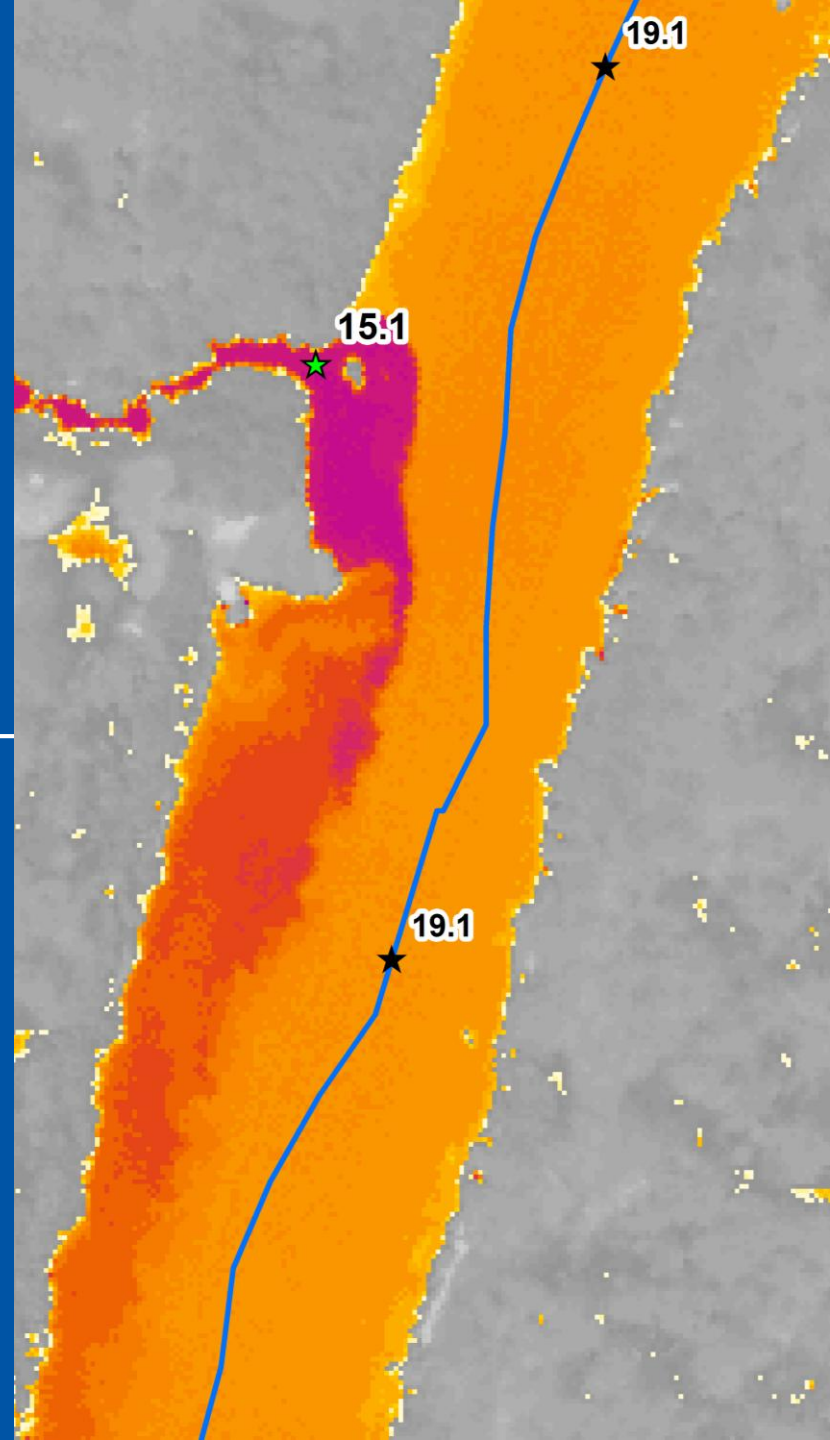


Science to Conservation Outcomes: Cold Water Refugia

Sue Mauger
Cook Inletkeeper



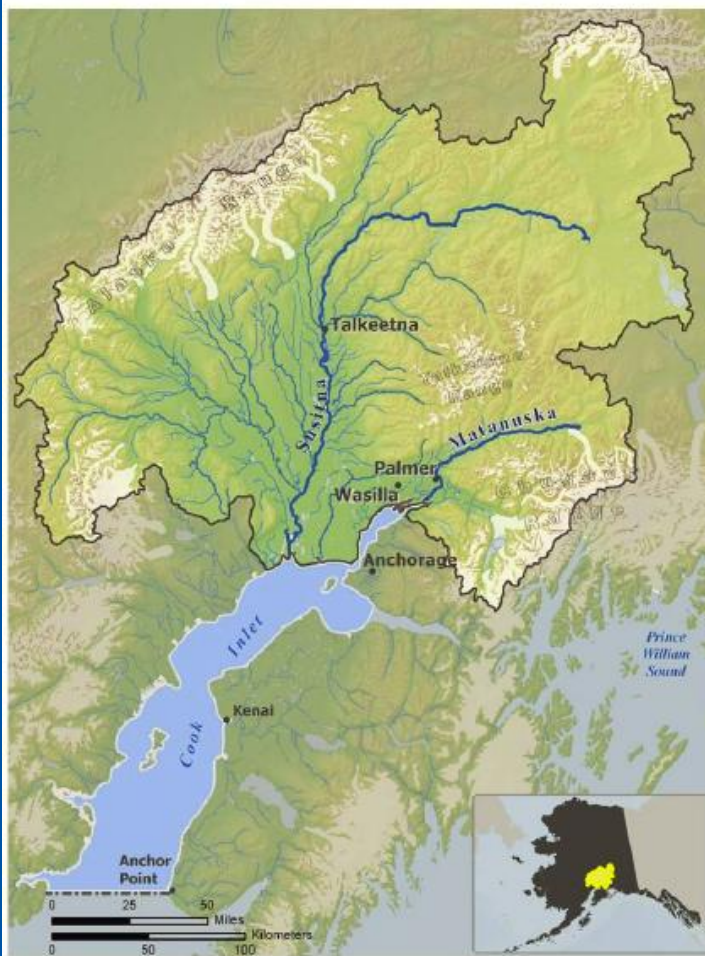
Jessica Speed
Mat-Su Basin Salmon
Habitat Partnership



Working for thriving fish, healthy habitats, and vibrant communities in the Mat-Su Basin

WHO WE ARE

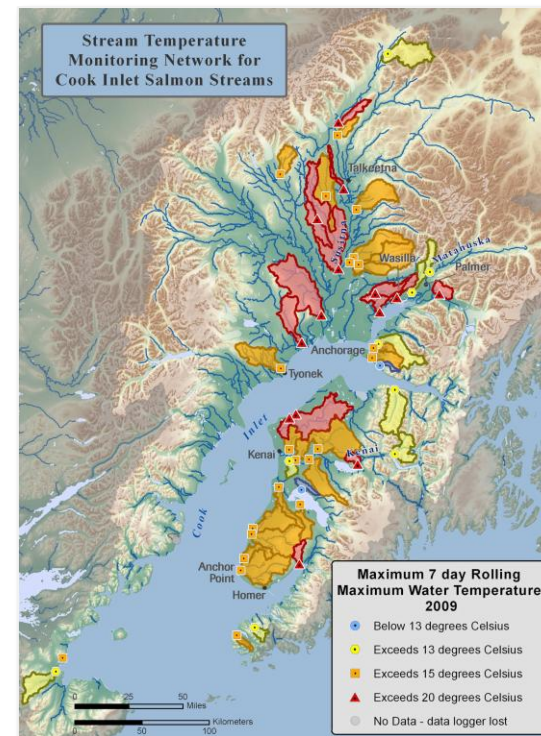
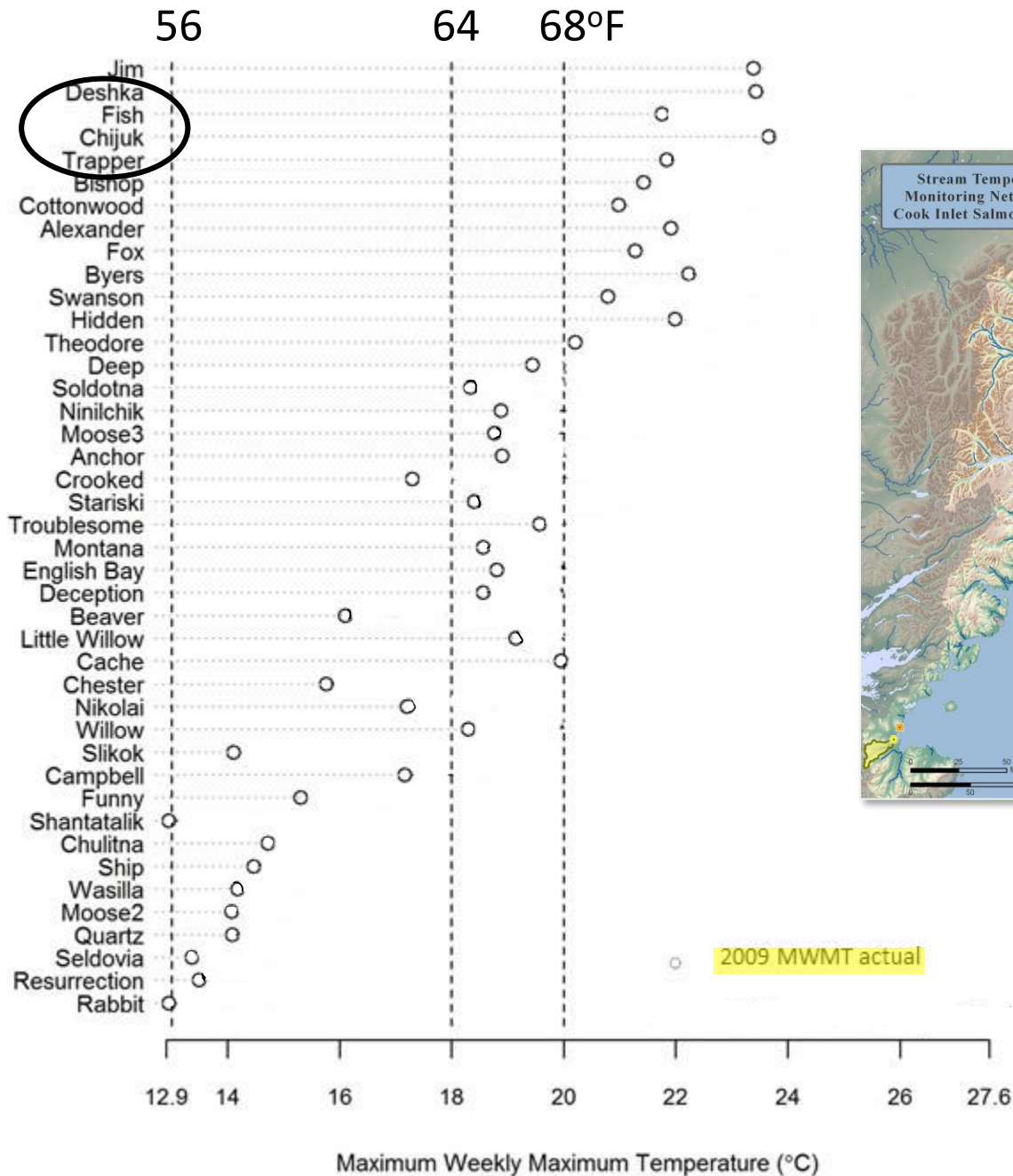
Alaska Department of Commerce, Community and Economic Development • Alaska Department of Environmental Conservation • Alaska Department of Fish and Game • Alaska Department of Natural Resources • Alaska Department of Transportation & Public Facilities • Alaska Center for the Environment • Alaska Outdoor Council • Alaska Pacific University • Alaska Railroad Corporation • Alaska Salmon Alliance • Alaska Trails • AlaskaChem Engineering • Alaskans for Palmer Hay Flats • Aquatic Restoration & Research Institute • Bureau of Land Management • Butte Area Residents Civic Organization • Chickaloon Village Traditional Council • City of Palmer • ConocoPhillips Alaska, Inc • Cook Inlet Aquaculture Association • Cook Inletkeeper • Eklutna Tribal Conservation District • Environmental Protection Agency • Envision Mat-Su • Fishtale River Guides • Glacier Ridge Properties • Great Land Trust • HDR Alaska, Inc • Innovative Funding • Knik River Watershed Group • Knik Tribal Conservation District • Matanuska River Watershed Coalition • **Matanuska-Susitna Borough** • Mat-Su Anglers • Mat-Su Conservation Services • Mat-Su Trails & Parks Foundation • Montana Creek Campground • National Marine Fisheries Service • National Park Service • Native Village of Eklutna • Natural Resources Conservation Service • Palmer Soil and Water Conservation District • Pioneer Reserve • Pound Studio • SAGA • Sierra Club • Susitna River Coalition • Sustainable Design Group • The Conservation Fund • The Nature Conservancy • The Wildlifers • Three Parameters Plus, Inc • Trout Unlimited • Turkey Red • Tyonek Tribal Conservation District • United Cook Inlet Drift Association(UCIDA) • United Fishermen of Alaska • Upper Susitna Soil & Water Conservation District • U.S. Army Corps of Engineers • U.S. Fish and Wildlife Service • U.S. Geological Survey • U.S. Forest Service • Wasilla Soil and Water Conservation District



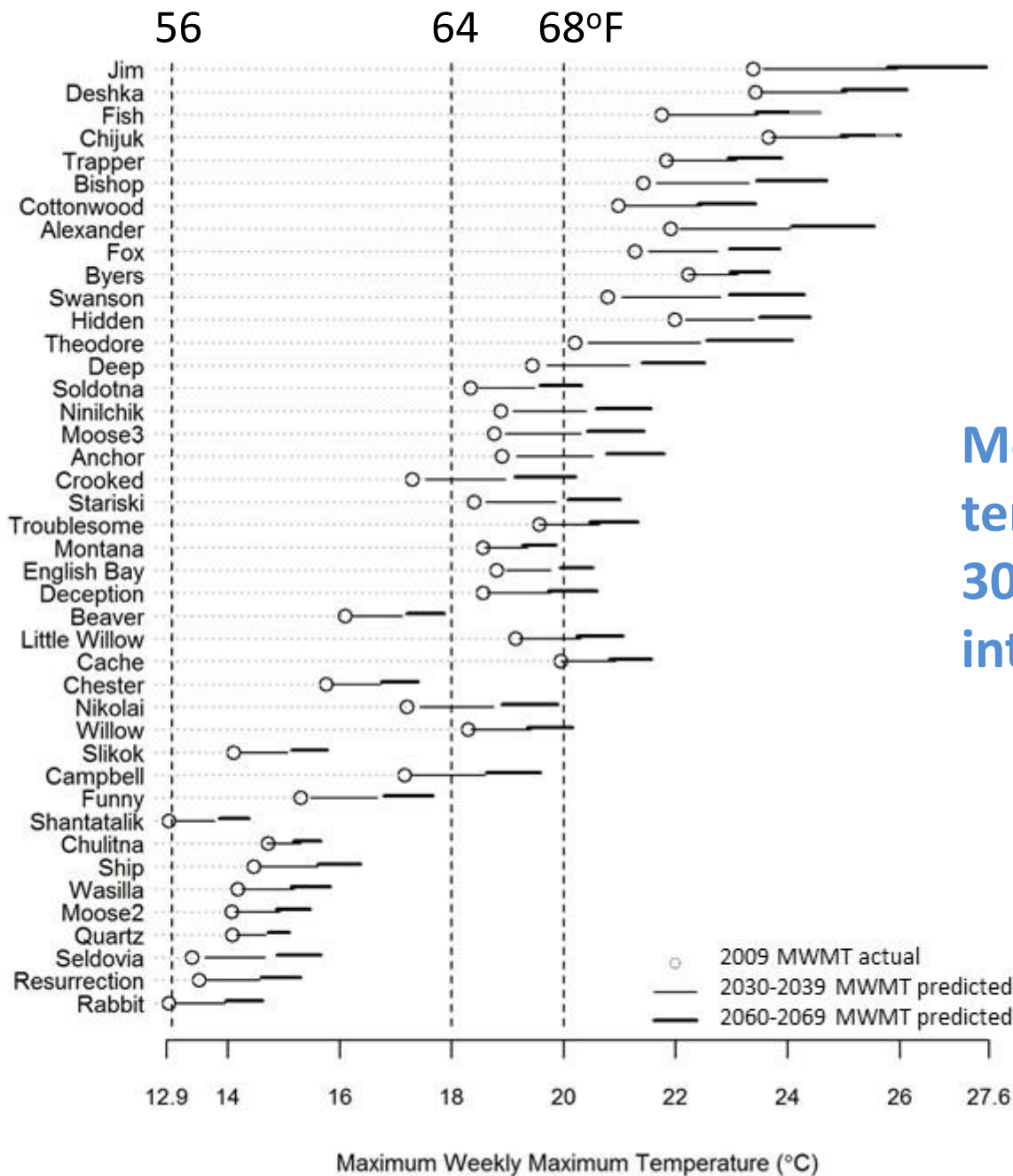
Science Takeaways

1. The Deshka and Big Lake systems are some of the warmest watersheds in the Mat-Su Basin and are likely to get warmer.
2. In 2019, warm stream temperatures blocked adult migration and had negative effects on juvenile growth in the Deshka.
3. We have identified cold-water refugia in the Deshka and Big Lake basin which may be critical habitat for salmon in warming watersheds.

non-glacial Cook Inlet streams



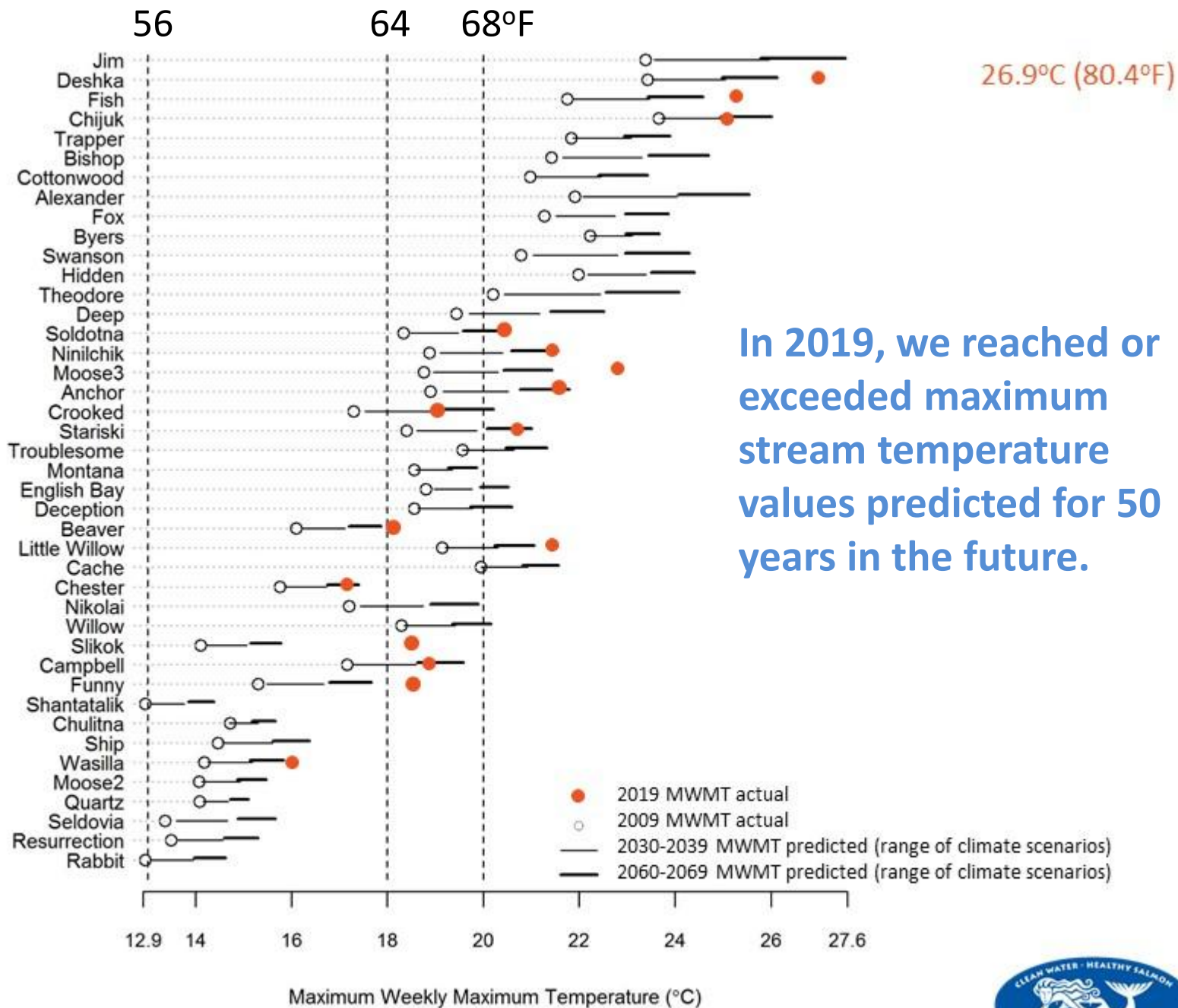
non-glacial Cook Inlet streams



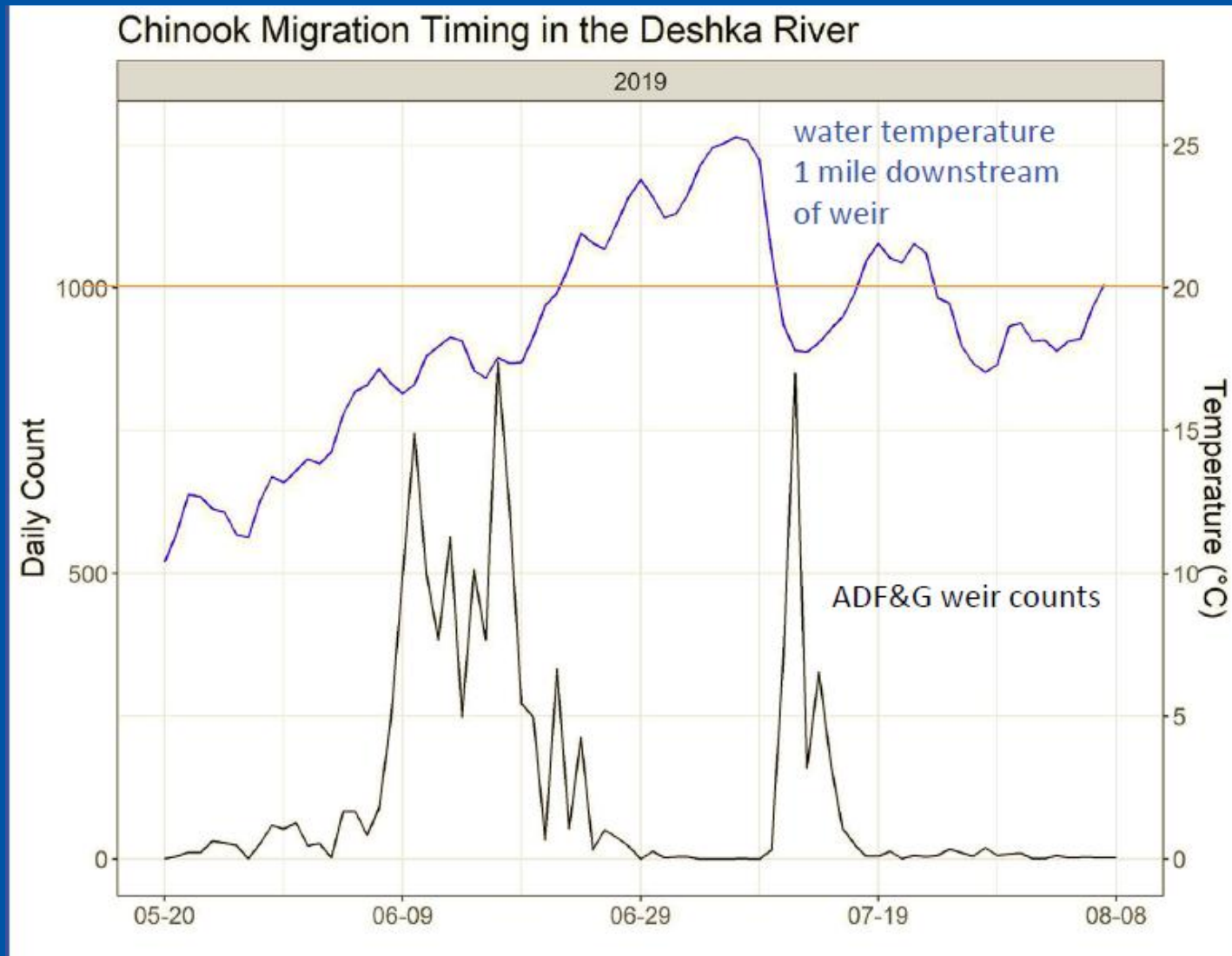
Modeled water temperatures for 30 and 60 years into the future.

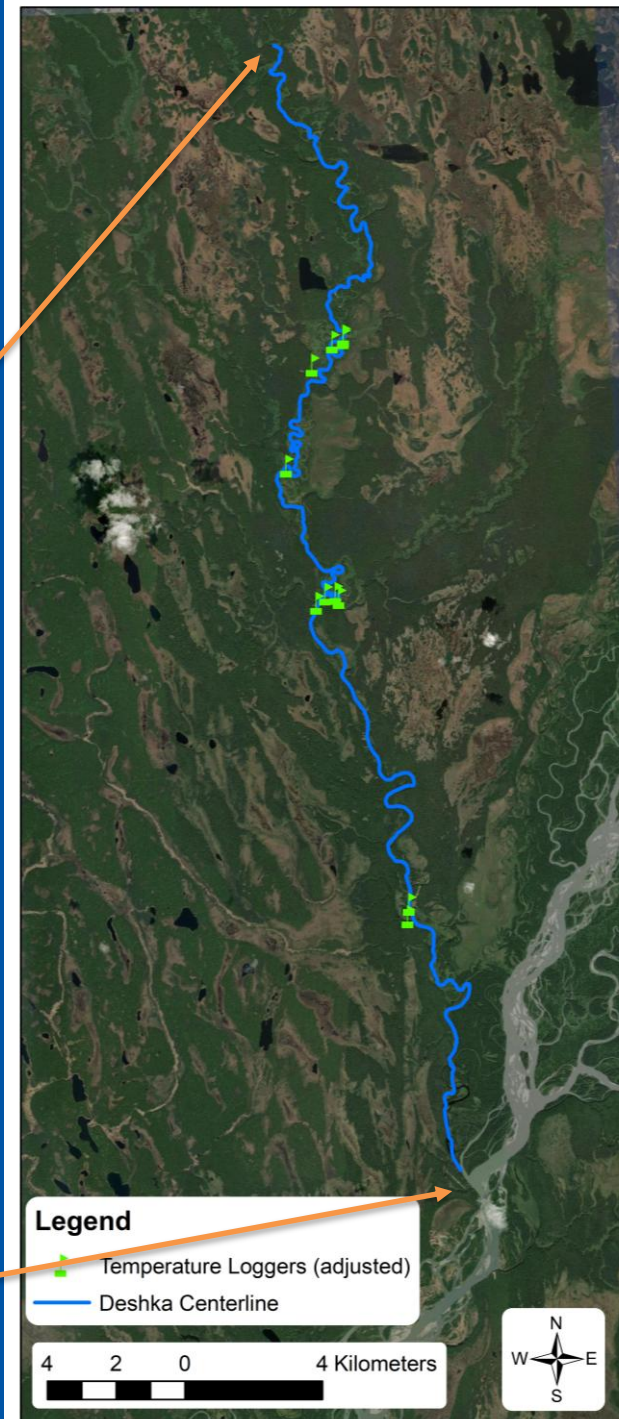
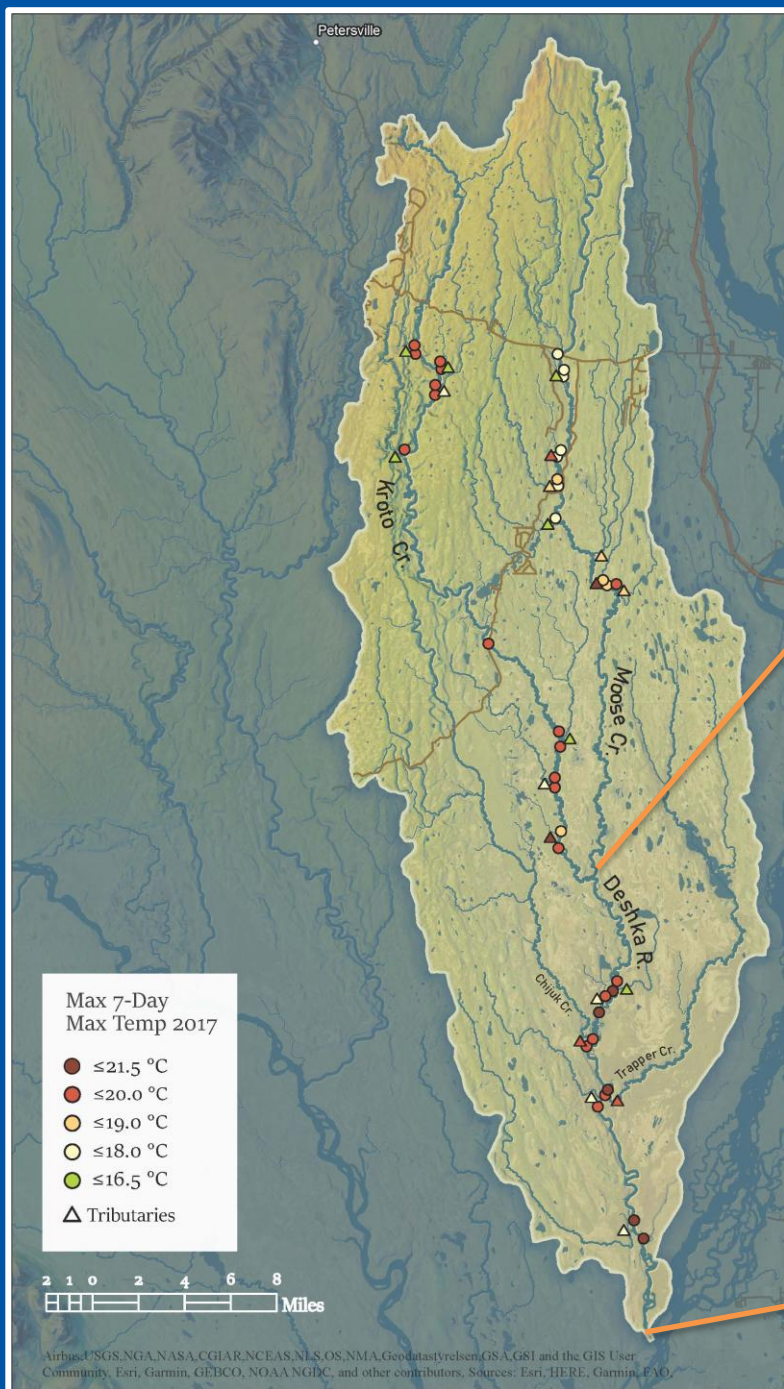


non-glacial Cook Inlet streams



In 2019, warm stream temperatures blocked adult migration and had negative effects on juvenile growth in the Deshka.





In 2020 Inletkeeper worked with Quantum Spatial to get 32 miles of thermal imagery on the Deshka.
(AKSSF #53004)

Objectives:

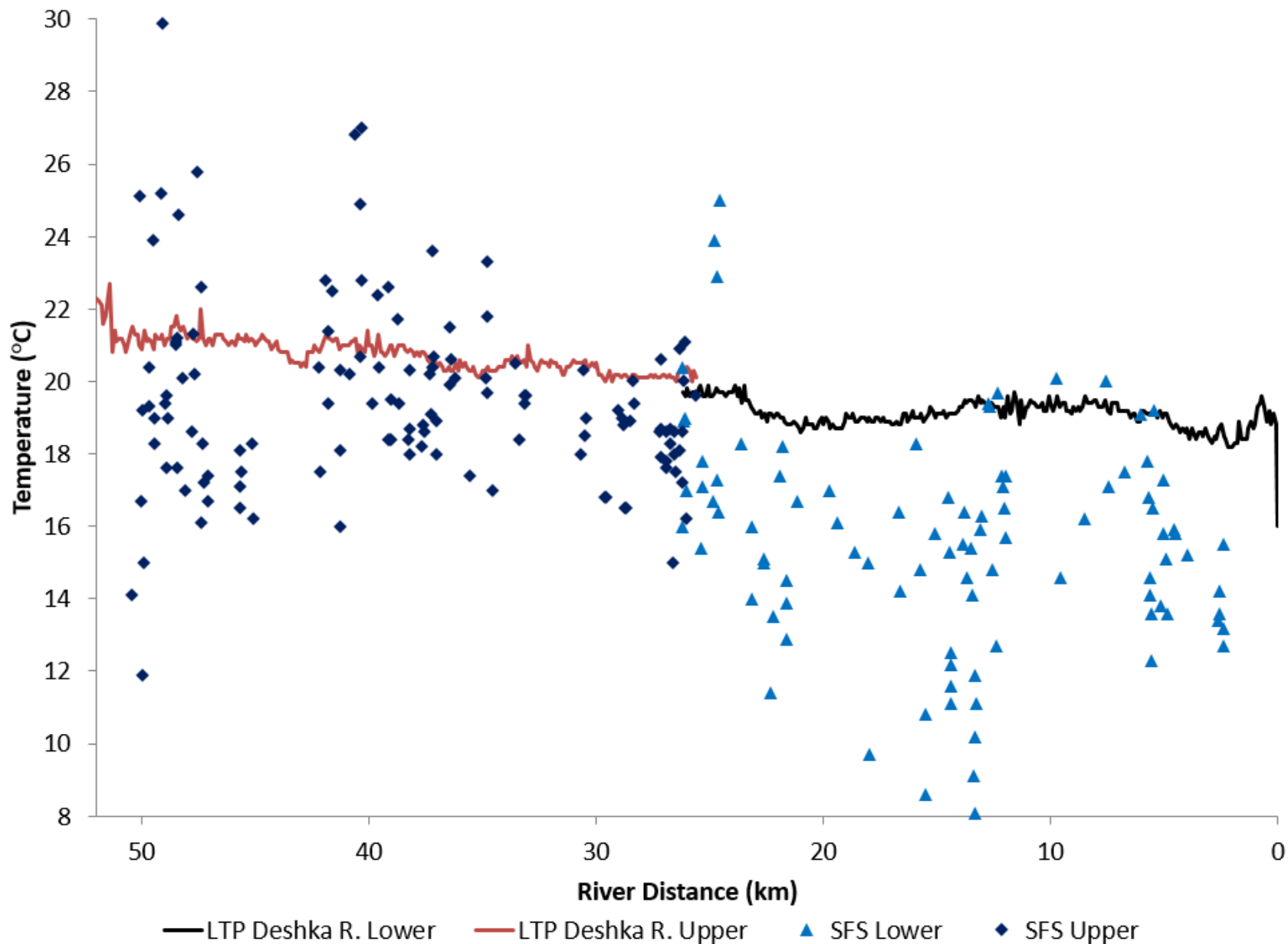
- 1) characterize fine-scale thermal heterogeneity during summer maximum temperature
- 2) identify cold-water refugia used by adult Chinook salmon to avoid high summer temperatures
- 3) guide future conservation actions to protect high-value habitat and thermal refugia



Thermal
infrared
sensor

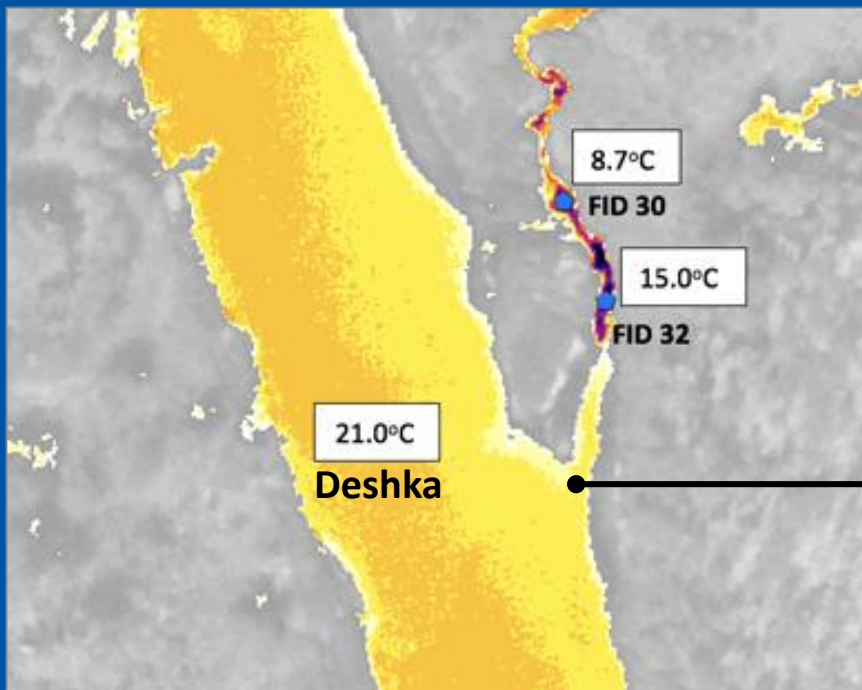


flight height = 400 - 500 meters
pixel resolution = 0.5 meter
July 4th, 2020 (15:10 - 16:40)



Longitudinal temperature profile and mean water temperature of significant features along the Deshka River: July 4th, 2020.

**‘Ground truthing’
field visits conducted
to confirm cold water
contributions**





Video by Ben Rich, USFWS
Deshka River, 2021



**More than 250 inflows
identified on the Deshka**

Land Ownership:

84.3 % State owned

13.7 % MSB land

2.0 % private (119 parcels)

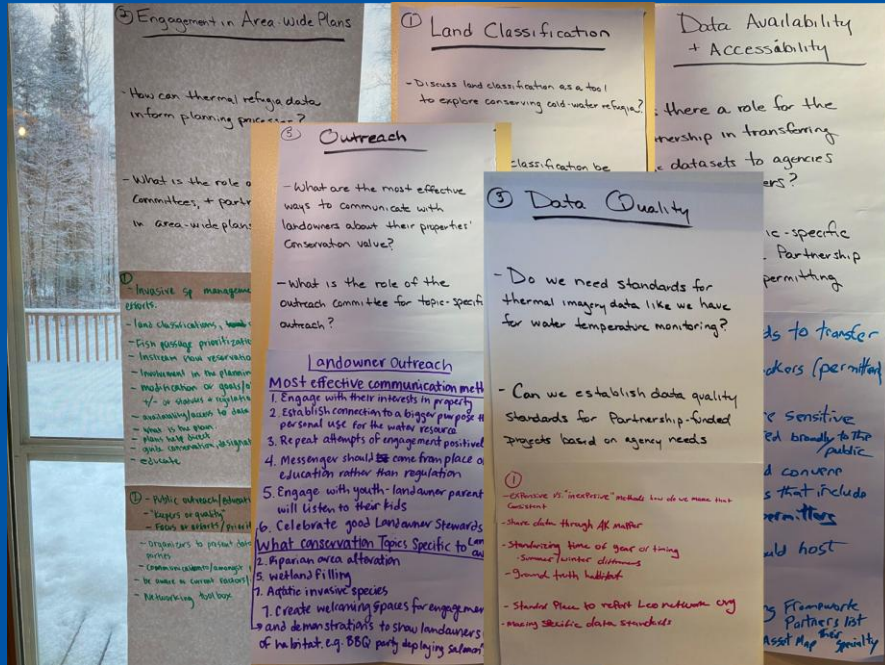
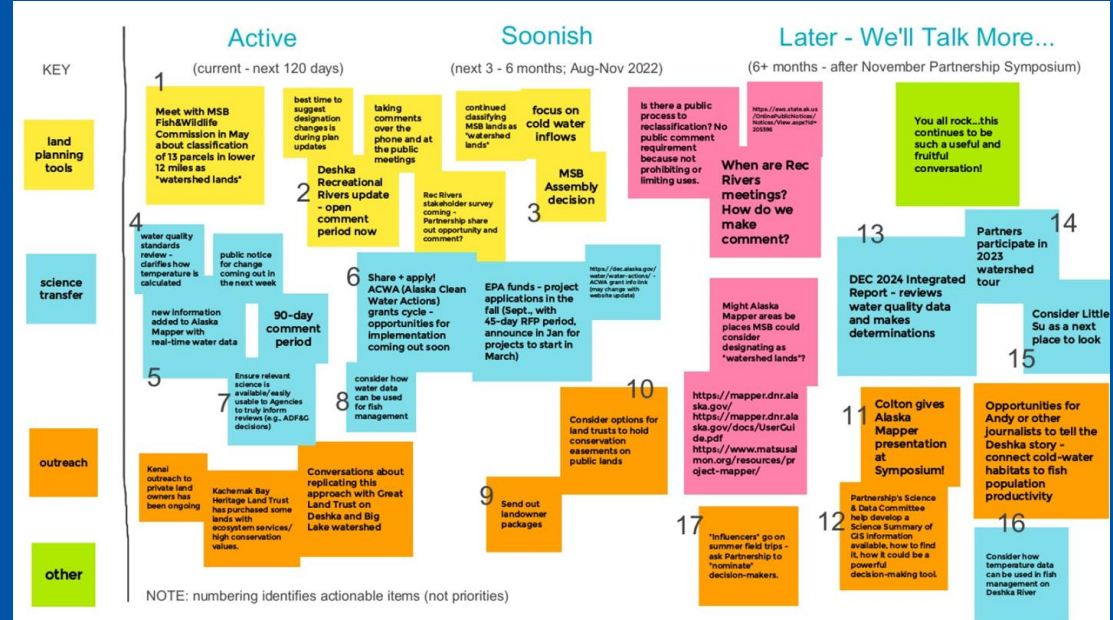
Science Takeaways

1. The Deshka and Big Lake systems are some of the warmest watersheds in the Mat-Su Basin and are likely to get warmer.
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Partnership Discussions (started in 2021)

Do we have land management tools to protect this habitat diversity to build salmon resilience?

Partnership engagement has been critical: brain storming, field trips and creating action plans!



Tools for Conservation

Incorporate thermal refugia information into the revision of the Susitna Basin Recreational Rivers Management Plan

Maintain and/or improve water quality standard revised language for water temperature

Communicate to private landowners about stewardship opportunities

Classify MSB parcels with thermal refugia as "watershed lands": a land classification that recognizes the importance of the land for water quality

Ensure relevant science is available, discoverable, interpretable for agencies for permit reviews and land sales

MSB Code 23.05.100

Land Classifications: Borough-owned land shall be classified in accordance with this title and such classifications shall be used as a tool to identify types of land use for those lands included in competitive land sales or retained for public purpose or facilities.

“Watershed lands” are lands that may be forested at a high or moderate relief which will direct water to low lying areas covered or saturated by surface or groundwater sufficient to normally support vegetation found in areas such as riparian, swamps, marshes, bogs, estuaries, and similar areas.

**Classification proposal supported by
MSB Fish & Wildlife Commission
Resolution FWC 2025-02**

