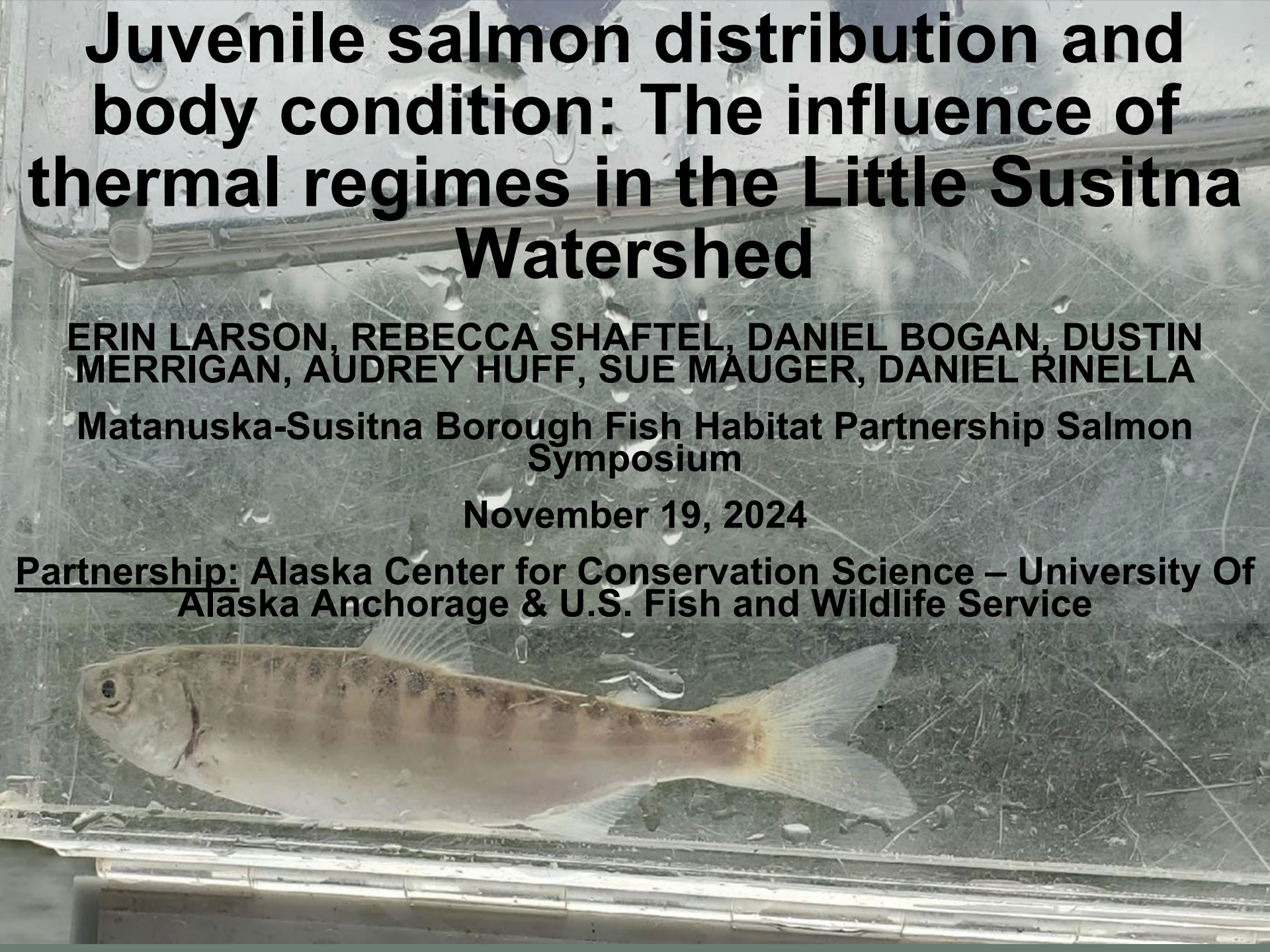
Juvenile salmon distribution and body condition: The influence of thermal regimes in the Little Susitna Watershed

ERIN LARSON, REBECCA SHAFTEL, DANIEL BOGAN, DUSTIN MERRIGAN, AUDREY HUFF, SUE MAUGER, DANIEL RINELLA

Matanuska-Susitna Borough Fish Habitat Partnership Salmon Symposium

November 19, 2024

Partnership: Alaska Center for Conservation Science – University Of Alaska Anchorage & U.S. Fish and Wildlife Service



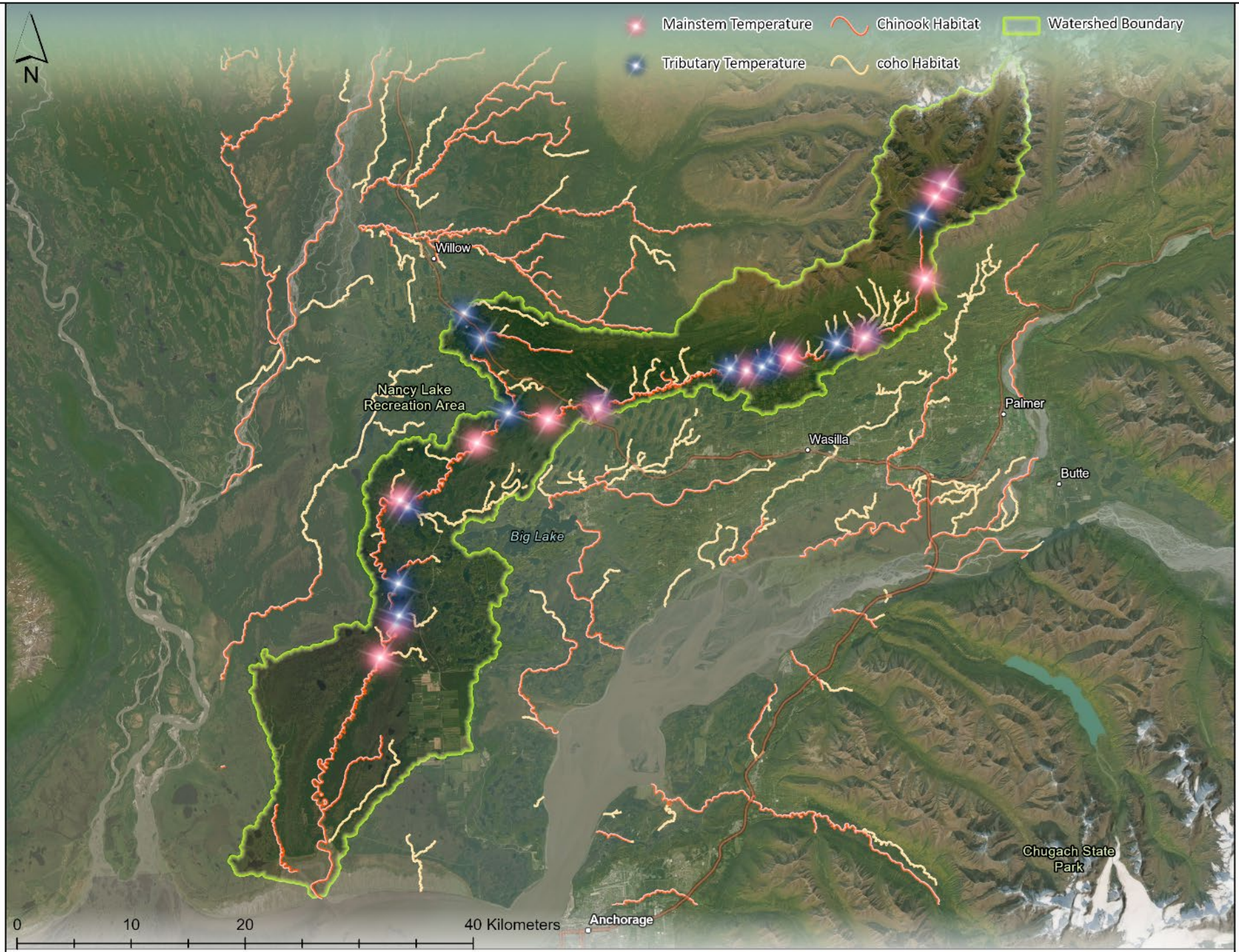
History of Little Susitna Work

Past: Temperature monitoring network established at 28 mainstem (13) and tributary (15) sites in late fall 2019

Past: Juvenile salmon monitoring started at all sites in early summer 2022

Today: 4th full year of temperature data collection, 3 years of juvenile salmon sampling (early & late season)

Future: Ongoing temperature monitoring (at least 5 years)


Mainstem Temperature
Tributary Temperature
Chinook Habitat
coho Habitat
Watershed Boundary
N
Willow
Nancy Lake
Recreation Area
Big Lake
Wasilla
Palmer
Butte
Chugach State
Park
Anchorage
0
10
20
40 Kilometers

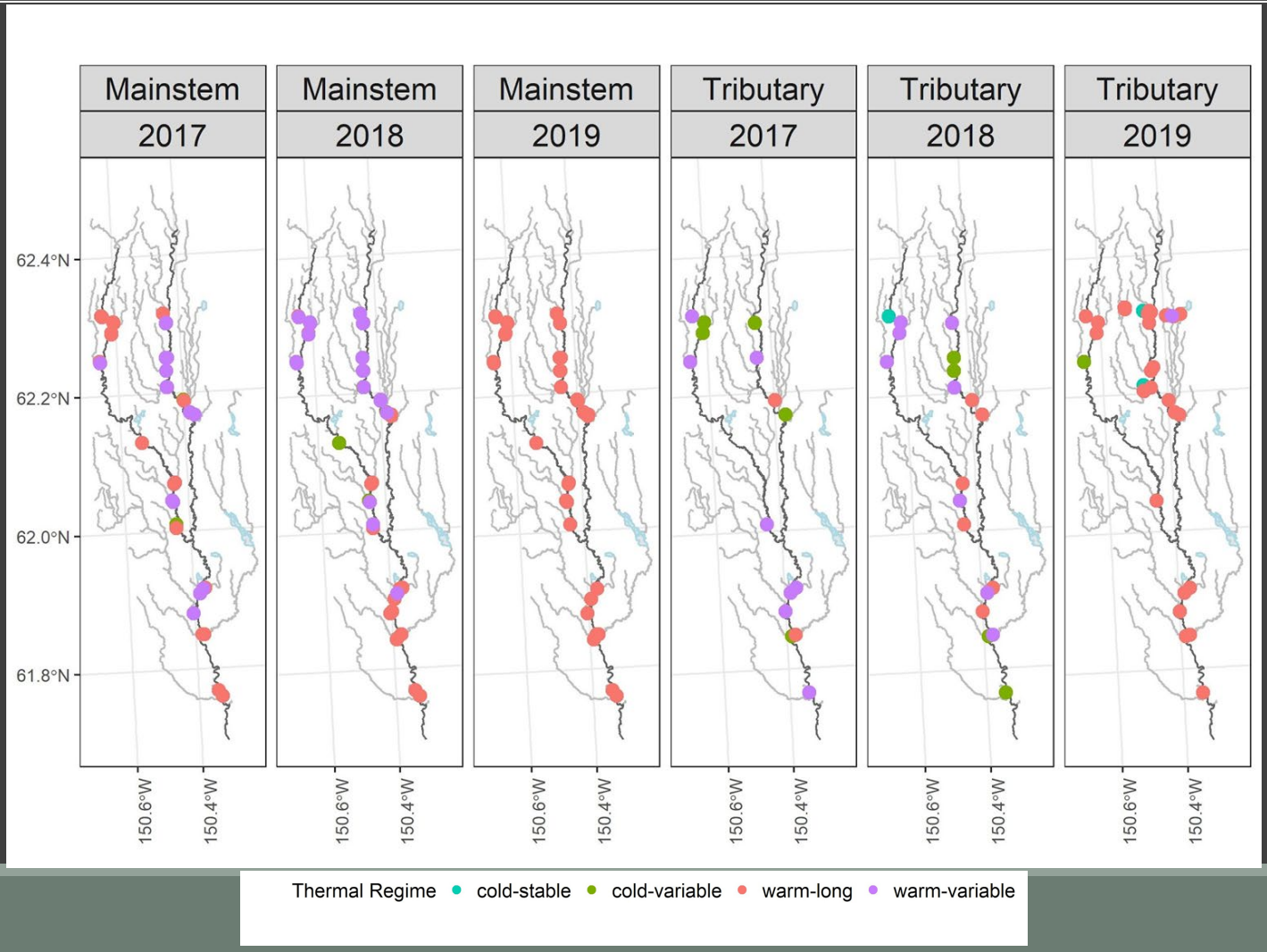
Temperature Methods

- Paired temperature loggers at each site
- Paired tributary/mainstem sites
- Maintain and download loggers in early summer and fall
- All data QC'ed and uploaded to AKTEMP

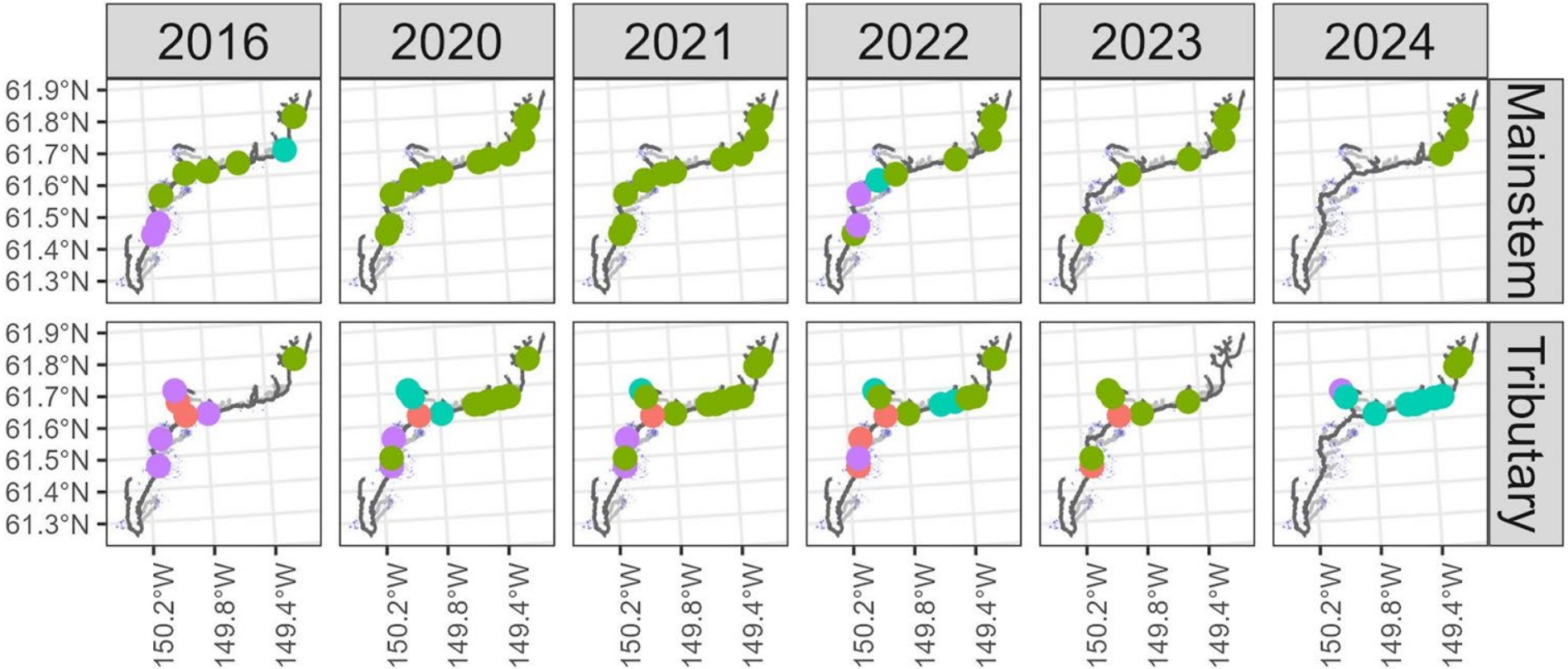
Fish Methods

- 10 minnow traps at each site deployed for 1 hour
- All fish recorded, salmon weighed and measured
- 5 vouchers to USFWS from each sampling time point at each site

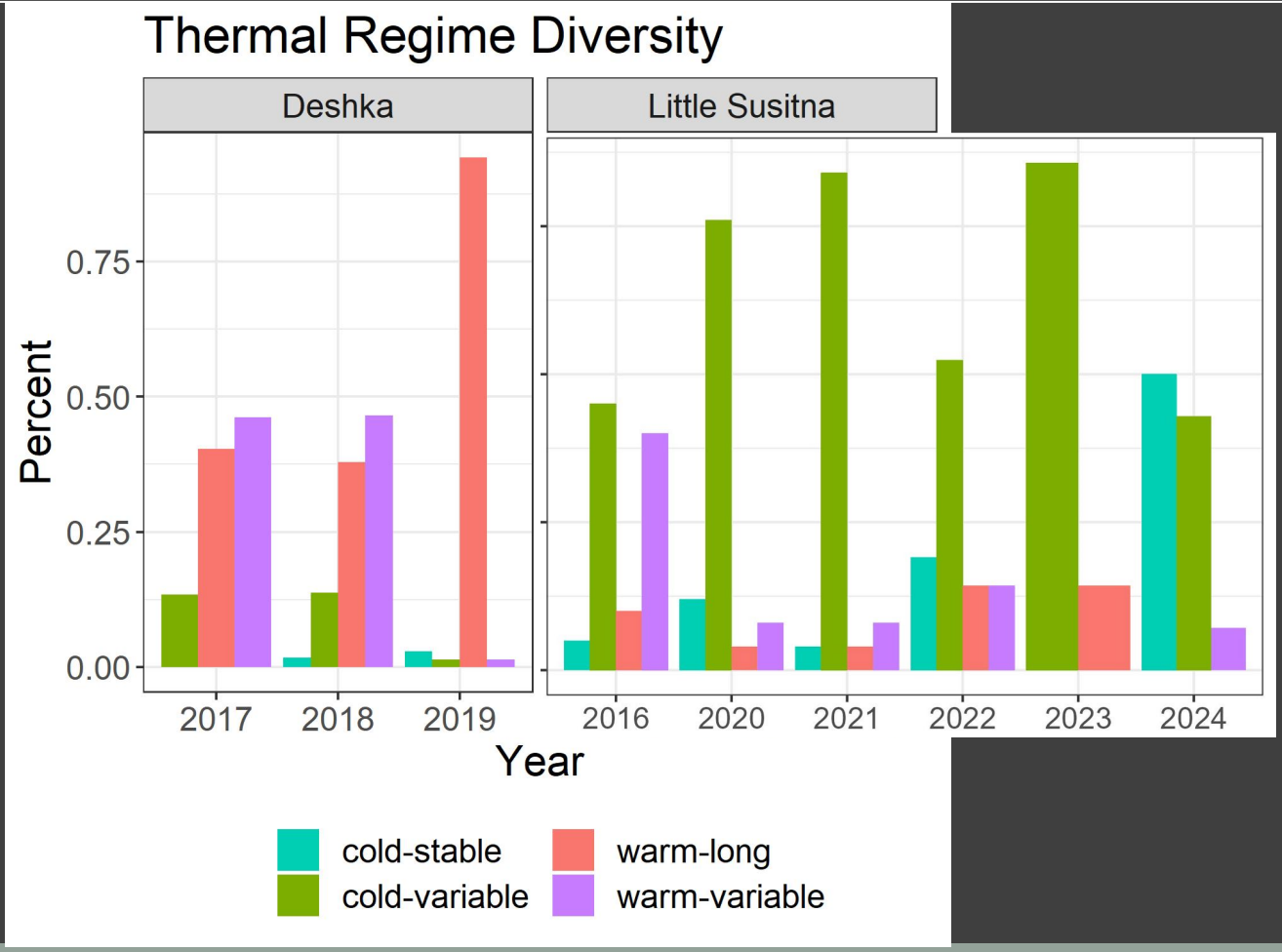
Deshka & Little Susitna Comparisons



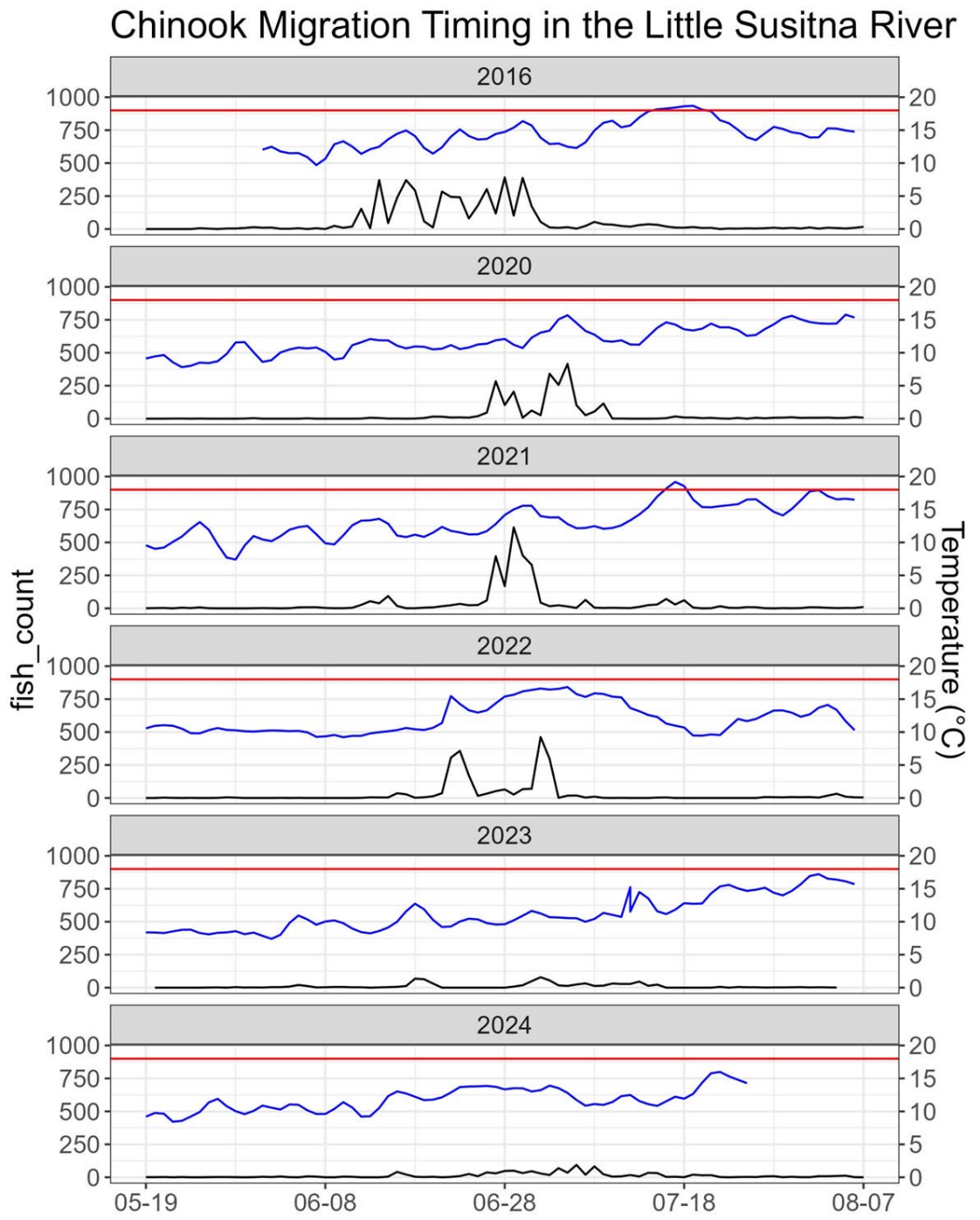
Deshka & Little Susitna Comparisons



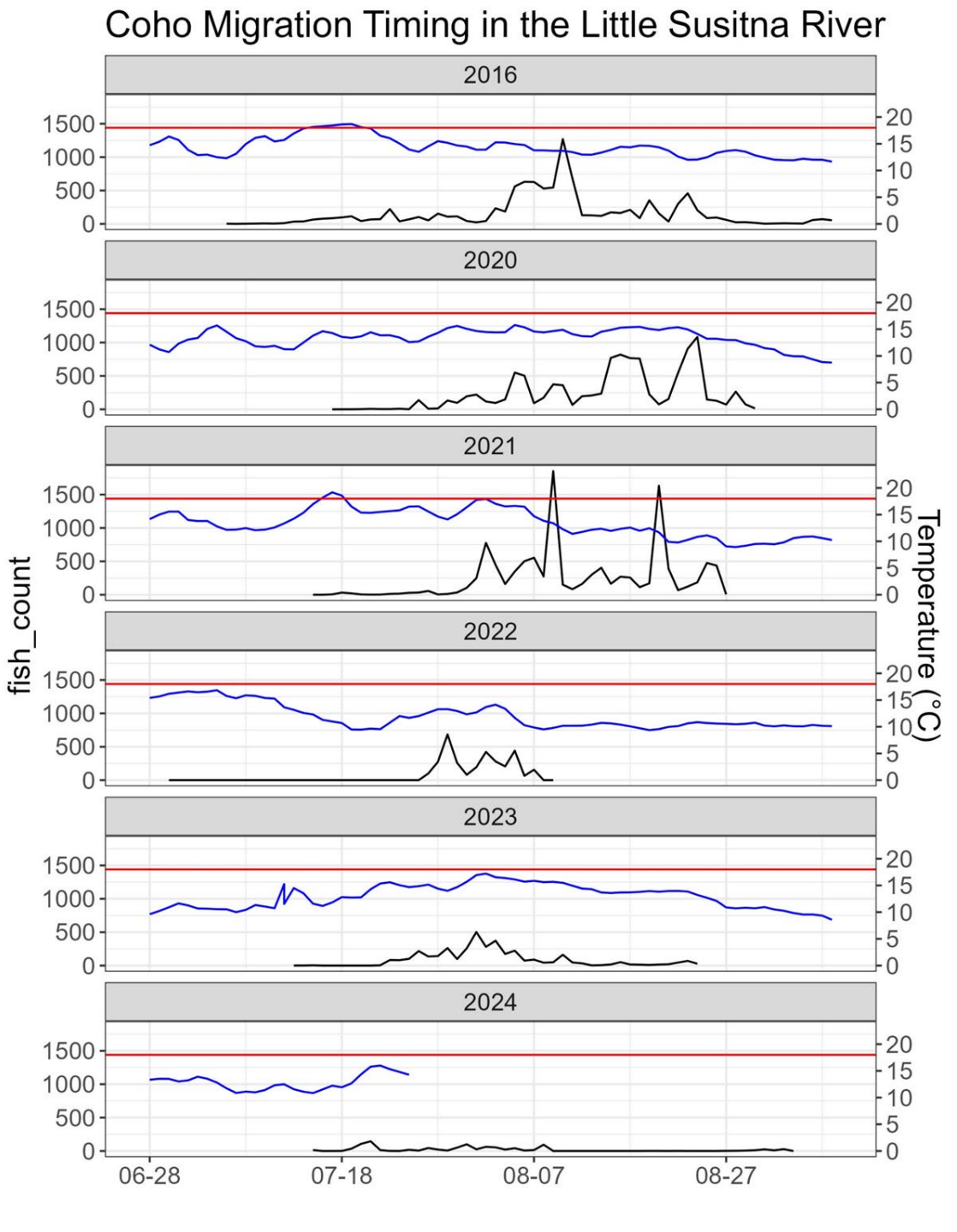
Deshka & Little Susitna Comparisons



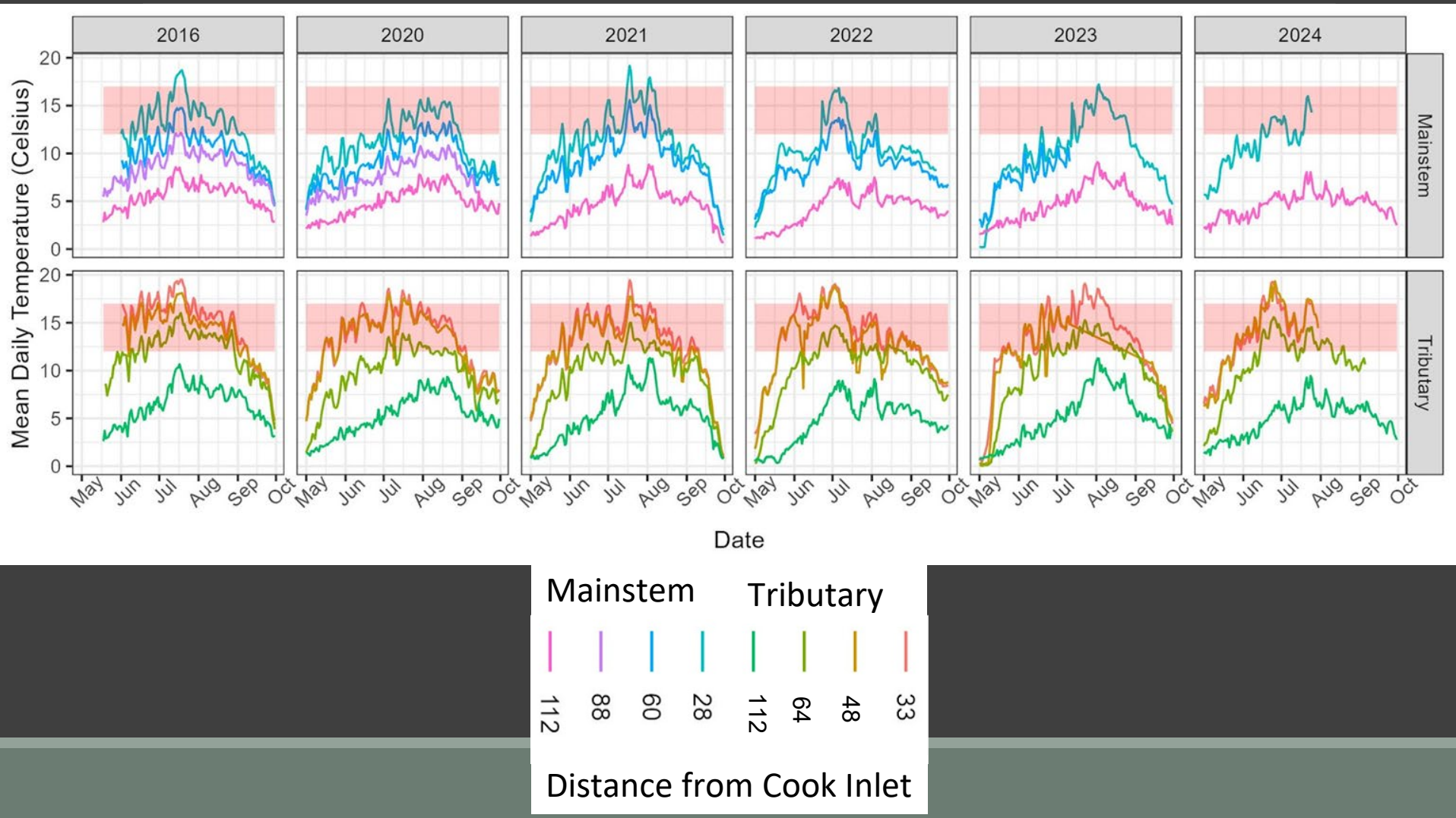
Chinook Migration & Heat Stress



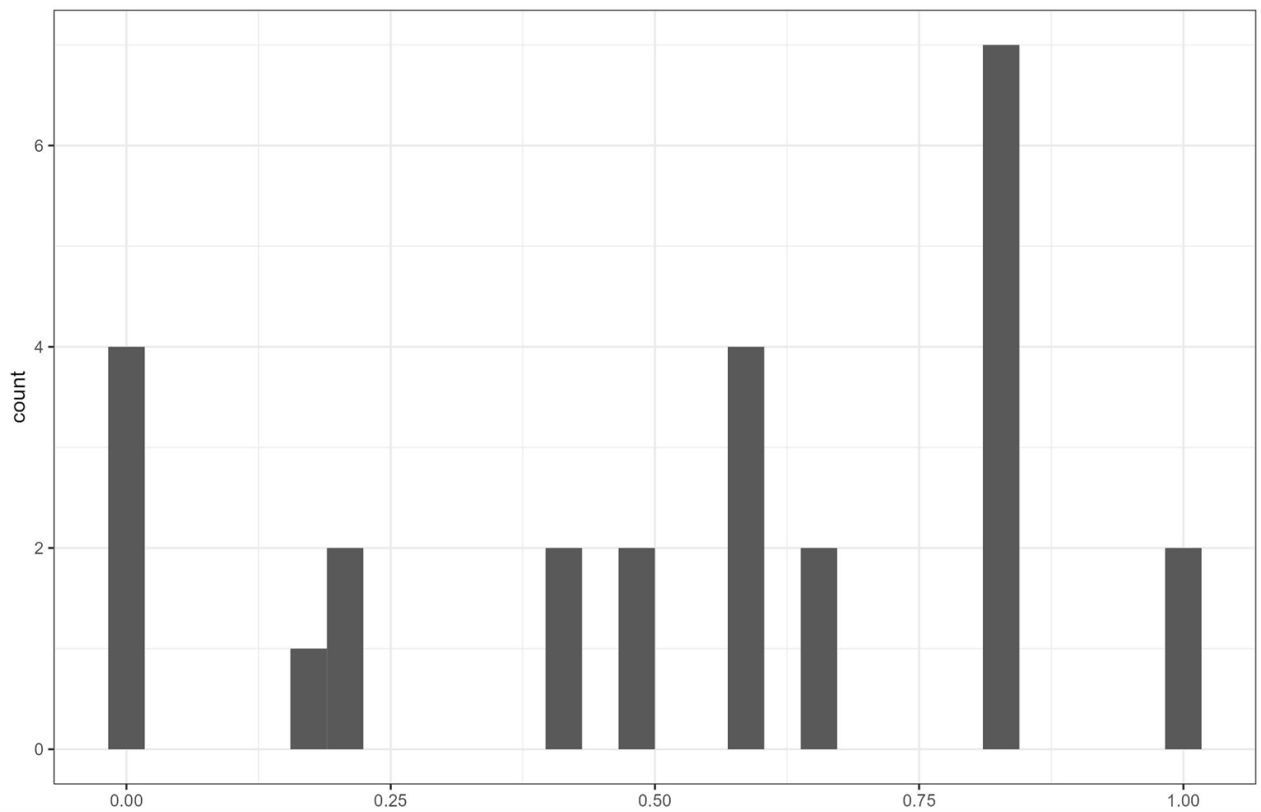
Coho Migration & Heat Stress

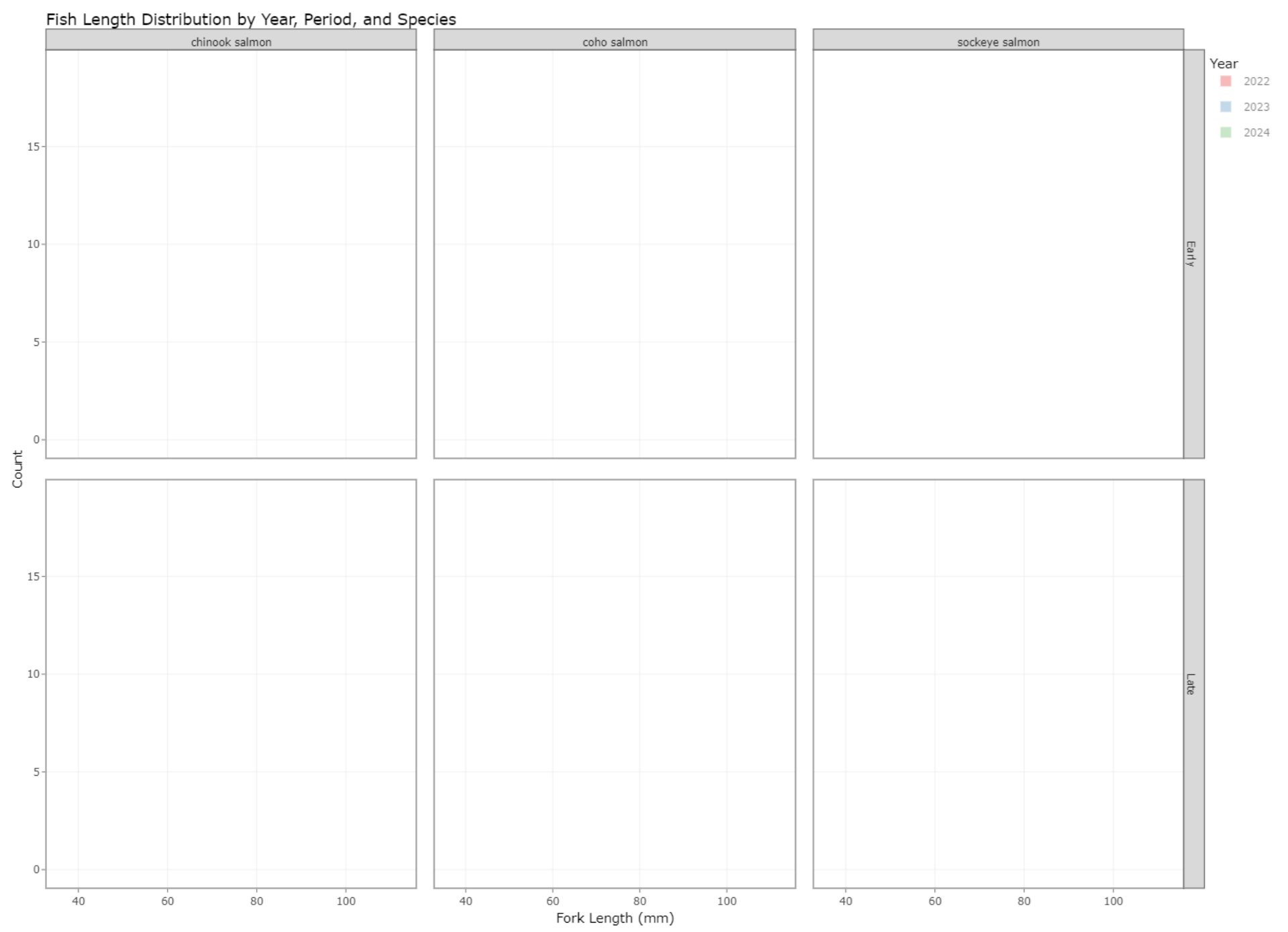


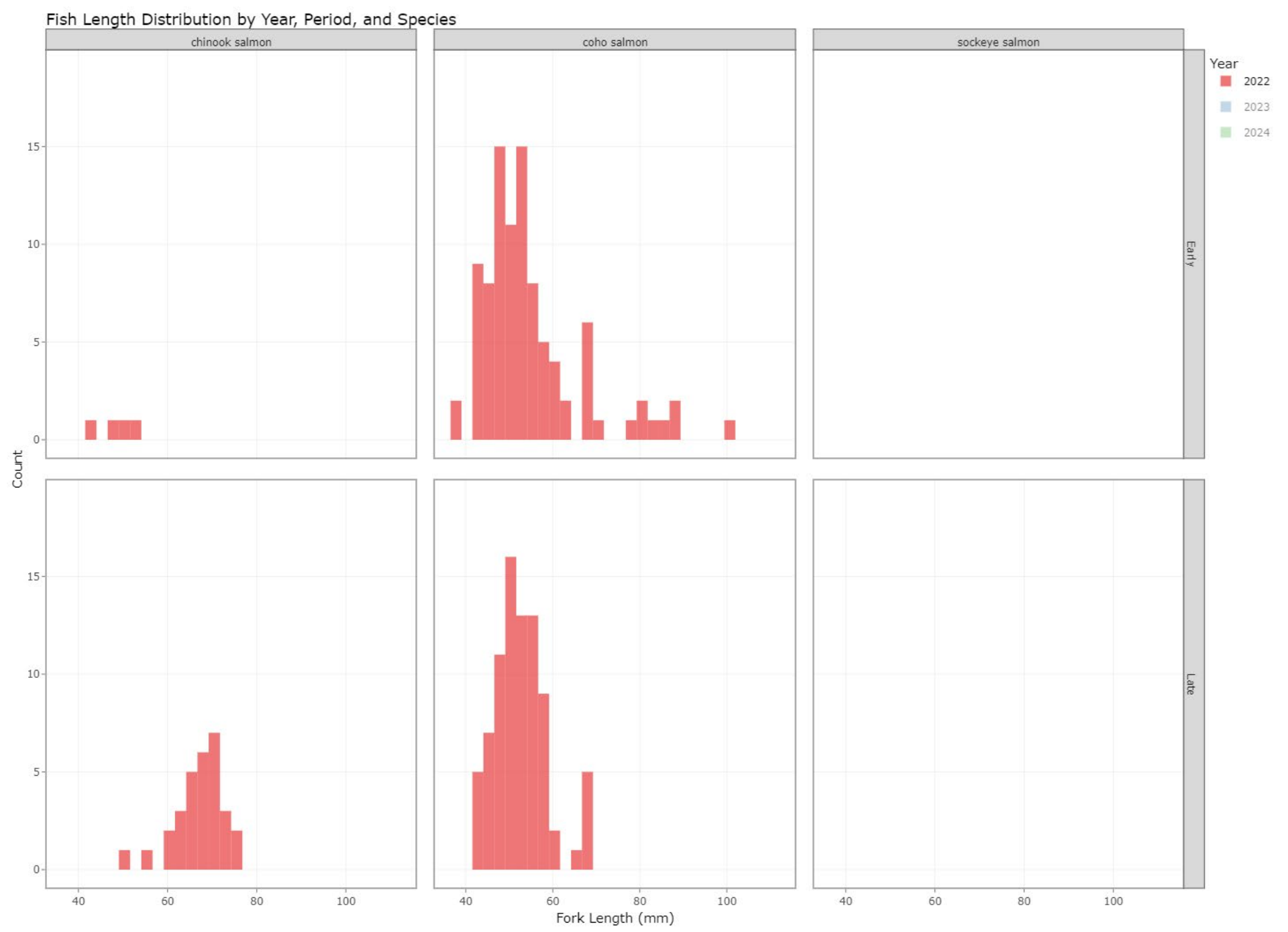
Optimal Juvenile Growth Temperatures Along Longitudinal Gradient

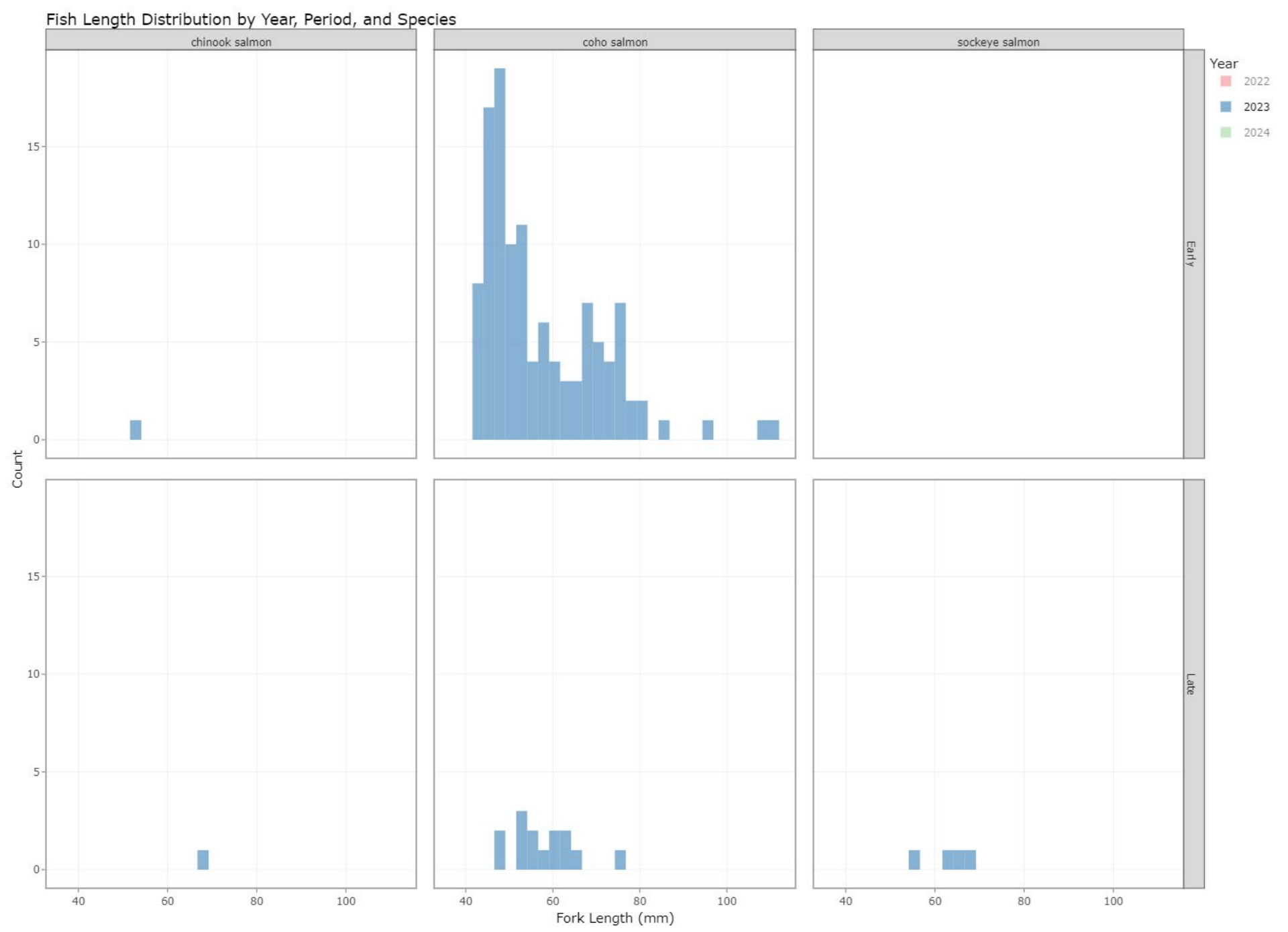


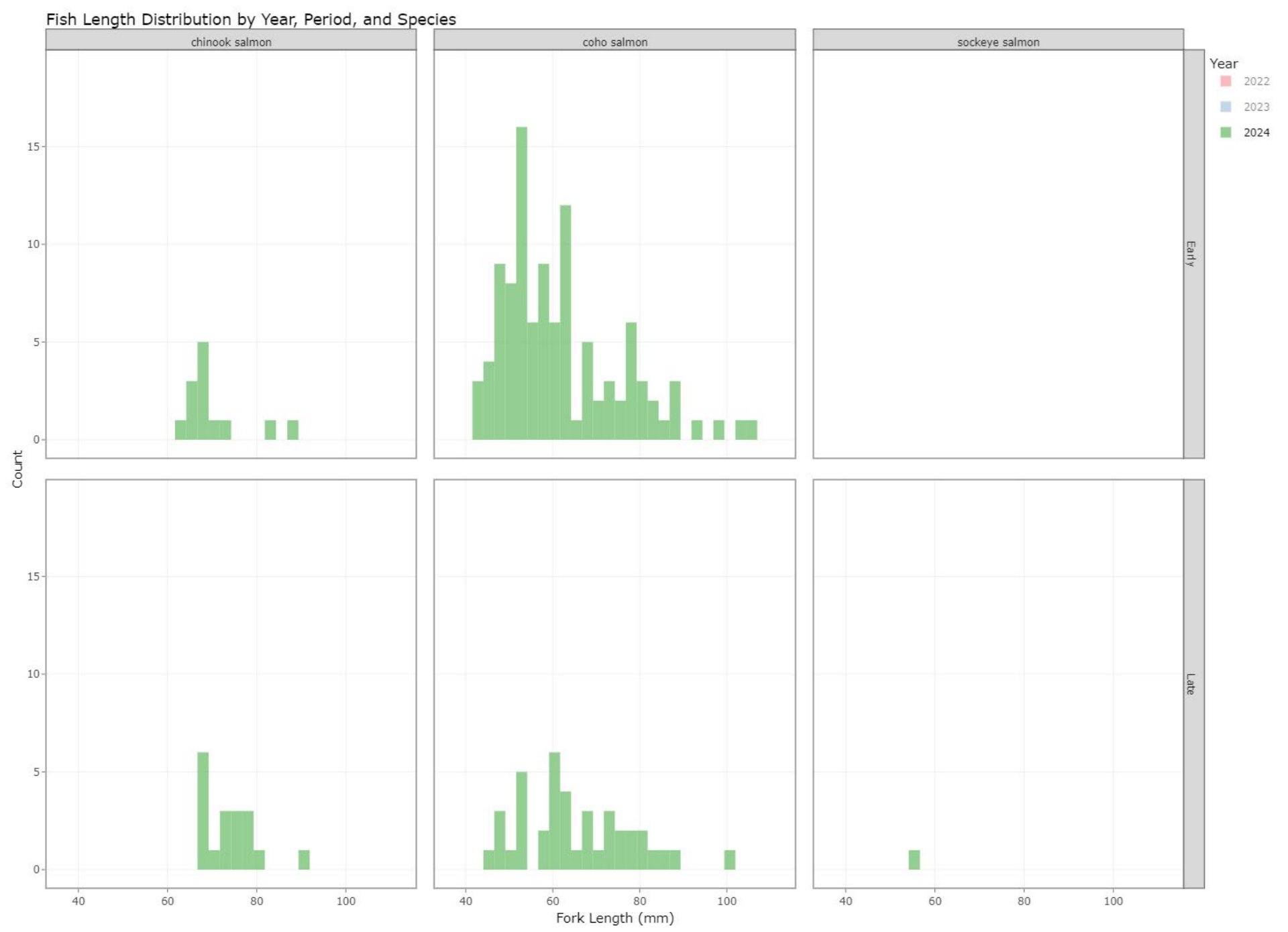
How successful were trapping efforts?




Fish Length Distribution by Year, Period, and Species
chinook salmon
coho salmon
sockeye salmon
Early
Late
Year
2022
2023
2024
Count
0
5
10
15
40
60
80
100
Fork Length (mm)

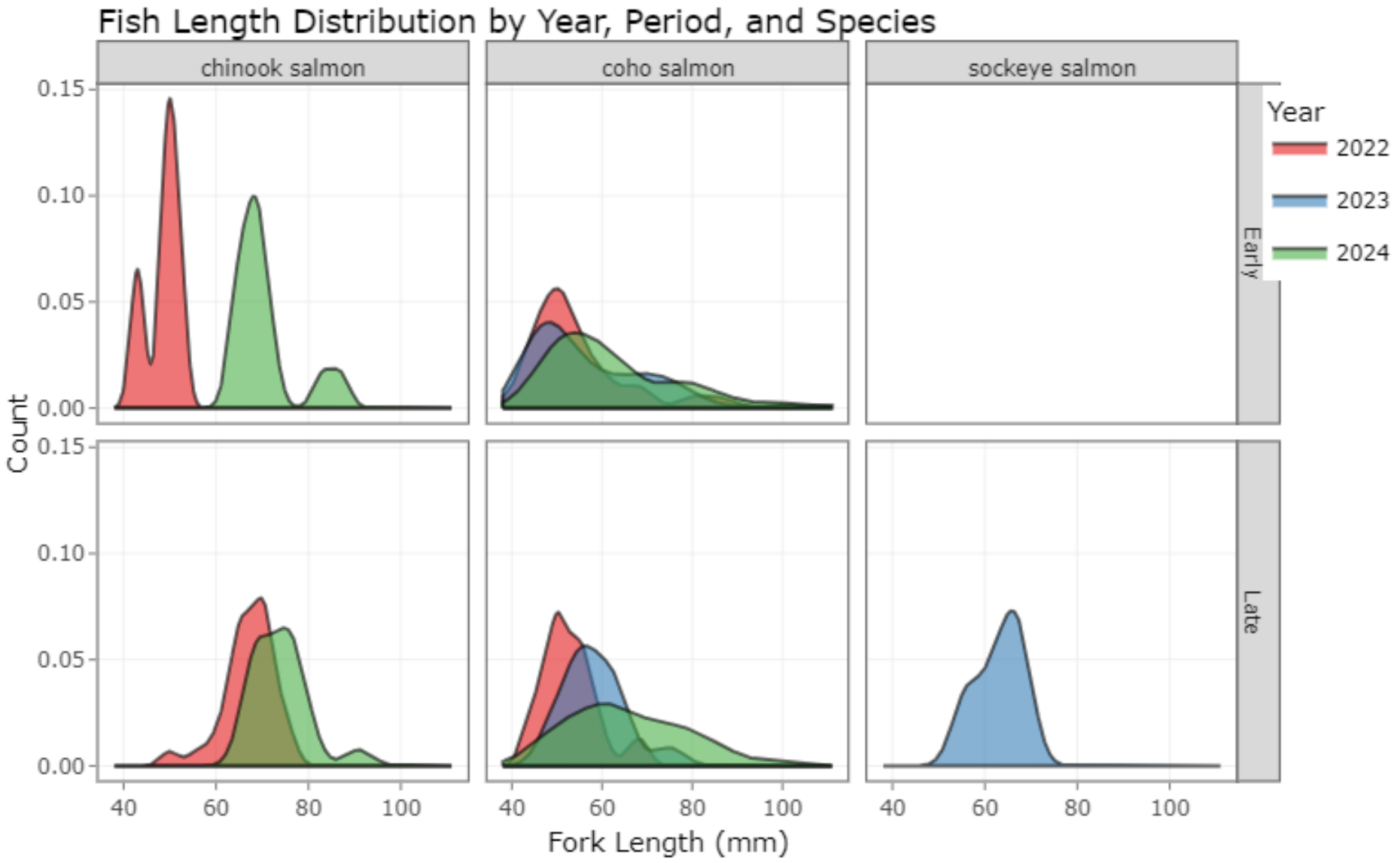

Fish Length Distribution by Year, Period, and Species
chinook salmon
coho salmon
sockeye salmon
Early
Late
Year
2022
2023
2024
Count
0
5
10
15
40
60
80
100
Fork Length (mm)


Fish Length Distribution by Year, Period, and Species
chinook salmon
coho salmon
sockeye salmon
Early
Late
Year
2022
2023
2024
Count
0
5
10
15
40
60
80
100
Fork Length (mm)

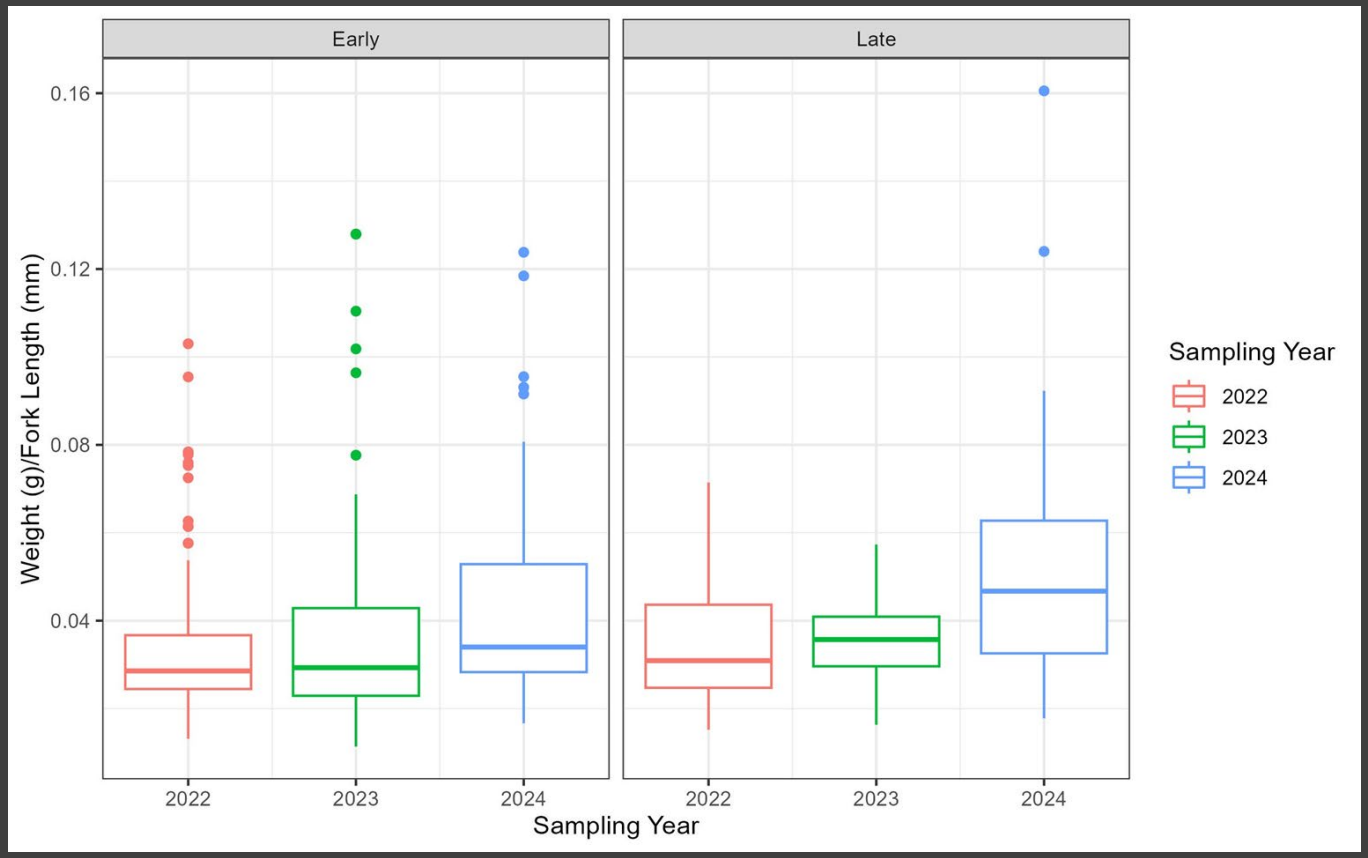

Fish Length Distribution by Year, Period, and Species
chinook salmon
coho salmon
sockeye salmon
Early
Late
Year
2022
2023
2024
Count
0
5
10
15
40
60
80
100
Fork Length (mm)


Fish Length Distribution by Year, Period, and Species
chinook salmon
coho salmon
sockeye salmon
Early
Late
Year
2022
2023
2024
Count
0
5
10
15
40
60
80
100
Fork Length (mm)

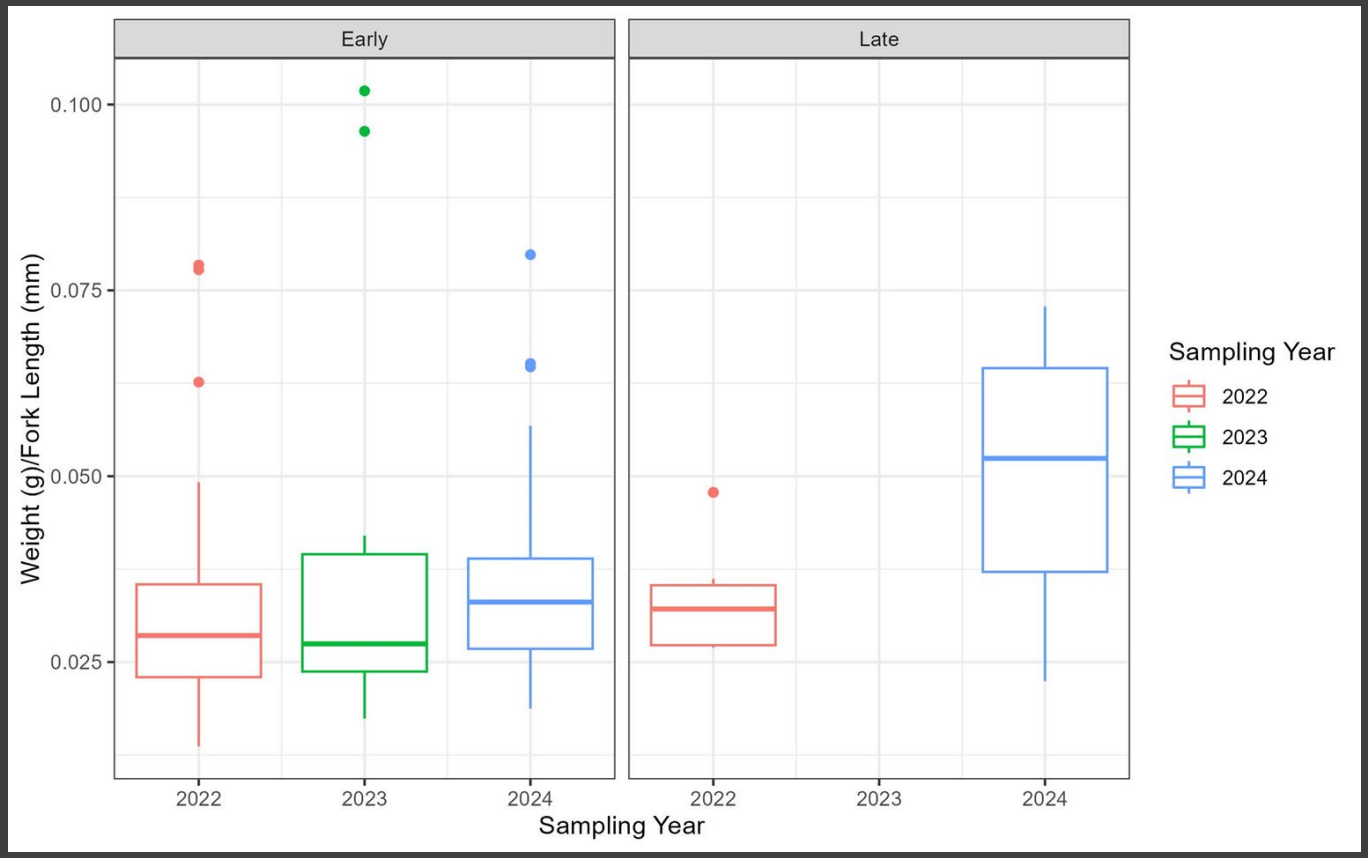
Fish Length by Year, Period & Species



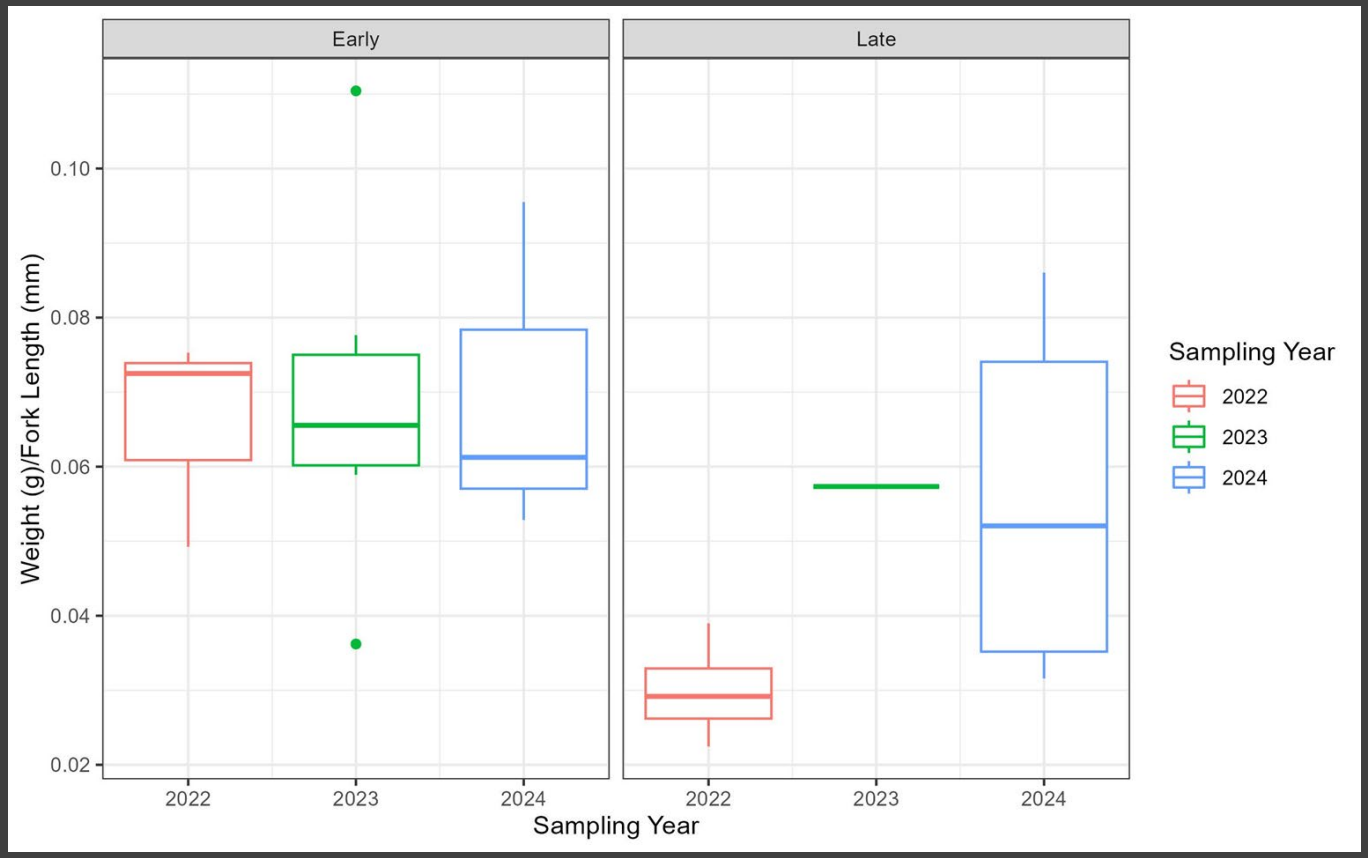
Juvenile Salmon Body Condition



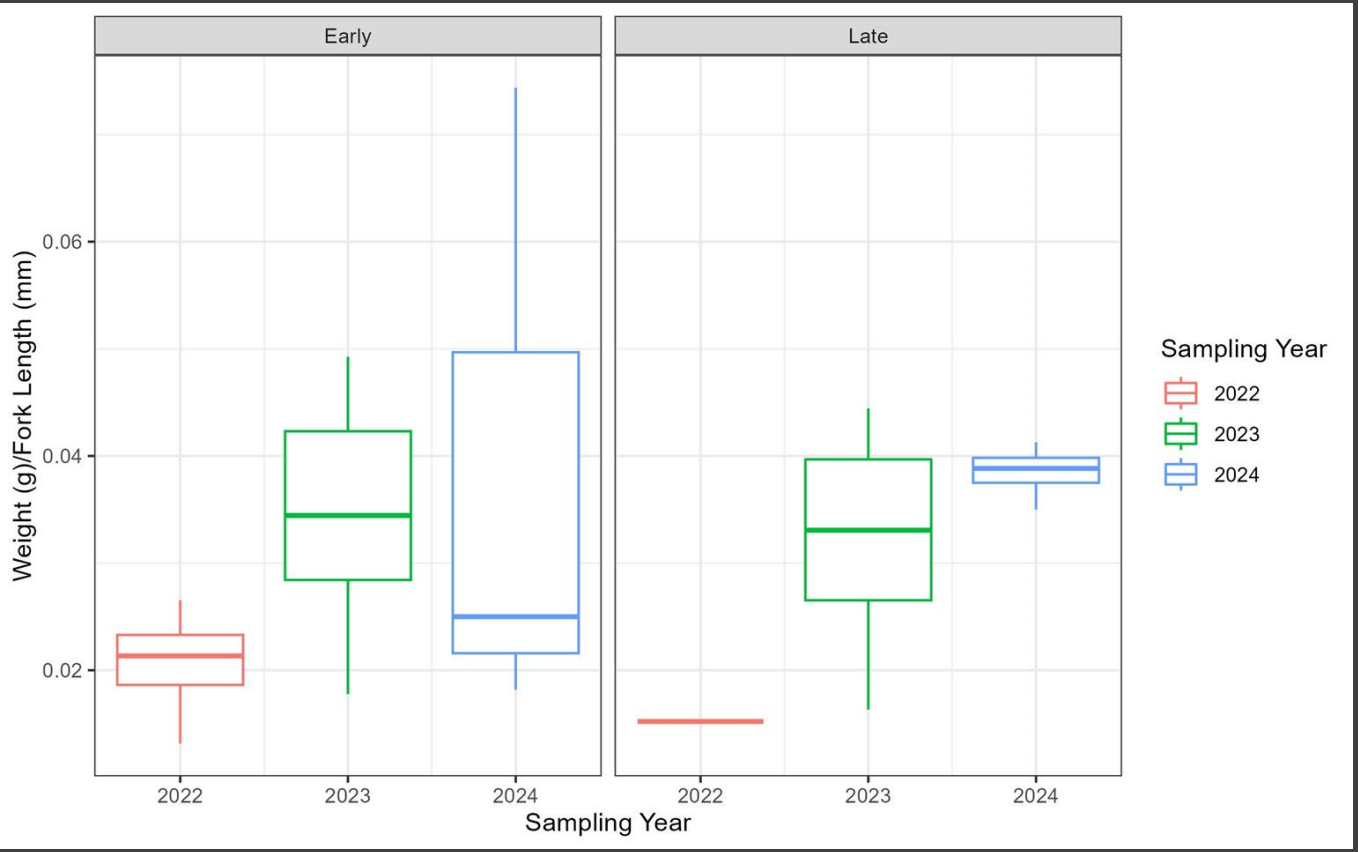
LSCOH - Coho Creek (River Mile 73)



LSNLT10 - Nancy Lakes Tributary (River Mile 63)



LSTRB33 - Unnamed Tributary (River Mile 33)



Future Directions and Next Summer

Fieldwork: Download and maintain loggers in early summer and late fall during Summer 2025

Labwork: Fish subsets to USFWS for daily growth increments, energy storage, food abundance and feeding rates

Analysis: Deshka and Little Susitna temperature comparisons and juvenile salmon comparisons

Thank you!

Mike Johnson (and other USFWS crew members), Molly Legg, Audrey Giddings, Preston Villumsen, Brian DiMento & Nowelle Spencer for field assistance.

MSFHP & USFWS for funding.

ARP's: SF2022-115; SF2023-136; SF2024-141

IACUC protocol: UAA - 1908949

All temperature data available in the AKTEMP database.

Flow conditions affecting sampling?