

Winter Run Chinook Temperature and Survival Models

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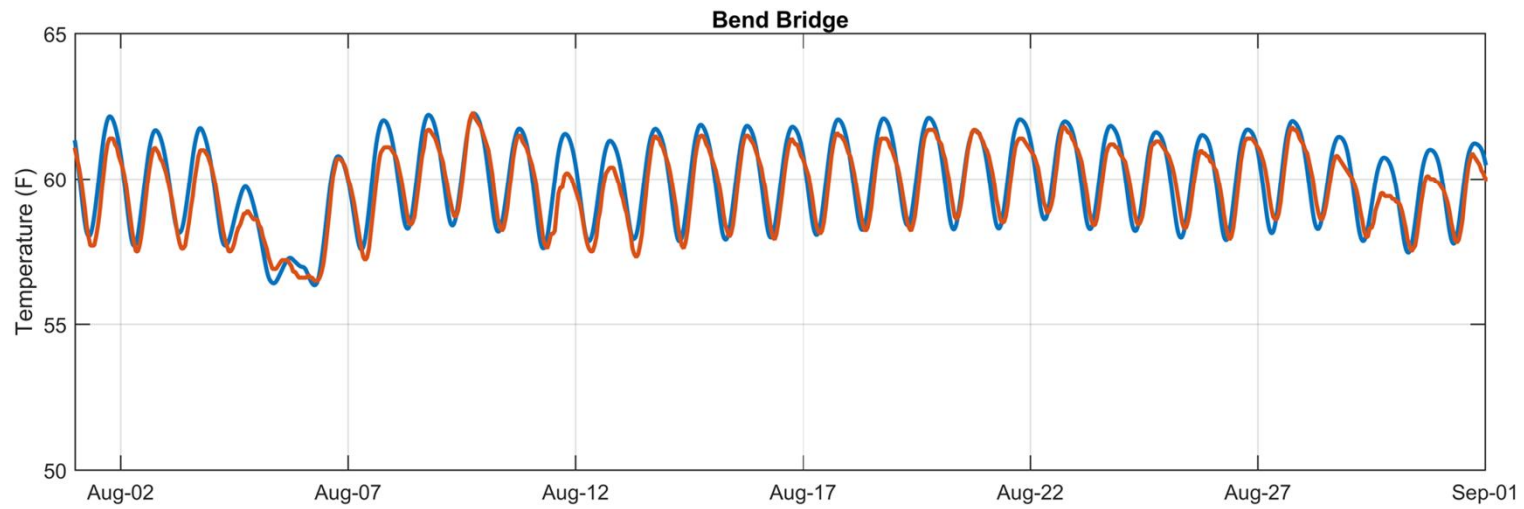
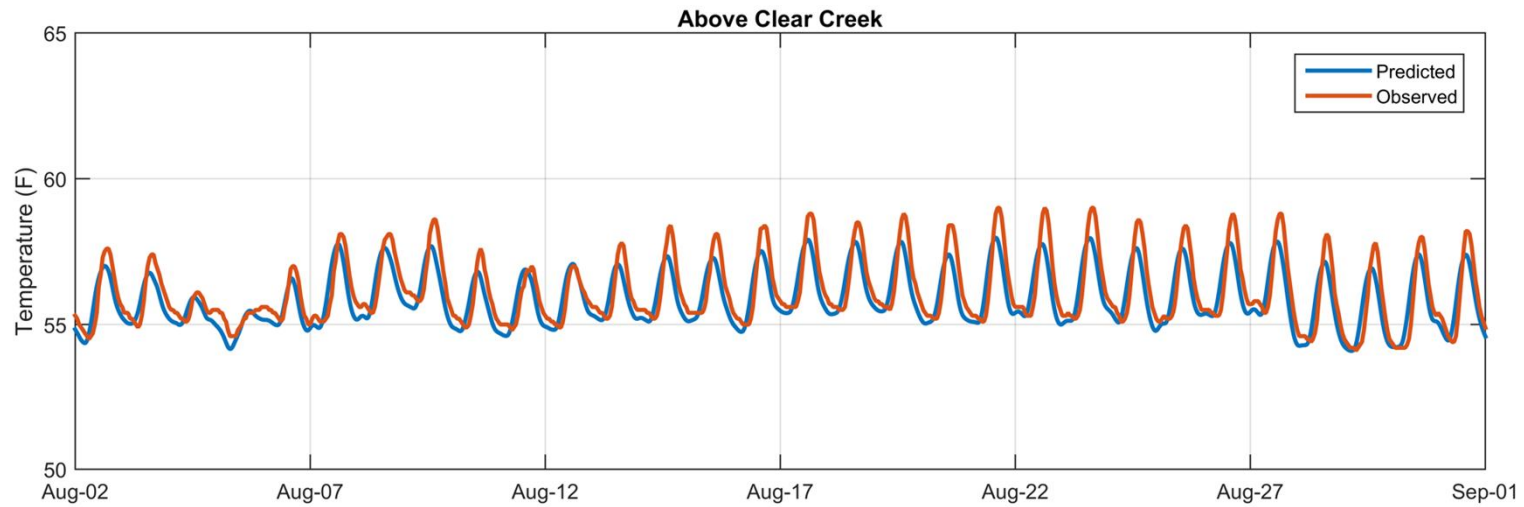
State Water Resources Control Board Workshop
March 18, 2016



NOAA FISHERIES

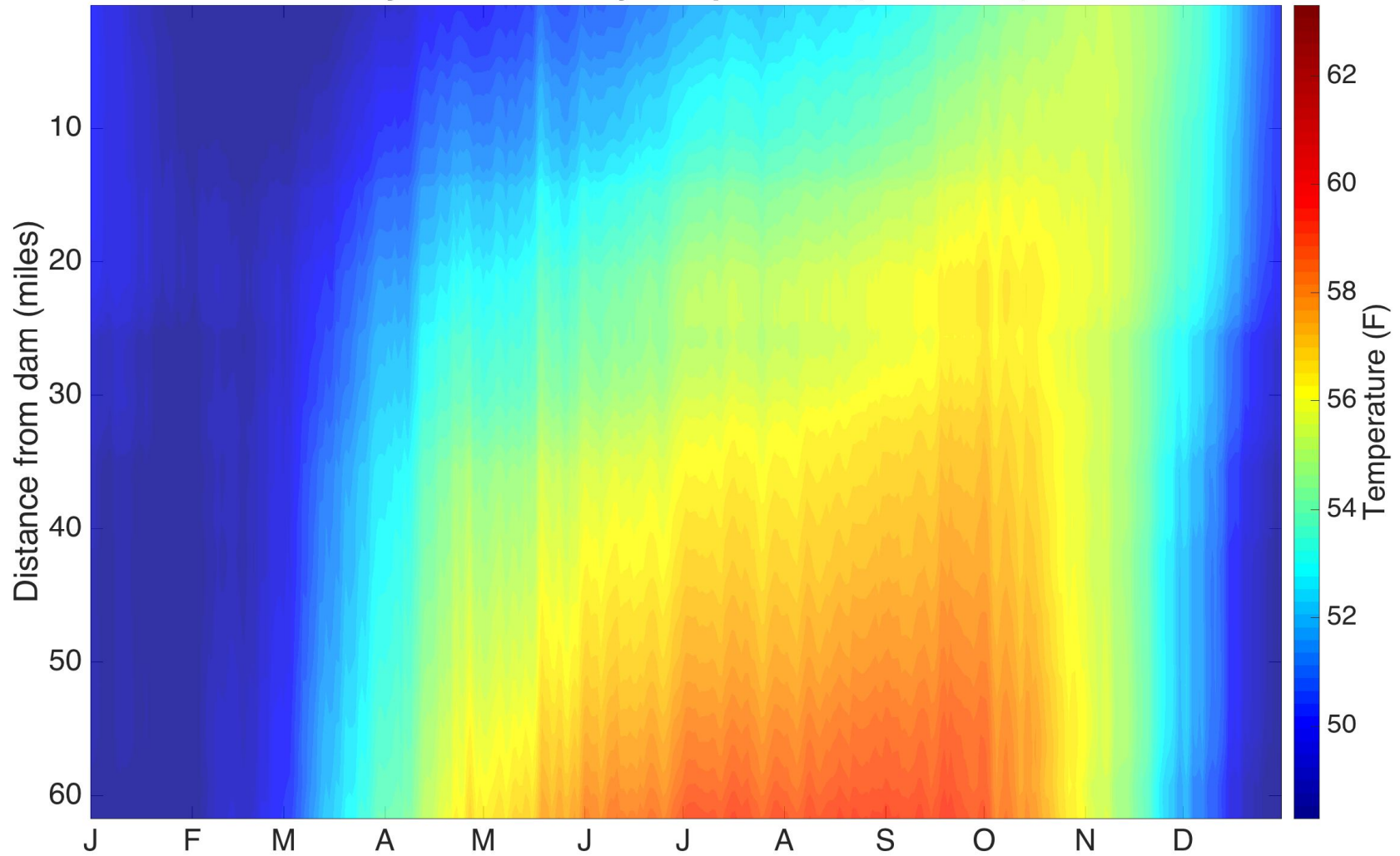


Modeled vs. Observed Temperatures 2014



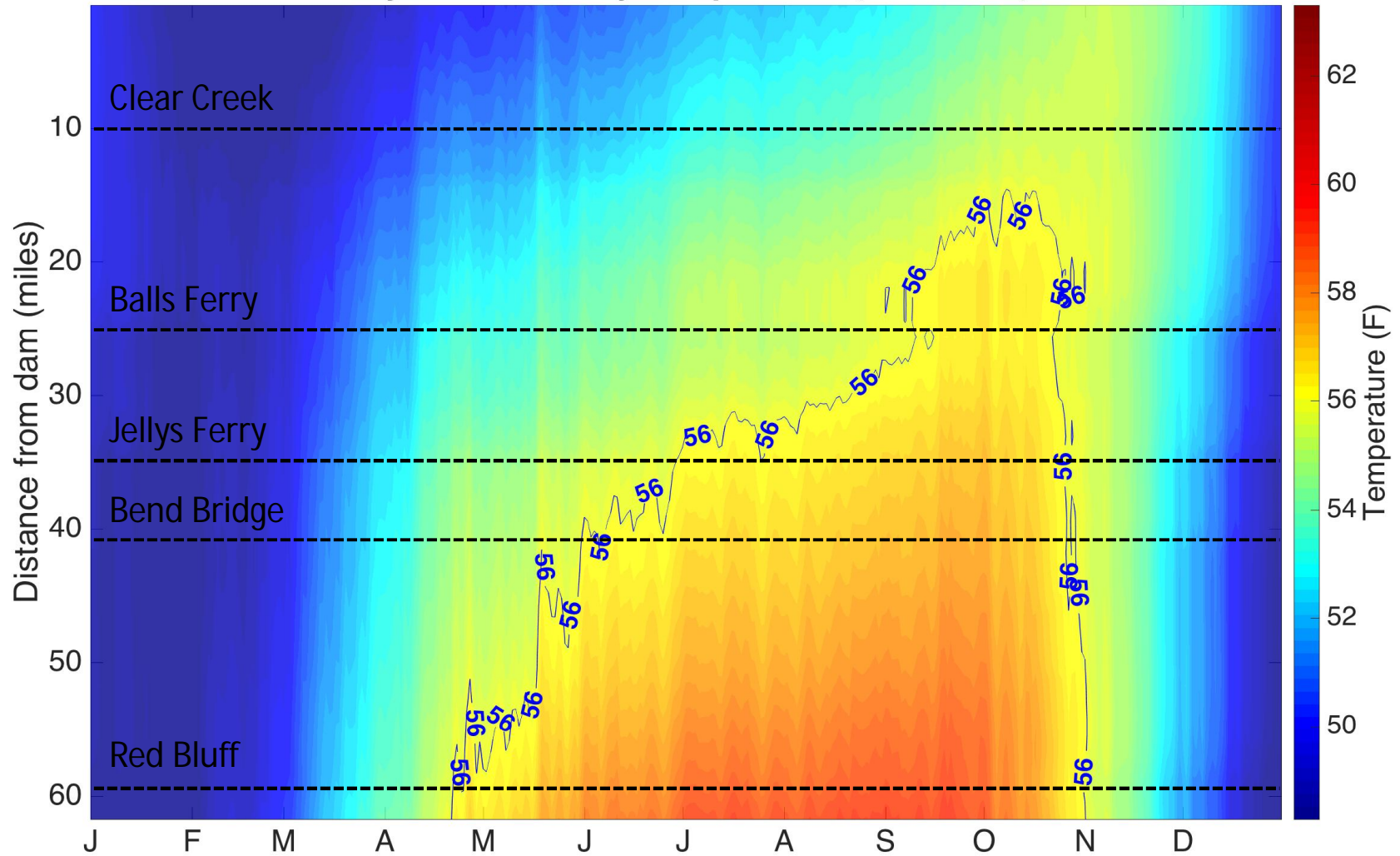
Temperature Landscape

25 year Mean Daily Temperature (1990-2014)

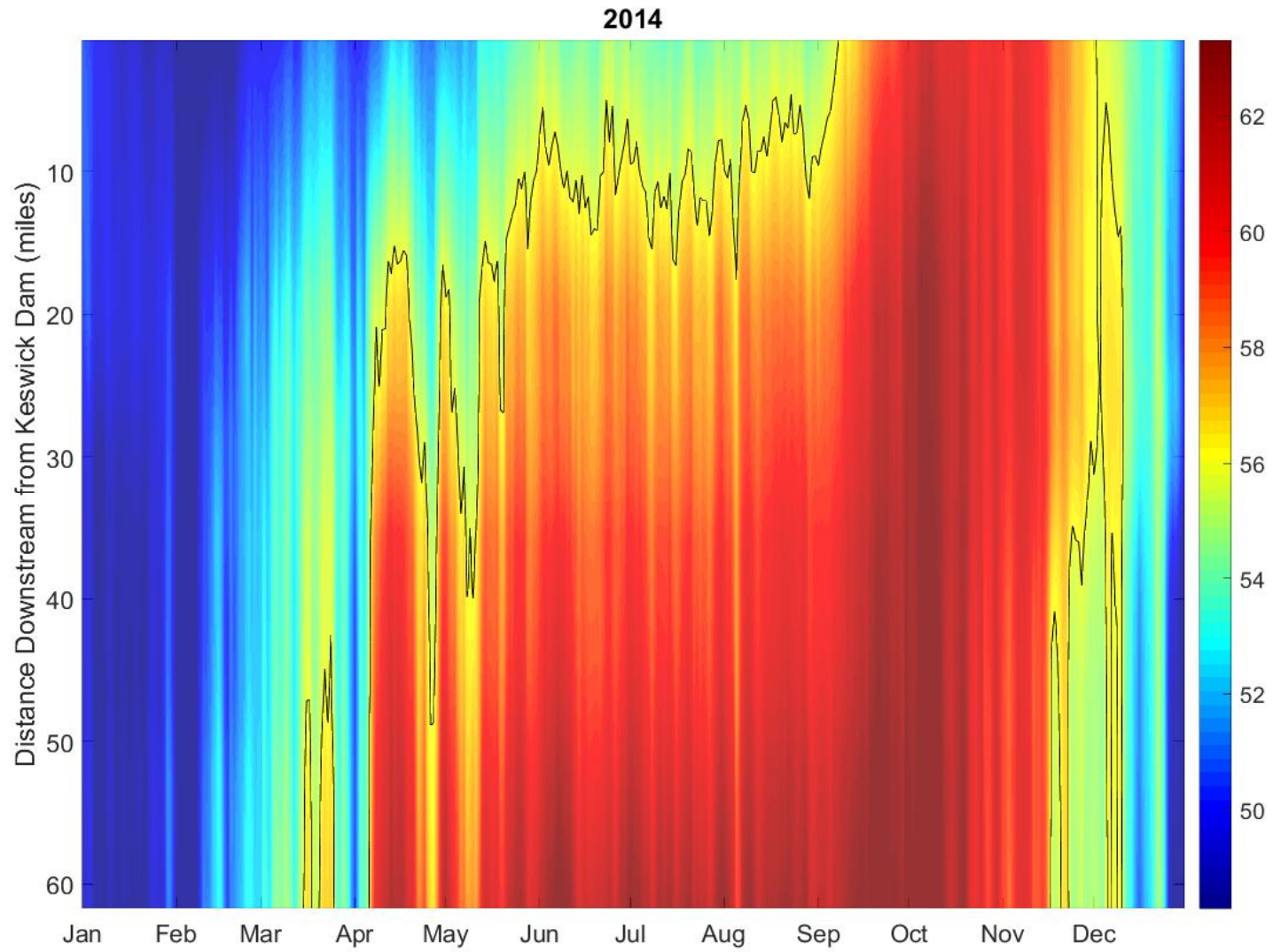


Temperature Landscape

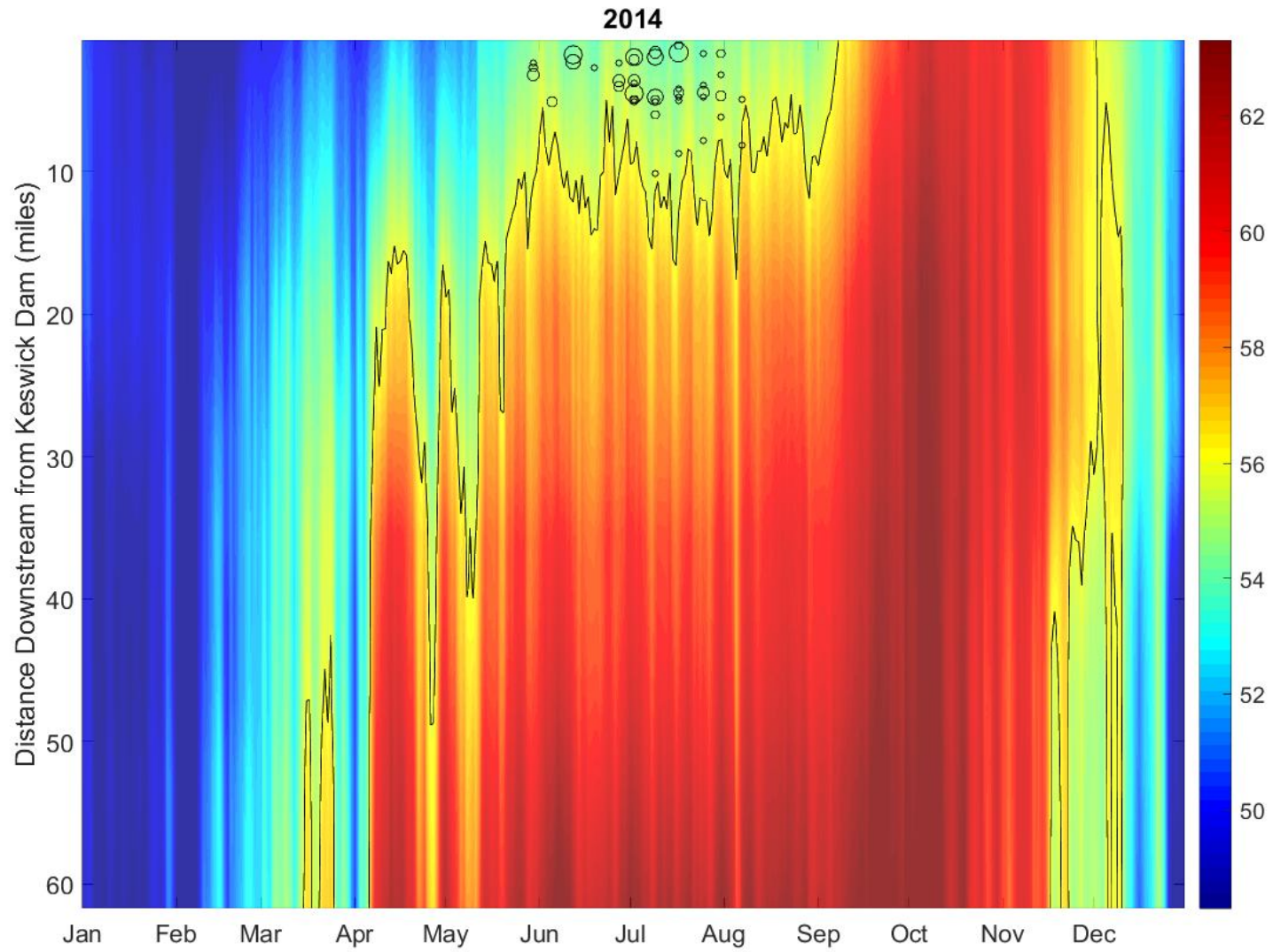
25 year Mean Daily Temperature (1990-2014)



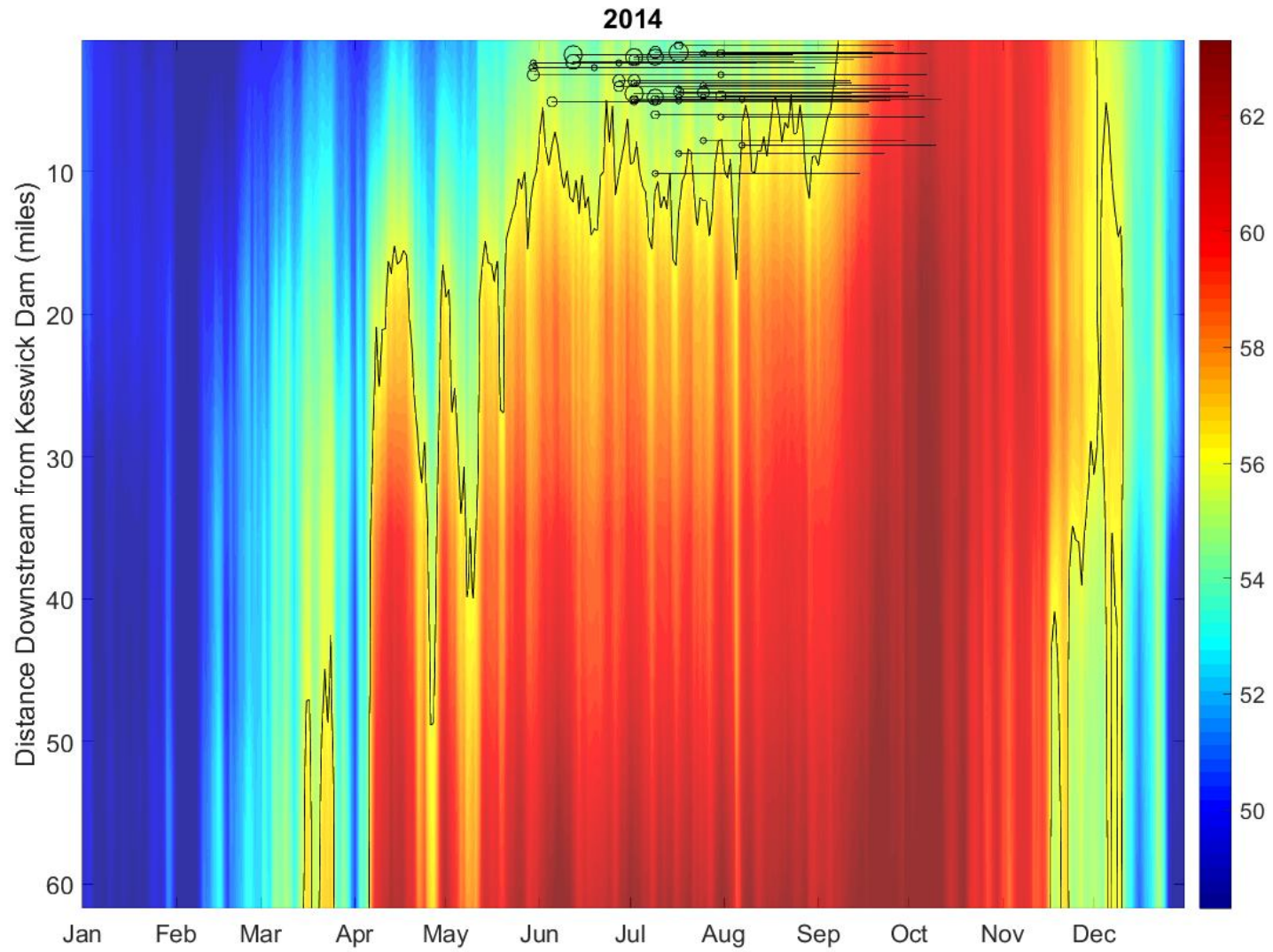
Temperature Landscape



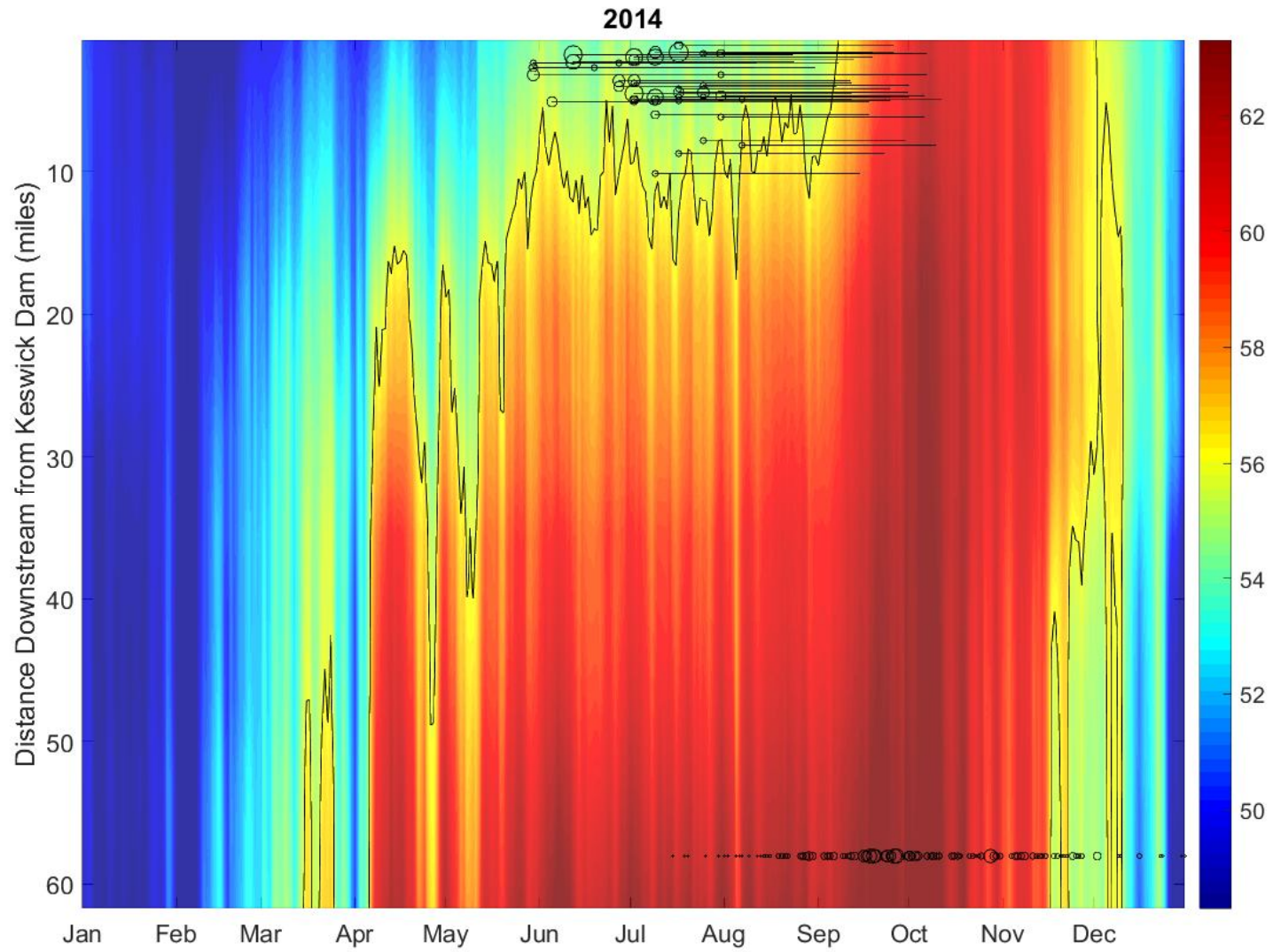
Temperature Landscape



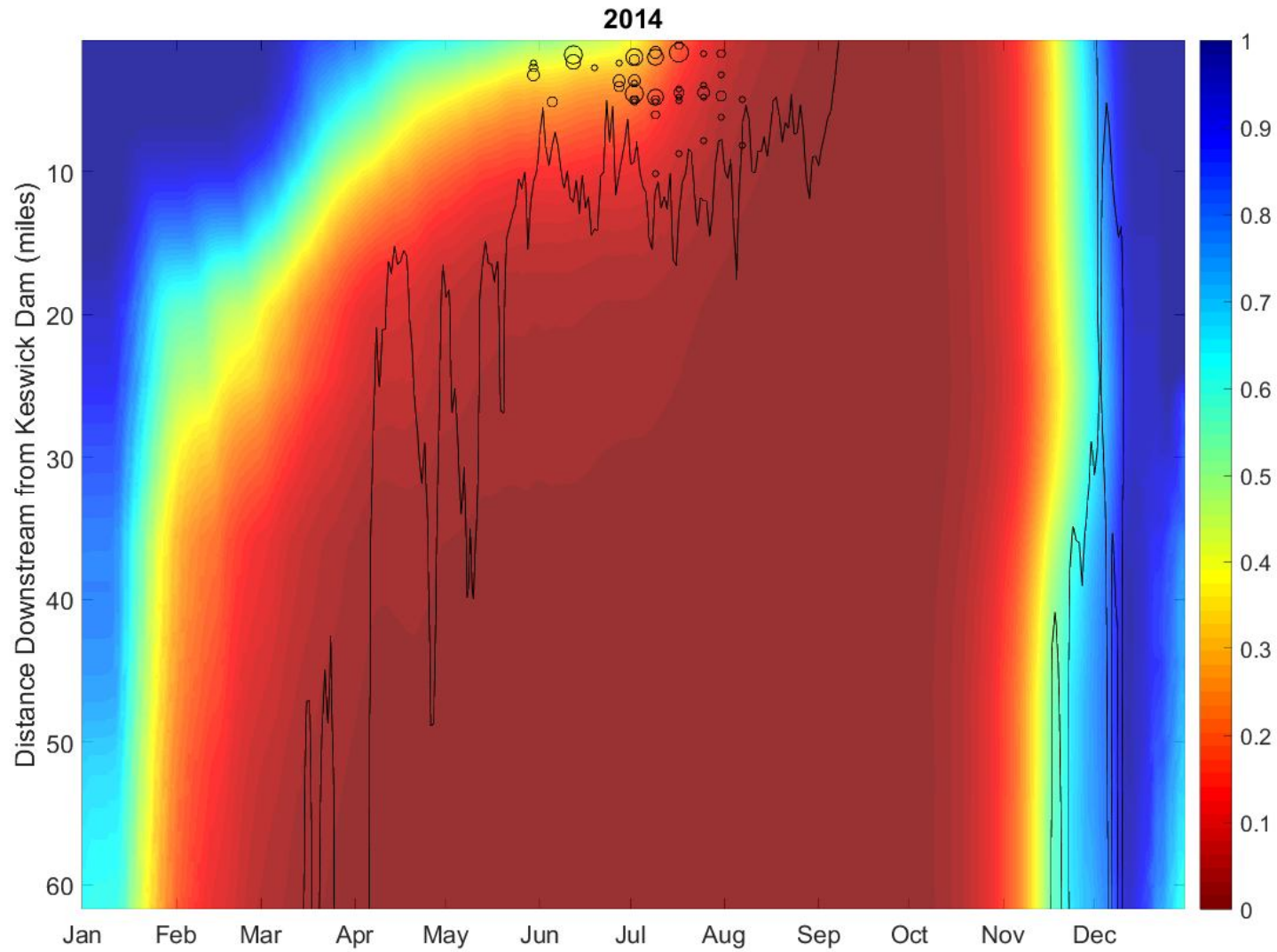
Temperature Landscape



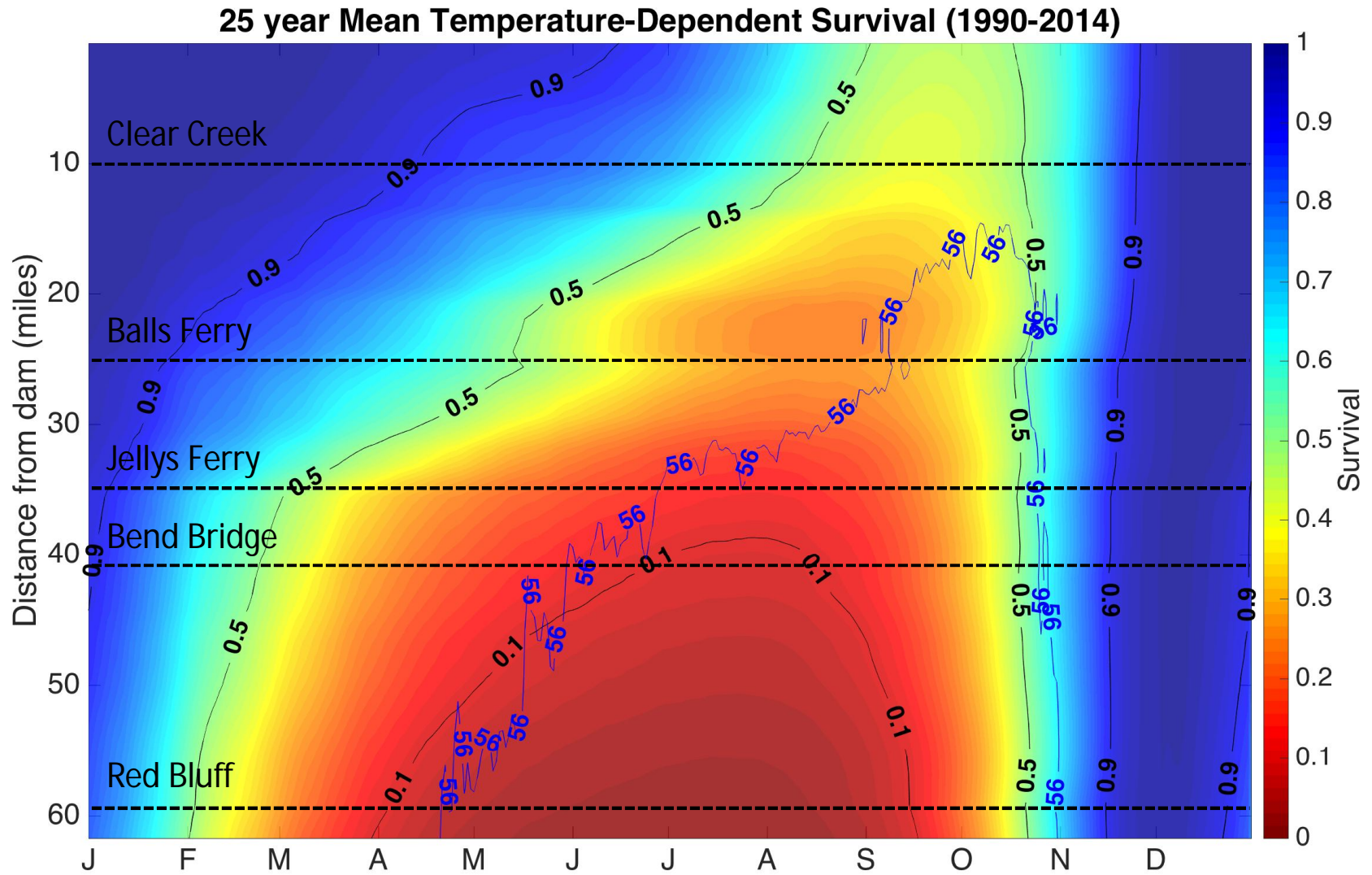
Temperature Landscape



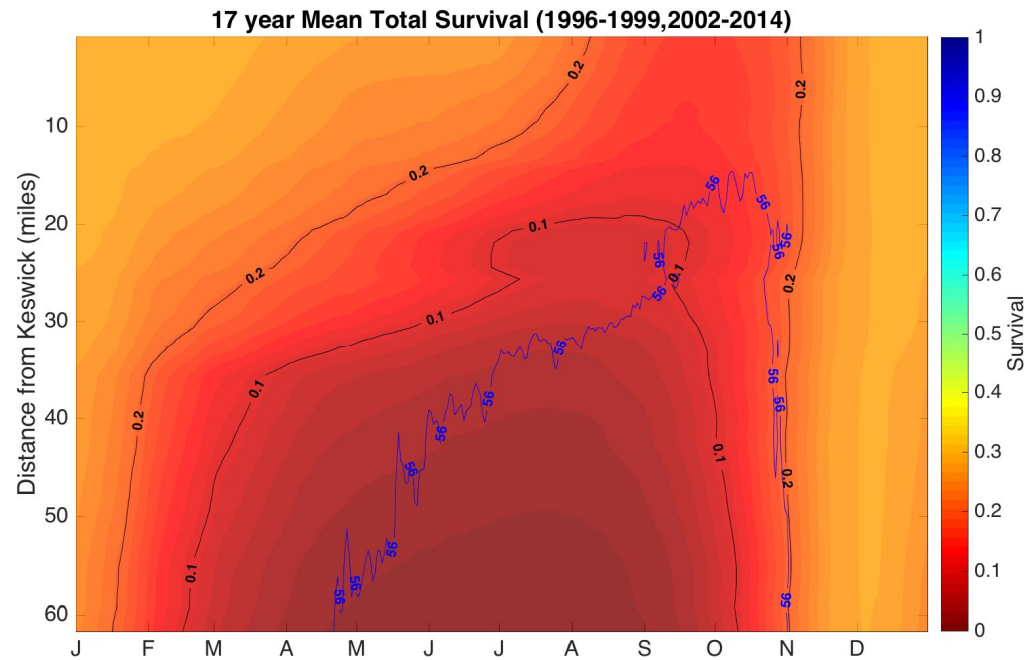
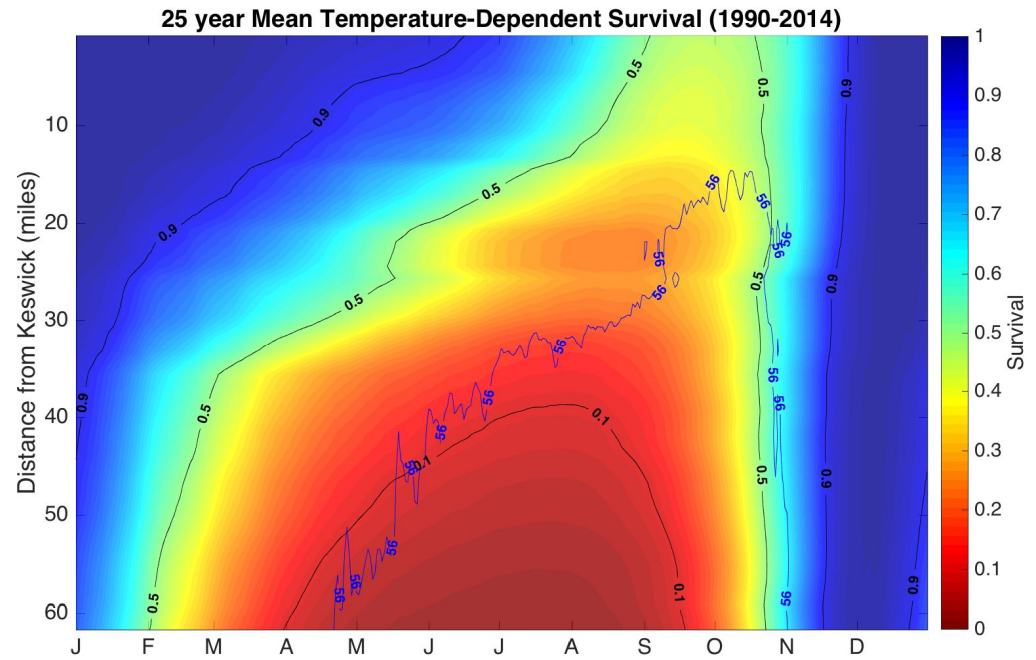
Temperature Dependent Survival Landscape



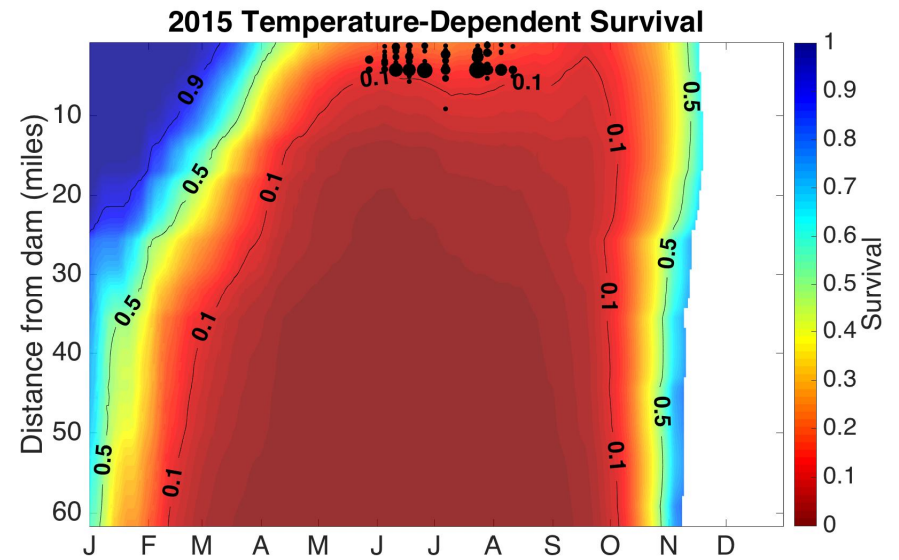
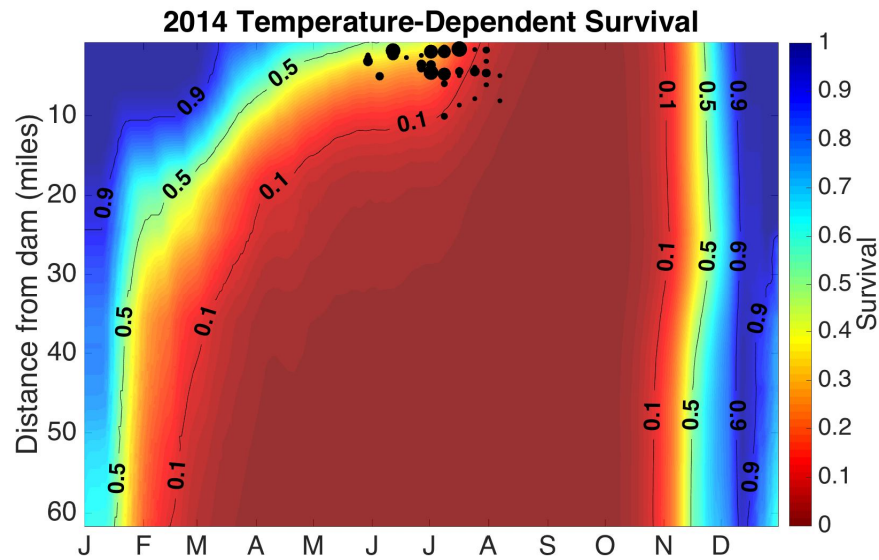
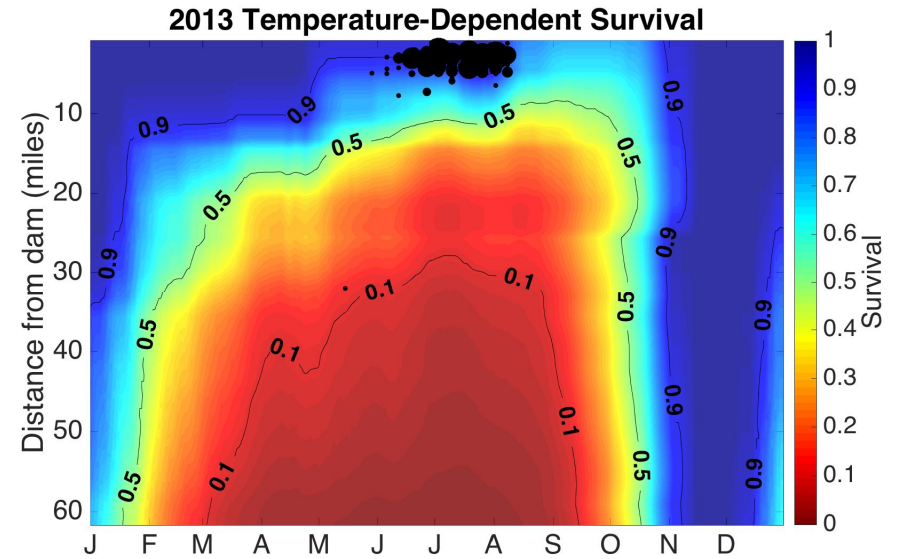
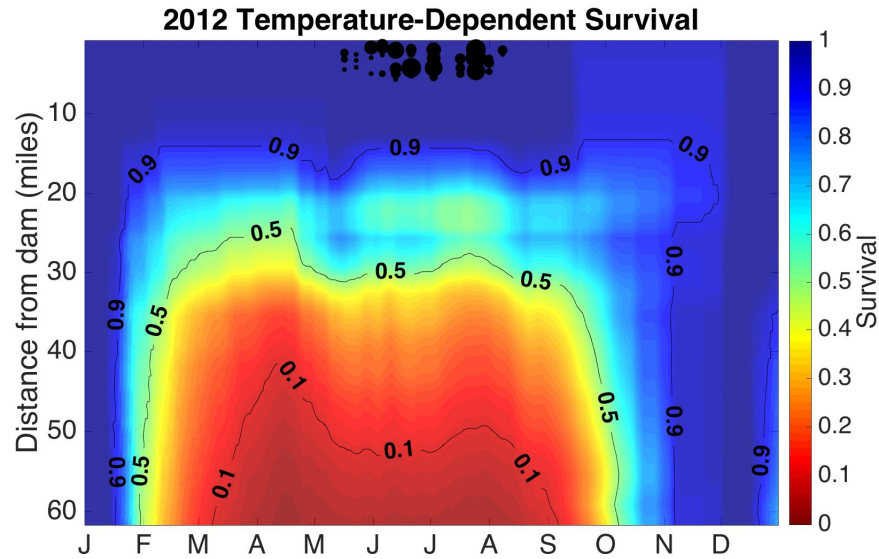
Salmon survival as a function of temperature



Total survival =
Temperature Dependent
Survival * Background
Survival

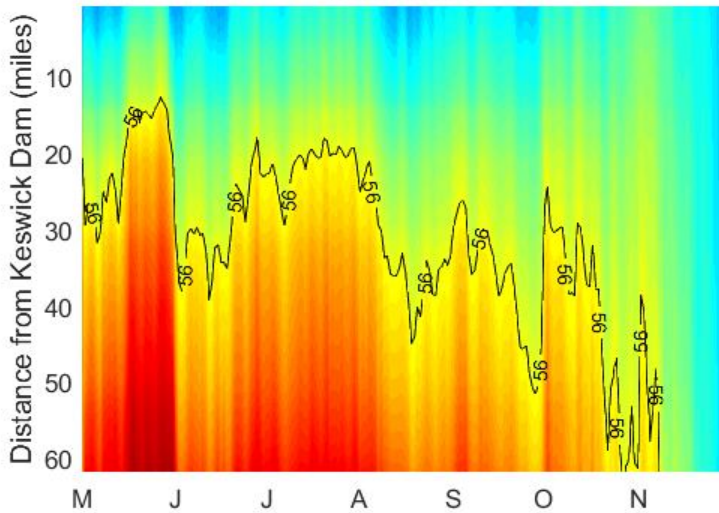


As we head into a drought...

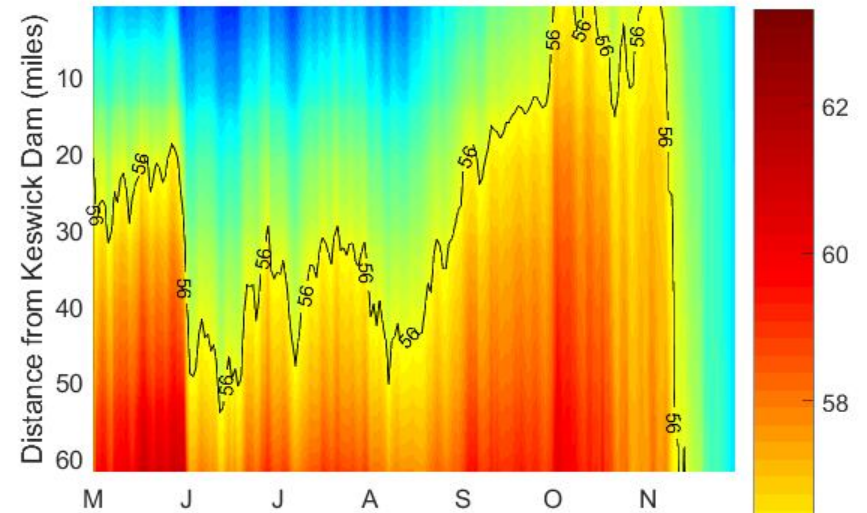


Scenario Analysis

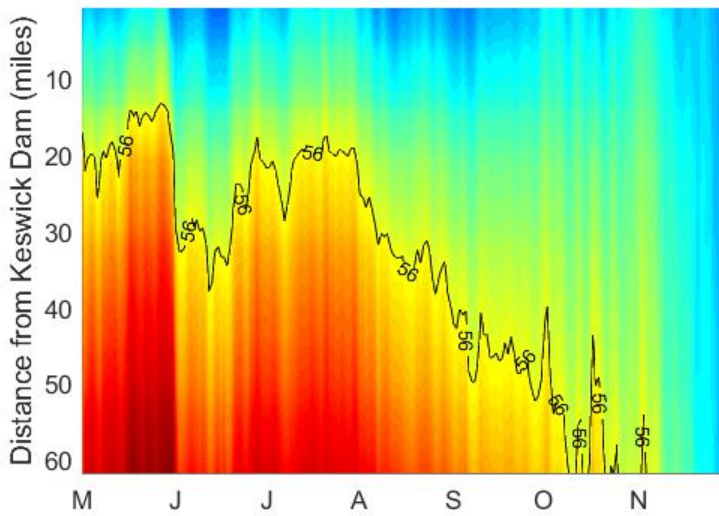
Scenario 1



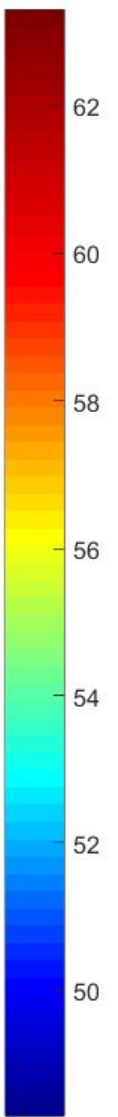
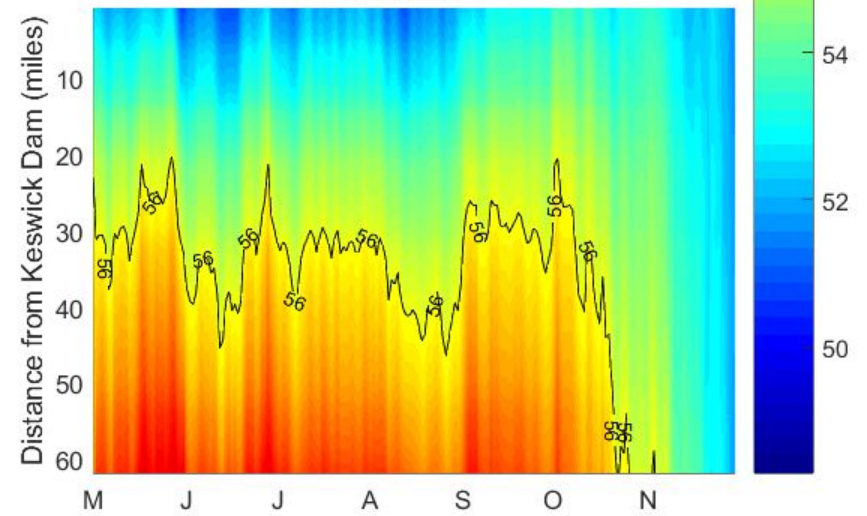
Scenario 2



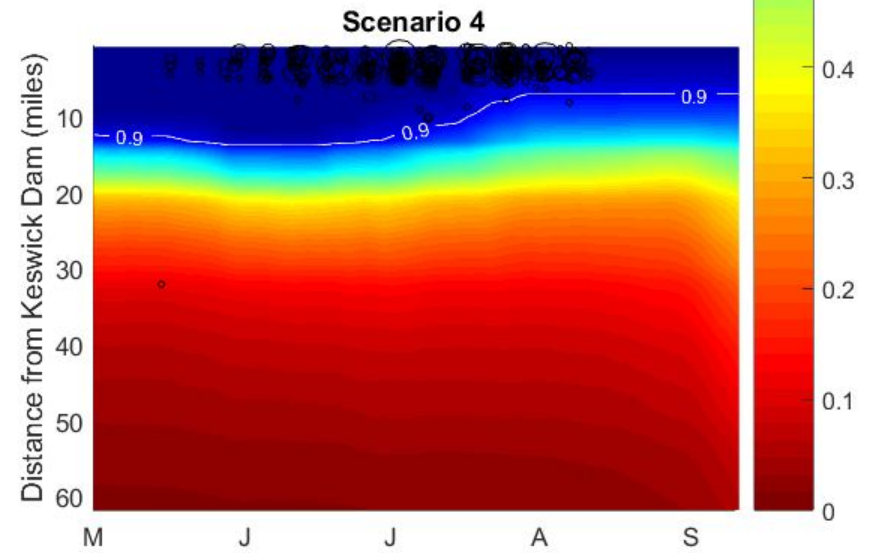
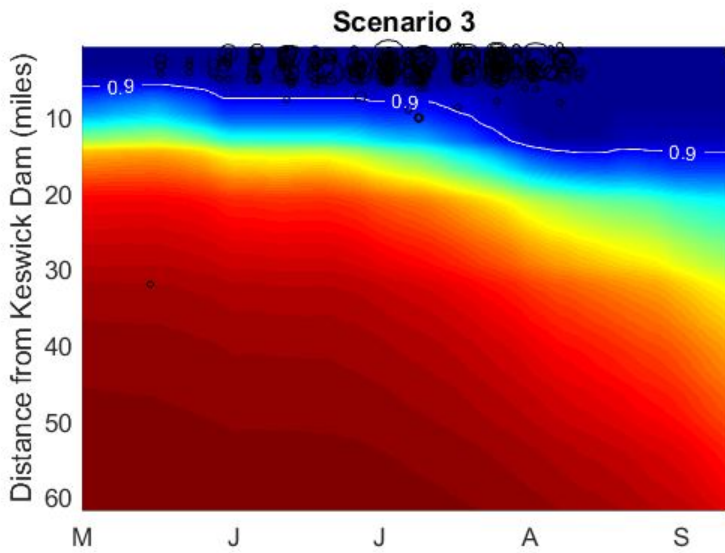
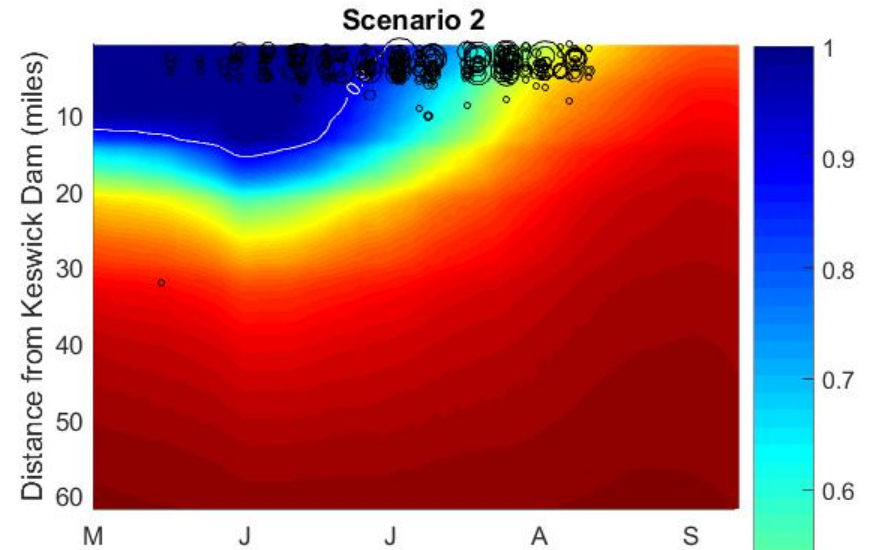
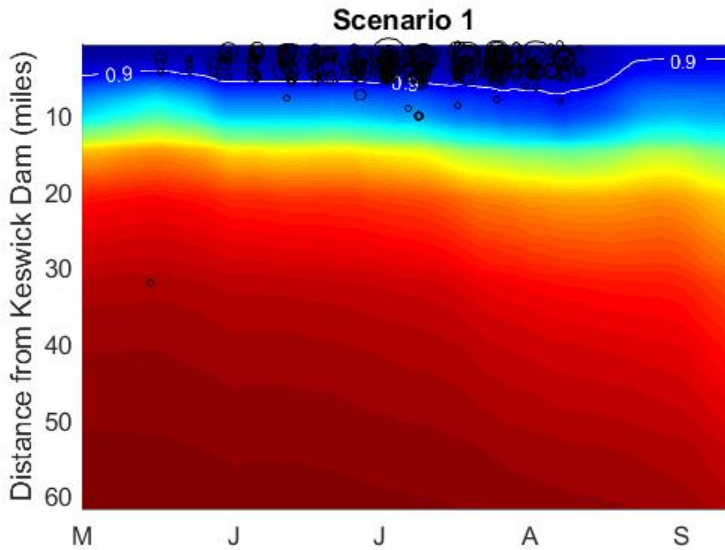
Scenario 3

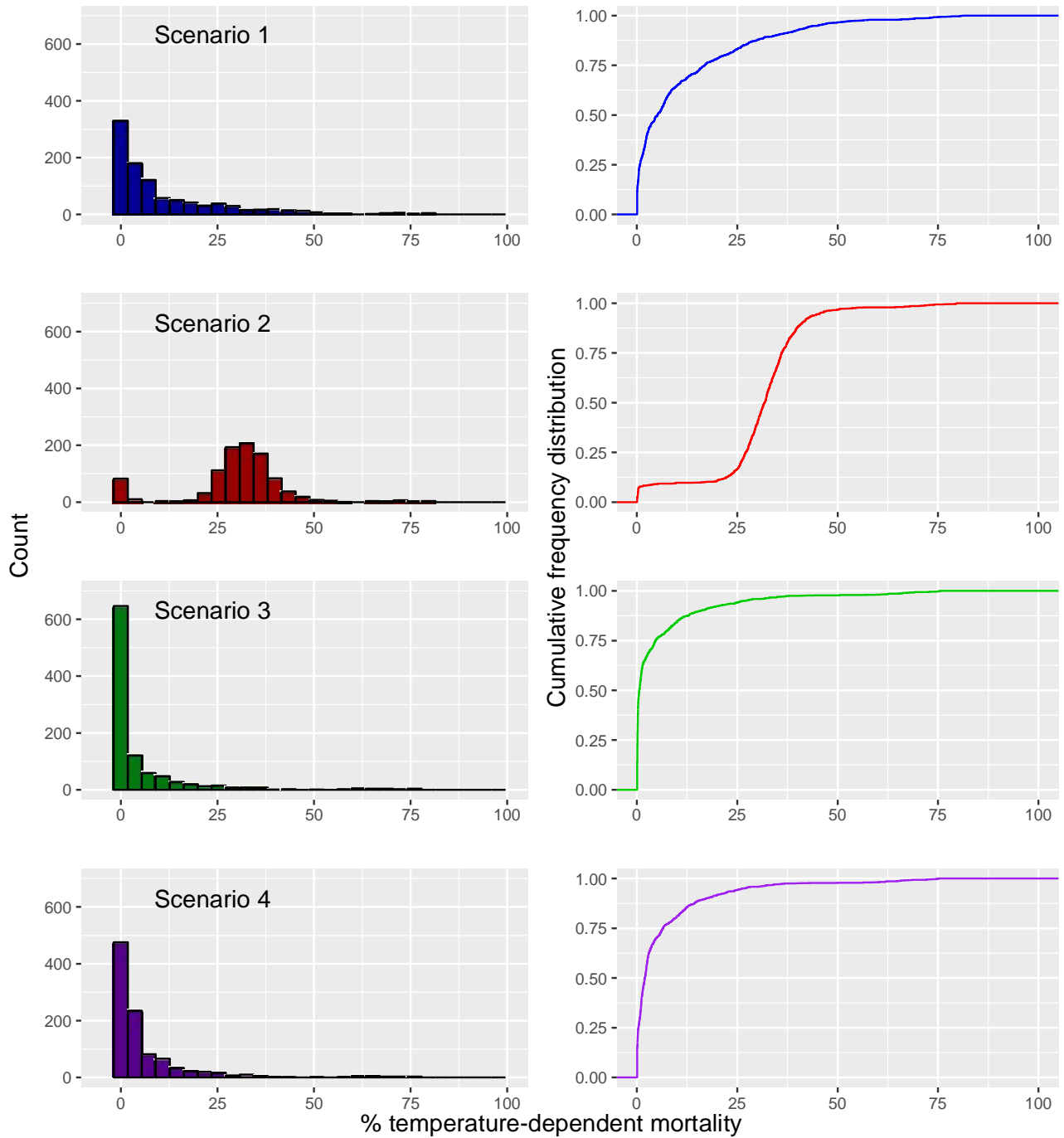


Scenario 4

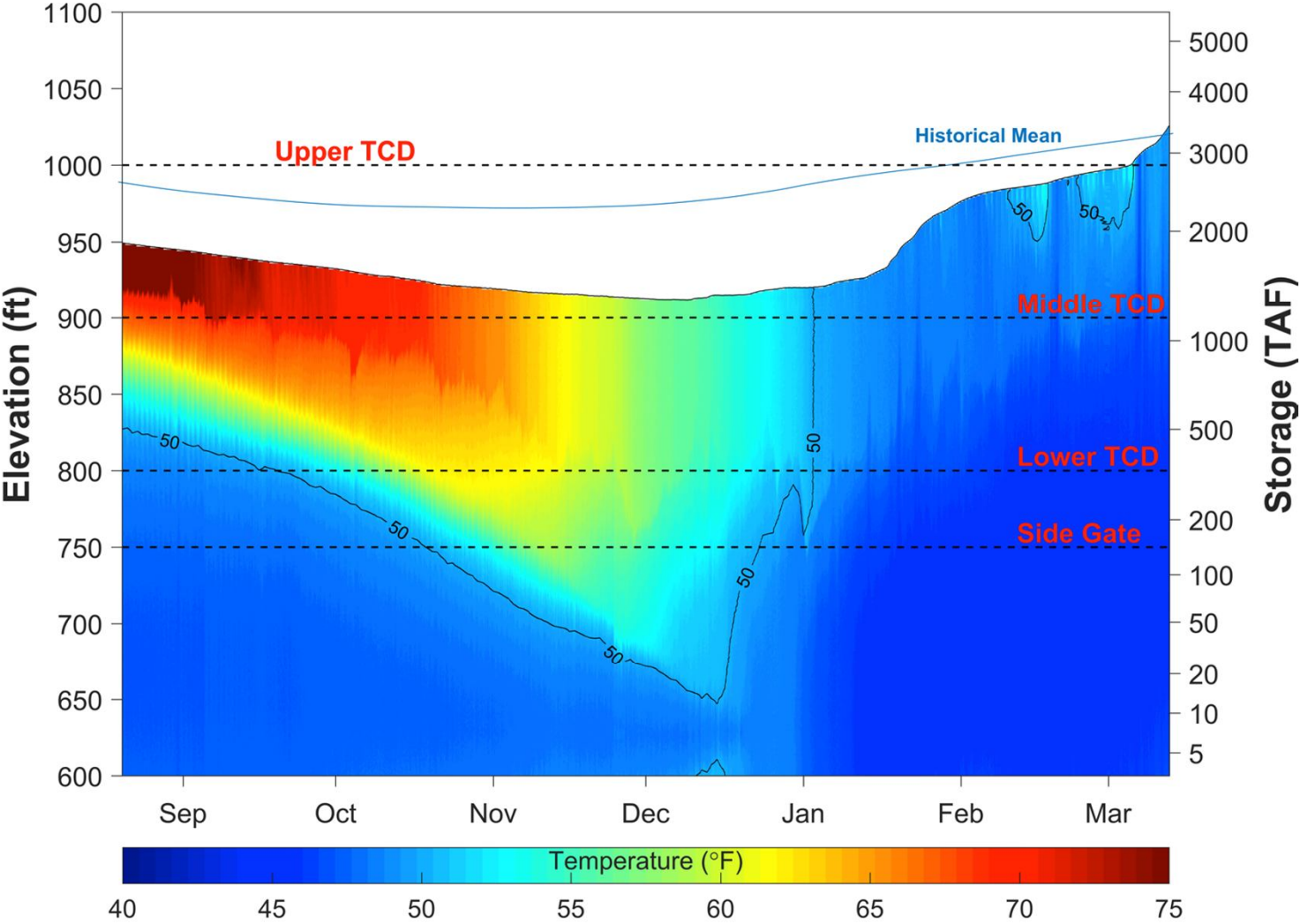


Scenario Analysis





Shasta Thermal Profile



Long Term Measures

What long term measures should be considered to ensure temperature control and related measures to protect winter-run Chinook salmon and other Sacramento River salmonids in future years?

