

2022 Drought and Coho Salmon Concerns

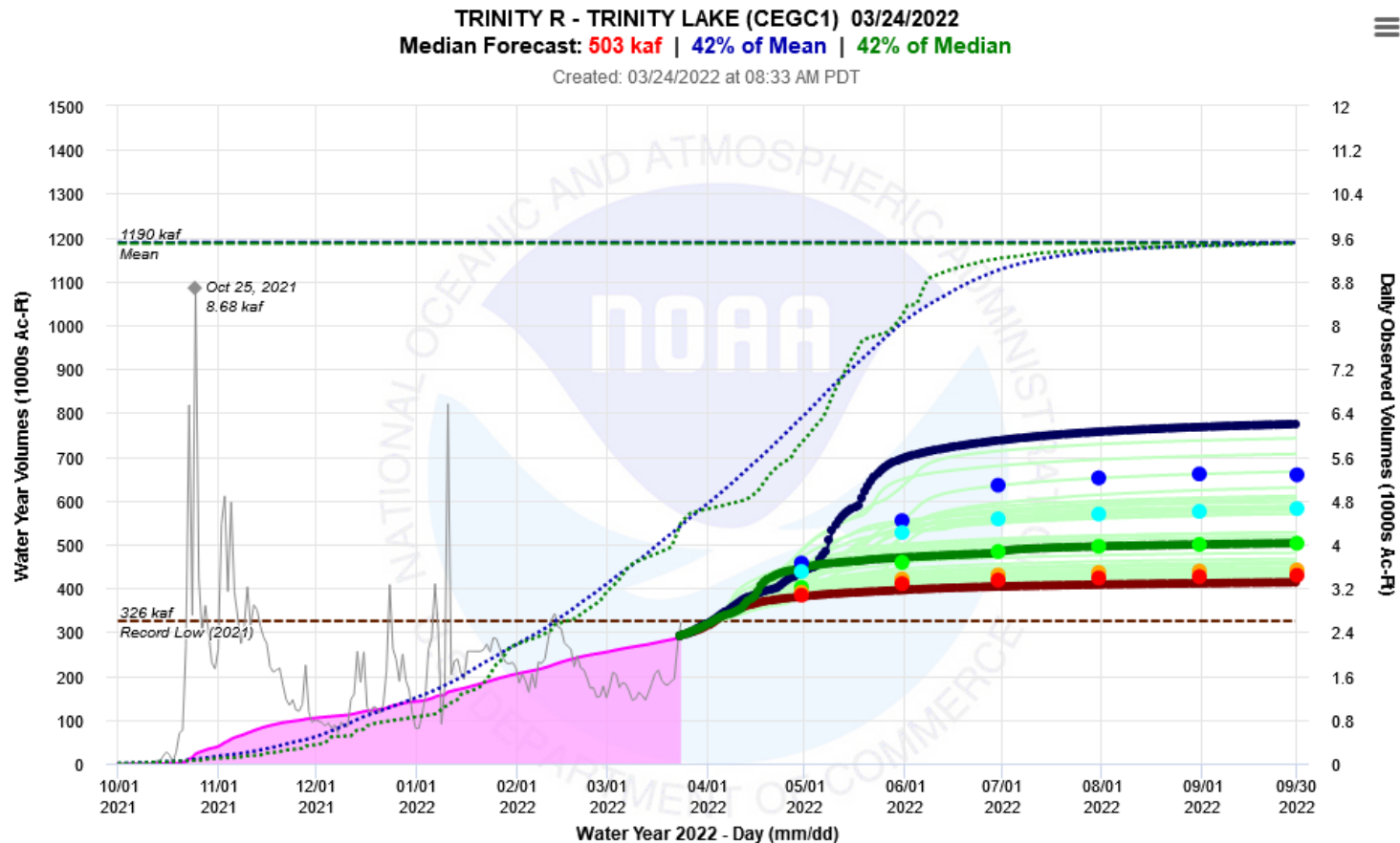


Trinity Management Council
March 30, 2022
Virtual Meeting

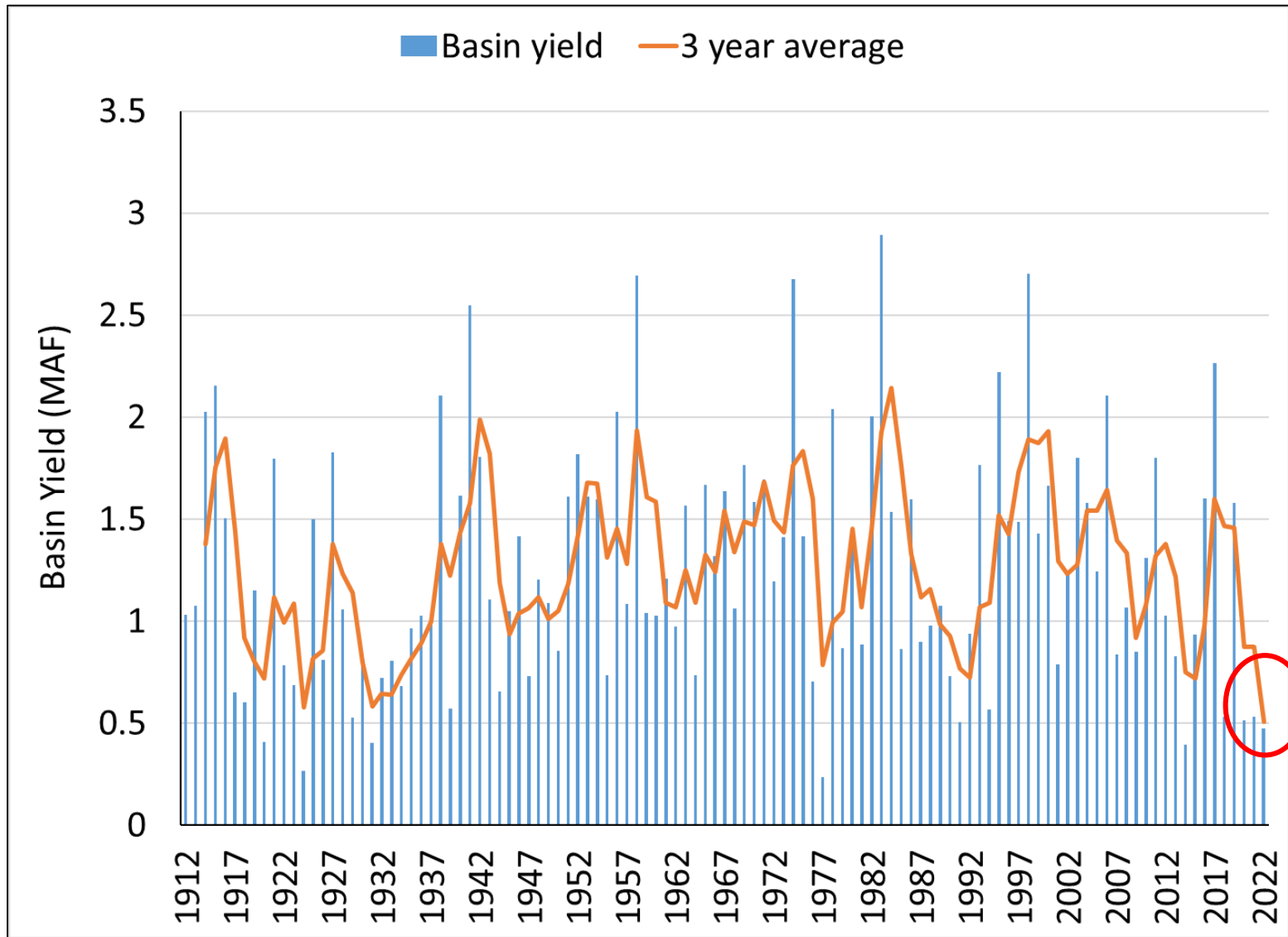
Seth Naman, NOAA

Water Year 2022 Inflow Forecast

Critically Dry

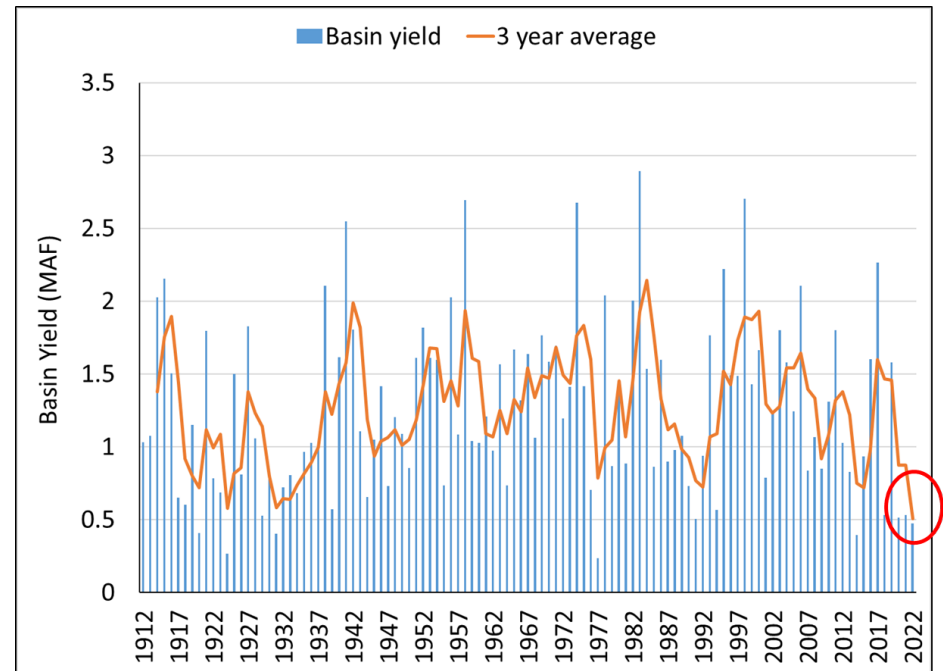


Current Drought Is Historic

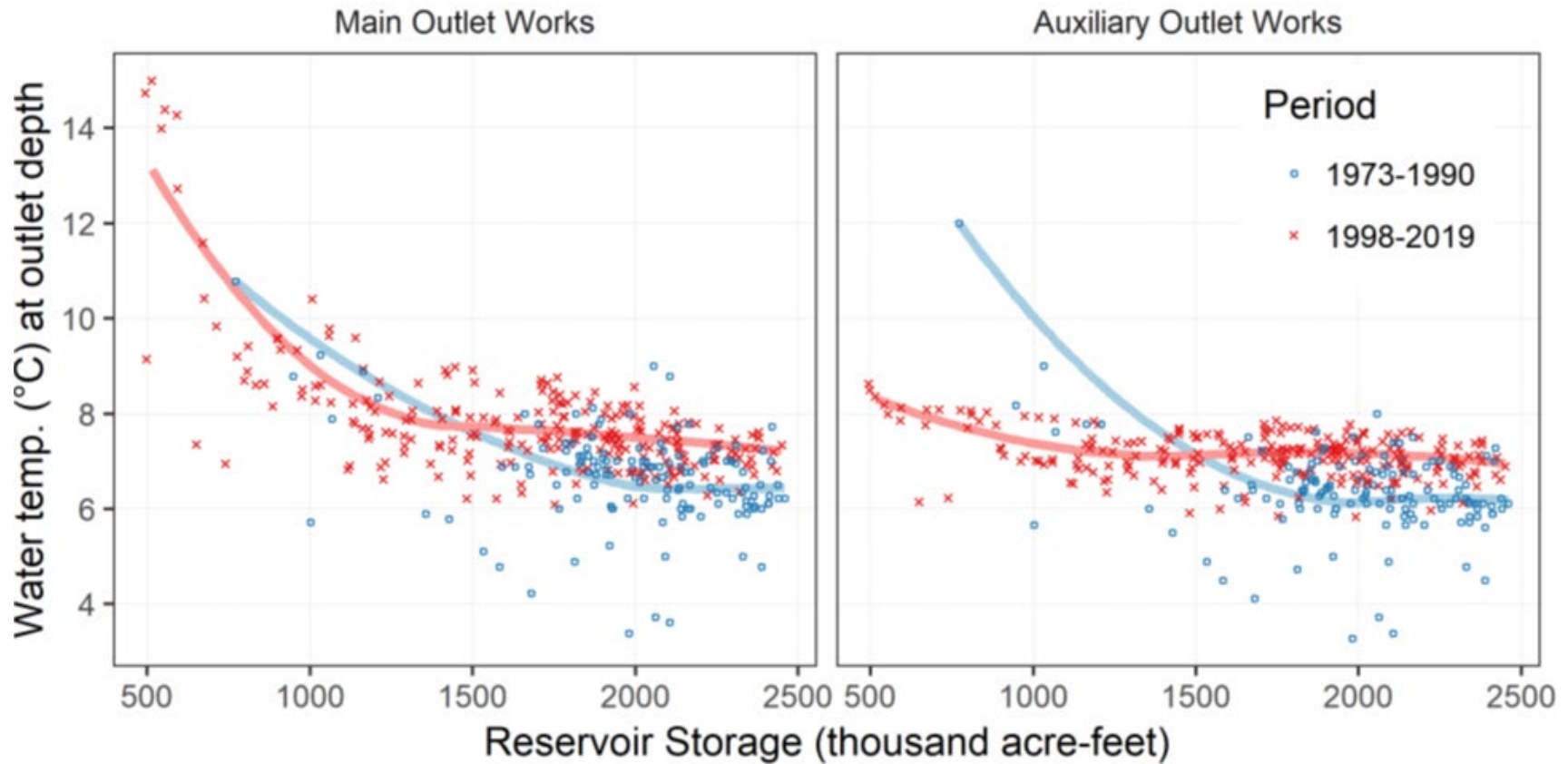


Current Drought Is Historic

- Trinity River basin yield for water years 2020-2022 was the three lowest in 110 years
- Since Trinity Dam was constructed, current three year average is lower than next lowest by ~200,000 AF
- Significant downward trend in basin yield since late 1990s



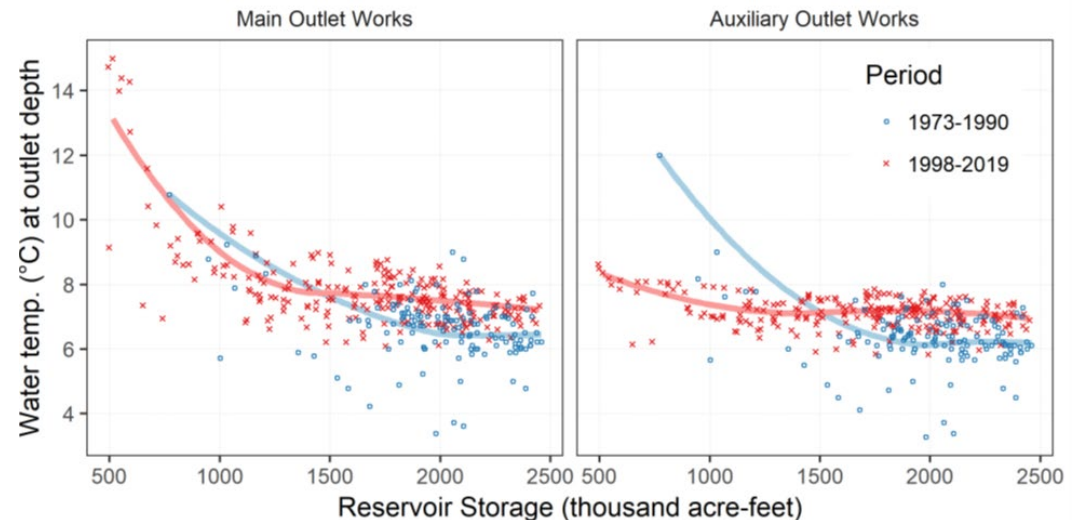
Reservoir Storage vs Water Temperature



Asarian et al (In prep)

Reservoir Storage vs Water Temperature

- When storage is less than 1.25 MAF, reservoir releases from main outlet works quickly rise with decreasing storage (non-linear)
- The coldest water at the bottom of the reservoir has increased $\sim 1^{\circ}\text{C}$ over time. Likely due to climate change.



Asarian et al (In prep)

End of September Reservoir Storage

2020: 1,354,080 AF

2021: 710,444 AF

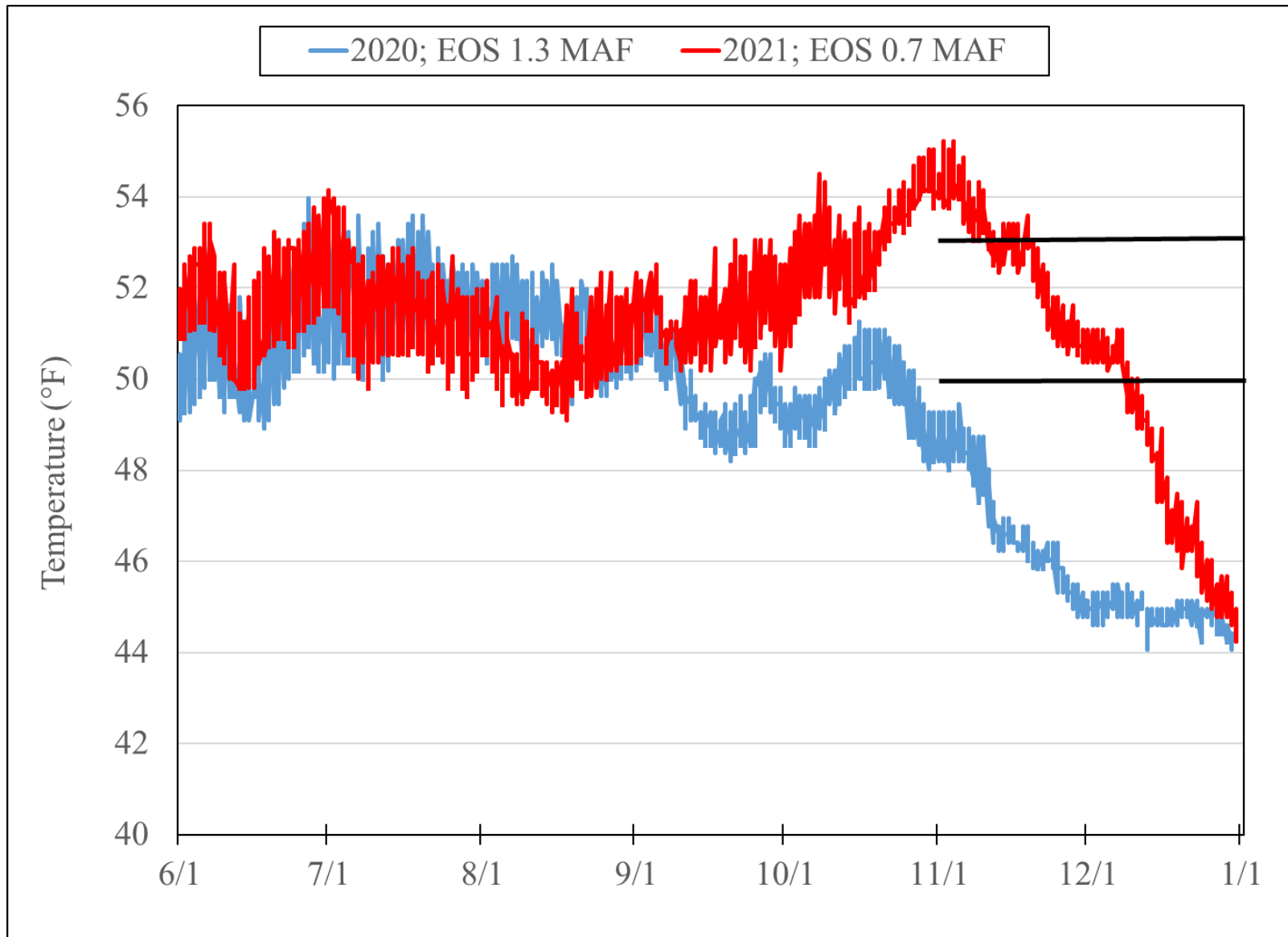
2022:~500,000 AF

2015: 545,901



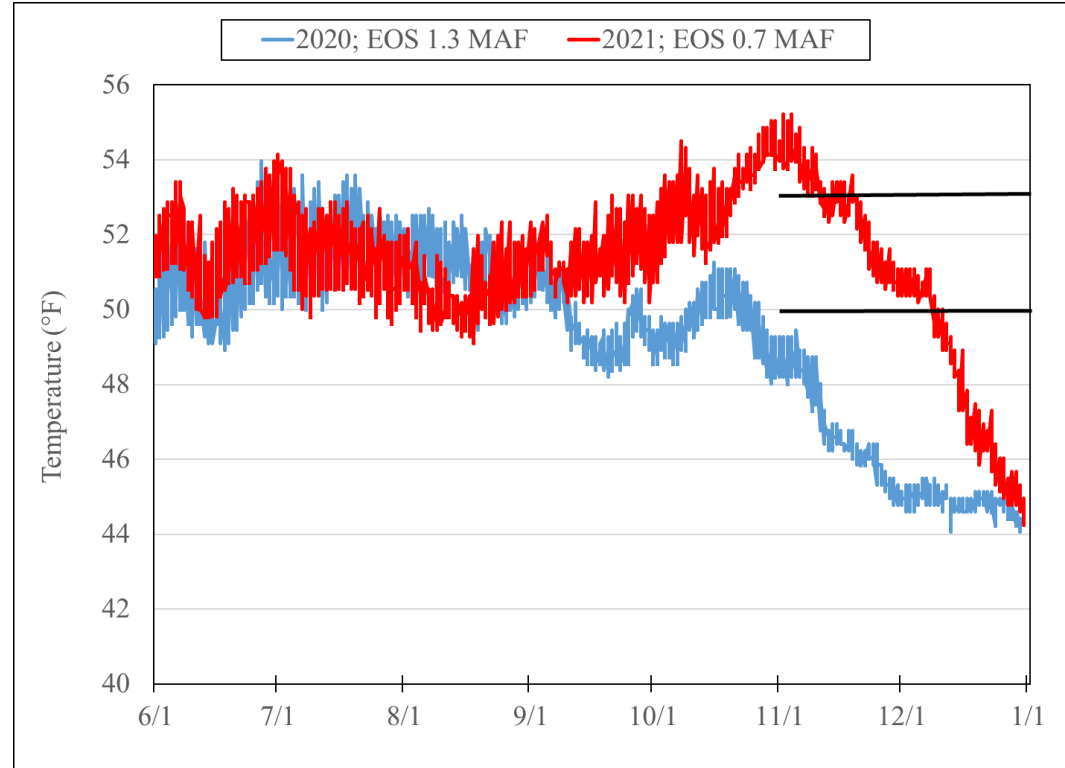
Trinityjournal.com

2020 versus 2021



2020 versus 2021

- Salmonids are not adapted to maximum temperatures for the year occurring in November (e.g. run timing, spawning dates, etc).
- Significant “thermal inertia” in Trinity Reservoir in the fall-like a bathtub that cools slowly
- As fish swim upstream from North Fork of Trinity River, water temperature does not cool in critically dry years with low reservoir storage



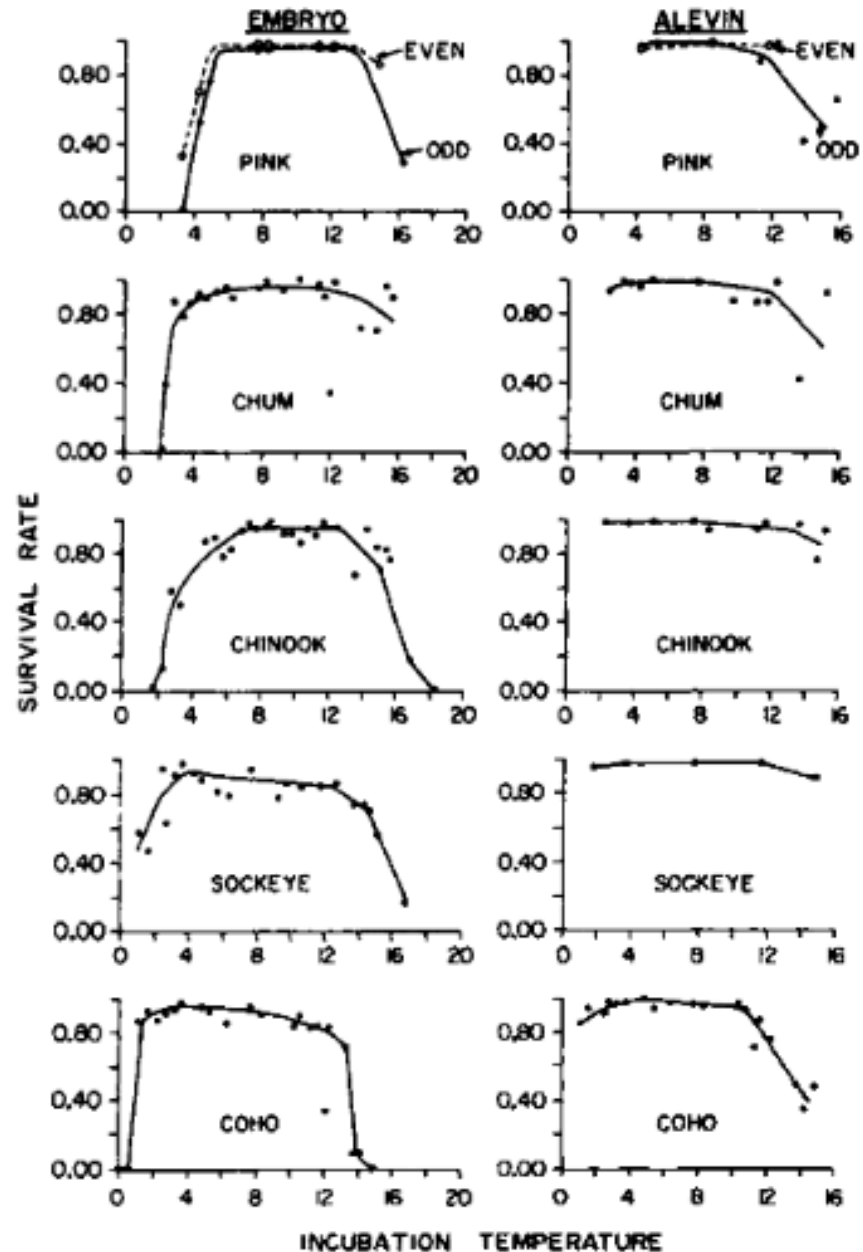
Current water temperature requirements (daily average)

Date	Temperature Objective (°F)	
	Douglas City	North Fork Trinity River
July 1 through Sept 14	60	-
Sept 15 through Sept 30	56	-
Oct 1 through Dec 31	-	56

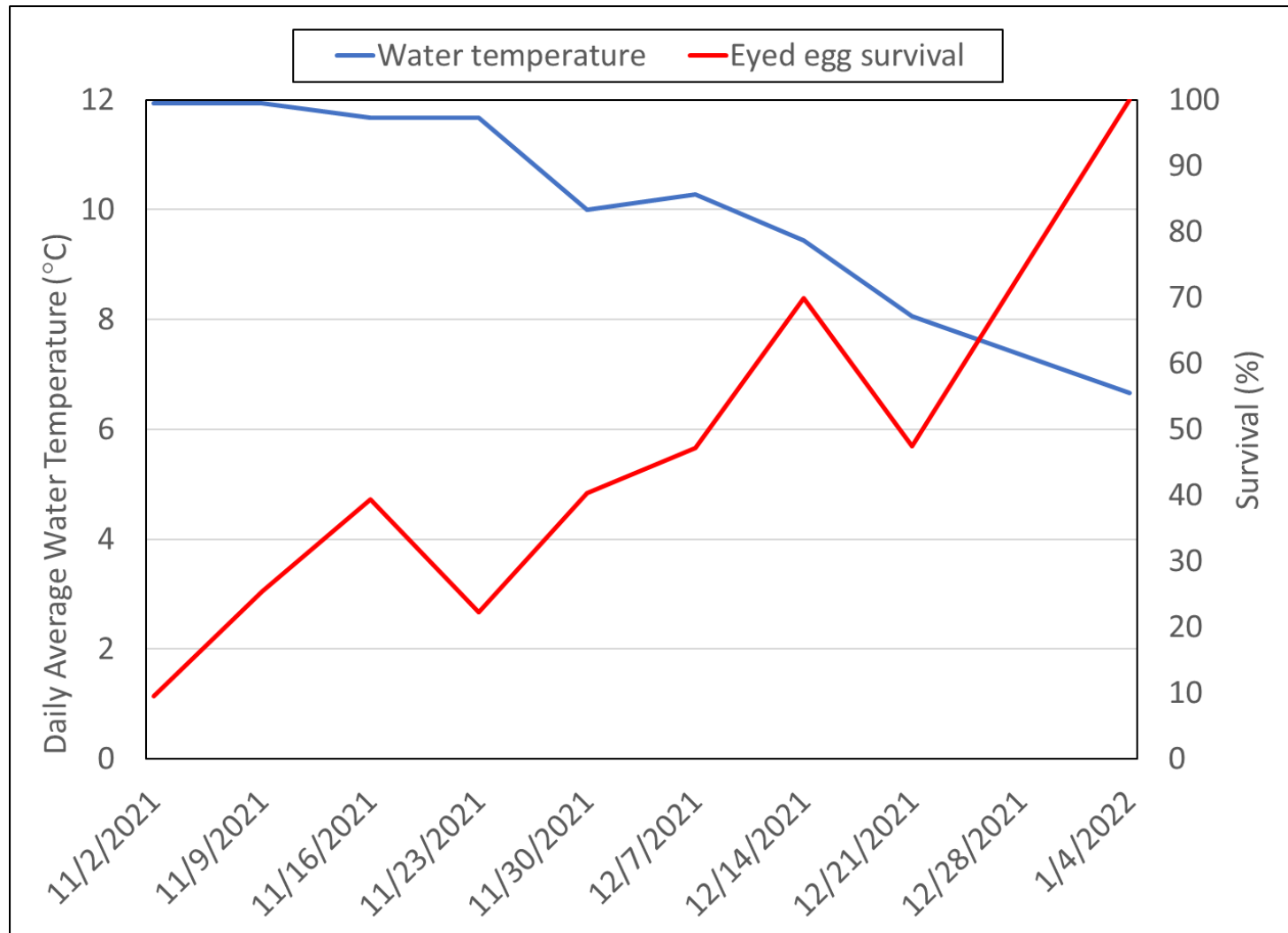
Date	Temperature Objective (°C)	
	Douglas City	North Fork Trinity River
July 1 through Sept 14	15.6	-
Sept 15 through Sept 30	13.3	-
Oct 1 through Dec 31	-	13.3

Coho Salmon egg requirements

- Coho salmon egg survival rapidly falls after 53.5°F (12°C)
- 56°F (13.3°C) temperature objective not protective of Coho Salmon
- Originally developed for central valley Chinook Salmon
- Currently no water temperature objectives for Lewiston Dam releases
- Temperature requirements set forth in 1990 assume seasonal cooling and cooling in downstream direction



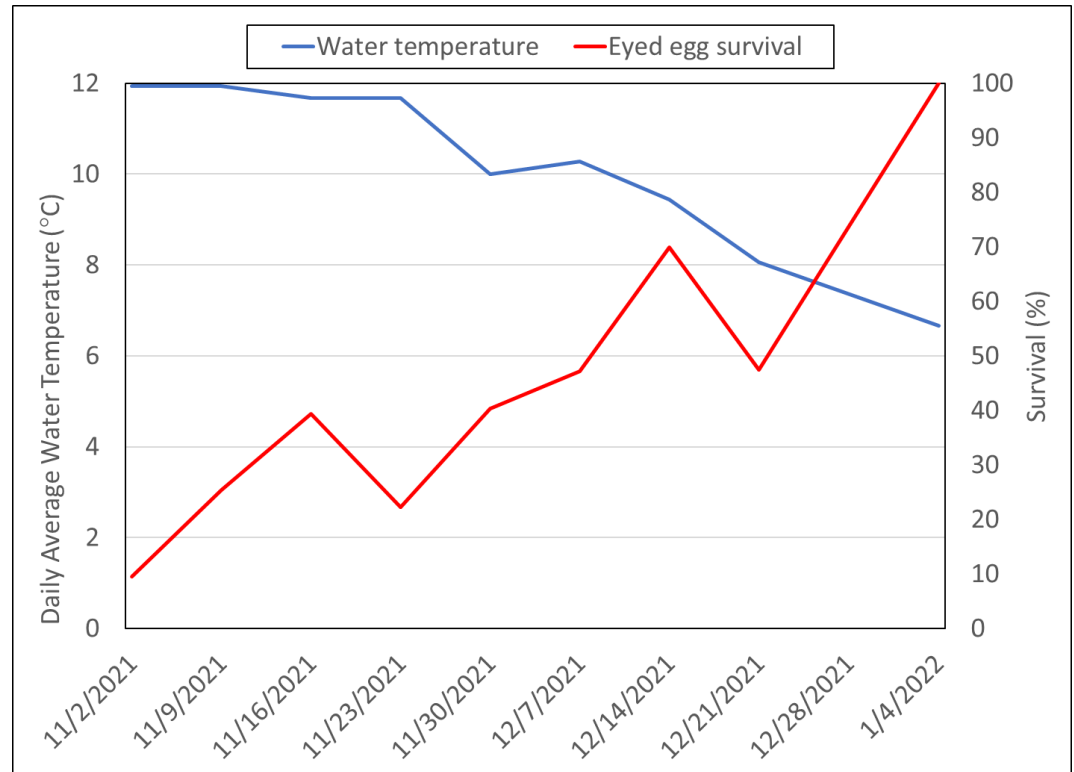
Trinity River Hatchery Coho Salmon Egg Survival 2021



Data provided by M. Clifford, CDFW

2022 likely worse than 2021

- Significant mortality in 2021, at TRH and in Trinity River.
- End of September carryover storage will be 200,000 AF less in 2022 versus 2021
- Significant mortality will occur in 2022 unless steps are taken to reduce Lewiston water temperatures
- Also occurred in 2015, contributing to subsequent low run sizes



Data provided by M. Clifford, CDFW

Current TRRP efforts

- TRRP Temperature Synthesis provided underlying temperatures data and analyses
- Fish Work Group currently developing new temperature objectives for adult salmonids
 - Will seek TMC approval at June meeting
- TRH and Peer-reviewed literature provides biological requirements



TMC members could Request Reclamation:

- Meet the following water temperatures at Lewiston Dam
 - 53.5°F (12°C) daily max, 50°F (10°C) daily average, Optimal 46.5°F (8°C)
- Reduce Carr diversions in water year 2022 to maximize Trinity Reservoir end of September storage
- Conserve Trinity Reservoir cold water pool for use in the fall
- Utilize auxiliary outlet in Trinity Reservoir through December as needed to meet above objectives
- To prepare for a possible 4th year of drought, reduce Carr diversions in water year 2023 until sufficient precipitation and/or snowpack indicate at least average or above average hydrologic conditions.
- Reinitiate consultation on the Trinity River Division

TMC members could engage other management entities the following ways:

- Comment on draft Sacramento temperature management plan (TMP), expected release on April 1
 - Written comments can be provided to bay-delta@waterboards.ca.gov
- Request modeling and actions through the Sacramento Temperature Task Group
- Request NMFS adopt new water temperature thresholds for coho salmon in the Trinity River Division ESA consultation

Questions?

