**From:** Miles Daniels - NOAA Affiliate <miles.daniels@noaa.gov>
**Sent:** Tuesday, April 30, 2019 1:56 PM
**To:** Eric Danner - NOAA Federal
**Subject:** Summary of Tier 2 temp-mortality

Hi Eric,

Attached is the summary plot simulating how a stringent adherence to Tier 2 temperature targets on the Sacramento River could affect temperature-dependent winter-run egg mortality. The plot shows the simulated river temperature generated for the Tier 2 simulation (more text below describing methods) and corresponding egg mortality for the emergence (Martin) model and hatch (Anderson) model. Each sub-plot also has marginal histograms showing the distribution of when redds are assumed to be constructed in time and space on the river.

To generate a river temperature landscape from the Tier 2 figure USBR provided, which only specifies temperature targets at the Clear Creek gauge (CCR), historical observations from 1990-2017 were used. Specifically, historical observations were used to estimate the rate of river temperature change above and below CCR. Put another way, if we assume CCR temperature to be 53.5F, what is the river temperature below and above CCR. To generate these temperatures we selected dates when CCR was at 53.5 or 56F (the two temperature targets) and made cumulative distribution functions (CDFs) of how much the river temperature changes from gauges up or downstream from CCR and chose the 75th percentile estimate of the CDF.

The attached plot title "CDF_CCR", shows an example of this approach for the change in river temperature from Keswick (KWK) to CCR for the month of July. The plot shows that for the 75th percentile, when CCR temperature is 56F (i.e. 13.3C), Keswick temperature is 0.94C cooler. This approach was done for months from May-October using gauge data from KWK, BSF, JLF, BND, and RDB.

Please let me know if you want any further clarification on any of this,
Miles

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