From: Cathy Marcinkevage - NOAA Federal <cathy.marcinkevage@noaa.gov>
Sent: Tuesday, May 21, 2019 9:52 PM
To: Garwin Yip; Howard Brown
Subject: Fwd: Shasta Temperature Section and Comments

FYI, some info on temperature stuff from Stephen.

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From: **Stephen Maurano - NOAA Federal** <stephen.maurano@noaa.gov>
Date: Tue, May 21, 2019 at 4:17 PM
Subject: Re: Shasta Temperature Section and Comments
To: Cathy Marcinkevage - NOAA Federal <cathy.marcinkevage@noaa.gov>
Cc: Evan Sawyer - NOAA Federal <evan.sawyer@noaa.gov>

Hi Cathy,

- We already cited two of those studies (Myrick and Cech 1994, USFWS 1999) on the following page, so their inclusion isn't problematic. However, I don't think the characterization that NMFS decided not to use local data is well-stated. Additionally, elsewhere the reviewer added the sentence, "Studies have also shown relatively high survival at temperatures as warm as 57F, mostly recently Del Rio et al. (2018)." However, that paper emphasized a very different conclusion that, "This study, in addition to Martin et al. (2017), suggests that in natural redds where DO is variable, the target temperature of 56°F may be too high in some cases since salmon embryo mortality can occur at lower temperatures in hypoxia." (emphasis added). Also, the reviewer deleted the following sentence, but it should be retained since it was supported by a recent UCD literature review. "However, without daily average temperature criteria derived from local temperature tolerance studies, the EPA (2003) guidance provides the best available temperature tolerance criteria."

- So, I'd suggest something along the lines:

  "The EPA temperature recommendations remain the most robust management targets. There is a long standing precedent that the EPA guidelines represent the best available science and they have been the basis of Biological Opinions in the Central Valley (OCAP for Sacramento, American, and Stanislaus Rivers, Spring Creek) and FERC proceedings (Feather and Tuolumne Rivers). Recent studies such as Del Rio et al. (2019) have demonstrated thermal plasticity of various Chinook life stages, but haven't yet distinguished between the mechanisms of acclimatization to the local conditions versus thermal adaptation via genetic change, nor how to derive robust temperature targets from a physiological endpoint like aerobic scope. A 2018 literature review by the University of California Davis concluded that for most life-stages and species for which thermal performance data exists, the Region 10 guidelines appear to be protective against temperature-induced mortality. Although they may be sub-optimal and could use further refinement, in the absence of California-specific temperature guidance, the literature review recommended Region 10 Guidance for use in California (Zwillig et al, in prep)."

- Finally, the letter you referenced was from Lee Forsgren, a political appointee (Deputy Assistant Administrator) in EPA's Office of Water. Here's the key excerpt:

Forsgren Letter

With respect to the applicability of the EPA temperature guidance mentioned above, the EPA considers there to be an open and legitimate scientific question about the adaptability of salmonid populations to warmer conditions in California. The EPA is aware of research with salmonid species from California rivers that suggests populations at the southern limit of their distribution may be locally adjusted to warmer temperatures relative to more northern populations, and that these findings challenge the use of a single thermal criterion along the entirety of its distribution range. We would encourage FERC to use the most up to date research on the impact on fish populations in its review of these projects.

FERC Summary of Forsgren Letter

2018), EPA states that it is aware of research with salmonid species from California rivers that suggests populations at the southern limit of their distribution may be locally adjusted to warmer temperatures relative to more northern populations, and that these findings challenge the use of a single thermal criterion for their entire range. EPA concludes the issue of whether salmonid populations are adaptable to warmer conditions in California is an open and legitimate scientific question and encourages use of the most up-to-date research to evaluate the impact on fish populations.

On Tue, May 21, 2019 at 11:13 AM Cathy Marcinkevage - NOAA Federal <cathy.marcinkevage@noaa.gov> wrote:

> Stephen --
>
> The file below are Interior's comments on the draft effects analysis for the Shasta division for the ROC LTO. There are some comments related to the temperature component and additional studies that I would like your input on, mostly related to temperature thresholds.
>
> S:\Draft BiOp\2_ESA\2.5-2.6 Effects of the Action\Shasta Division\Upper Sac Comments Compiled_SOL Reclamation review 5.17.19.docx
>
> Specifically, with track changes ON:
>
> p. 67 references and insertions of Myrick and Cech 1994, USFWS 1999, DelRio et al 2018.
> p. 68 additional text and insertions/comments.
> p. 74 major revisions to "explain" the Anderson model.
>
> Please know that we are by no means poised to simply accept these edits and comments. First, NMFS writes NMFS' effects analysis. Next, many revisions are written as Rec would write them, not as the fisheries agency would. But we may discuss these in a meeting tomorrow and I'd like to have any recent thinking.
>
> Do you know much about the references that they inserted? I also recall a recent letter from EPA with regards to Tuolumne work that reflected that MID and TID made a case for "more local" data to be used instead of USEPA 2003. Can you provide me with any background or knowledge on that?
>
> I'll swing by in a few to chat about it.
>
> Thanks!
> Cathy

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