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**From:** Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>  
**Sent:** Wednesday, March 6, 2019 7:52 AM  
**To:** Sarah Gallagher - NOAA Federal  
**Subject:** Re: Maria's questions re: temperature dependent mortality by tier

Yes. That would further our understanding of the potential effect (or not) of the magnitude of allocation volumes. Please reply all to Evan's e-mail with that. Thanks.

Sent from my iPhone

On Mar 6, 2019, at 7:48 AM, Sarah Gallagher - NOAA Federal <[sarah.gallagher@noaa.gov](mailto:sarah.gallagher@noaa.gov)> wrote:

The only other thing Maria added was getting numbers for North of Delta contractors allocations from March-July. Should we ask for them?

**Sarah Gallagher | Fish Biologist**  
*NOAA Fisheries | West Coast Region*  
*U.S. Department of Commerce*  
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916-930-3712 | [Sarah.Gallagher@noaa.gov](mailto:Sarah.Gallagher@noaa.gov)

On Tue, Mar 5, 2019 at 9:03 PM Garwin Yip - NOAA Federal <[garwin.yip@noaa.gov](mailto:garwin.yip@noaa.gov)> wrote:  
Anything to add? I saw you were typing away when Maria was summarizing from her notes.

-Garwin-

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On Tue, Mar 5, 2019 at 4:00 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:

Hi all,

I tried to capture Maria's question(s) for Reclamation re: temperature dependent mortality and the Anderson "tier" approach to summer temperature management in the PA.

Howard please forward to Maria or Reclamation with ROCON leadership approval?

Evan

Clarification request for Reclamation:

**Q: What is the expected/modeled temperature dependent mortality associated with operating to each tier?** According to figure 5.6-21, under the proposed action about 25% of years would be expected to have a significant (~10% - 15%) amount of temperature dependent mortality. How is that mortality distributed across all operational tiers? (based on the CalSim II 1922 - 2002 period of record) "*Tier 1 years occur over 69 percent of the time and Tier 4 less than 8 percent of the time (Tier 2 in 17% of the years, and Tier 3 in 7% of the years)*" (pg. 5-20)

**Q: What drives the apparent improvement in the temperature dependent mortality in the PA relative to the COS?** It appears that for both the Martin and Anderson models the PA performs better than the COS with regard to temperature dependent mortality. What causes this? It is not clear that this is an effect of the operational tiers? On page 5-28 the difference is explained as "*the proposed action optimization of water temperatures early in the year leads to significant October improvements in temperatures driving these large improvements in temperature dependent mortality in wetter critically dry years.*" How does the PA affect the "*optimization of water temperatures early in the year*" relative to the COS? Is this improvement a result of a later start of temperature management in the PA (after COS May 15 start)? Are there other factors?

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