

---

**From:** Miles Daniels - NOAA Affiliate <miles.daniels@noaa.gov>  
**Sent:** Friday, April 19, 2019 4:12 PM  
**To:** Evan Sawyer - NOAA Federal  
**Cc:** Cathy Marcinkevage - NOAA Federal; Eric Danner - NOAA Federal; Garwin Yip - NOAA Federal  
**Subject:** Re: Summary/abstract on your IEP spring pulse/summer temp talk?  
**Attachments:** Spring\_Pulse\_Summary\_4\_19\_19\_MD.docx

Hi Evan,

Attached is a draft of the text summarizing the spring pulse modeling. Please let me know if you want more/less detail or content on other aspects not covered.

Thanks,  
Miles

On Tue, Apr 16, 2019 at 10:42 AM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hi Miles,

Thanks for calling, as we discussed, rather than have you develop a new (or expanded) analysis on spring flows and the effects to cold water pool or temperature dependent mortality could you provide some more detail on your existing analysis that was done for the IEP workshop (including the assumptions that went into the modeling)? Also if there are any general conclusions that can be drawn from you analysis, your description of those would be useful.

I've attached the intro section for our draft effects analysis regarding Reclamation's proposed Spring Pulse Flows to provide some context.

Thanks,  
Evan

On Mon, Apr 15, 2019 at 3:52 PM Miles Daniels - NOAA Affiliate <[miles.daniels@noaa.gov](mailto:miles.daniels@noaa.gov)> wrote:  
Hi Evan,

Can we talk tomorrow at 10? I'm currently waiting for a dental cleaning.

- Miles

On Mon, Apr 15, 2019 at 3:41 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hey Miles,

When you have a moment would you give me a call? I'd like to talk about whether or not you think it would be worthwhile to model the effects of spring releases (either for the discretionary North-of-Delta agricultural service contracts and/or the non-discretionary North-of-Delta Settlement Contract deliveries) on summer temperatures and temperature dependent mortality?

Thanks,

Evan

On Fri, Apr 12, 2019 at 4:18 PM Miles Daniels - NOAA Affiliate <[miles.daniels@noaa.gov](mailto:miles.daniels@noaa.gov)> wrote:  
Hi Evan,

Response below.

1) It is difficult to be certain of this without doing the modeling, but likely doing a pulse in March or April would have a different impact. How different is hard to say. So I would say that yes, it matters that I used those specific dates.

2) Yes, the same or similar approach could be used to assess effects of discretionary water allocation, however, there are a number of assumptions that would need to be considered for the modeling. Perhaps if this is of interest, we can have a phone conversation first to make sure the modeling efforts would be justified? As for the second part about being used as a management tool, I think it would depend on how confident we are on the modeling assumptions.

Thanks,  
Miles

On Fri, Apr 12, 2019 at 1:25 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hi Miles,

Thanks for the response. I heard you were at the SacRSP workshop yesterday so I knew you were busy. You are clear in your response but I also want to make sure I'm clear in the questions I'm asking.

Couple more questions:

1) Would the relation between a "spring" volume of water and summer WR temperature dependent mortality be the same if the pulse was implemented in March or April? (Reclamation is proposing to "consider" a spring pulse March - May 15) Does it matter that you modeled a pulse May 1 - May 15?

2) Could the same relation between a "spring" volume of water and summer WR temperature dependent mortality be applied to other uses of the "spring" water?

- As I mentioned in my previous email, Maria is interested in the effect of Reclamation's allocation of the (discretionary) agricultural service contracts which are of relatively small volumes (Averages: 1.4 TAF in March, 20.8 TAF in April, and 40.6 TAF in May). Can you apply the same analysis to the allocation of the agricultural service contracts as you did for the spring pulse to get at the change in summer WR temperature dependent mortality?
- Could this relationship be used as a management tool to compare, say, spring deliveries of agricultural service contracts with the effect on WR temperature dependent mortality? Could it be used to scale the contract deliveries along the lines of: "in Dry years reducing ag service contract deliveries by \_\_\_\_% would reduce WR TDM by \_\_\_\_%?"

Thanks,  
Evan

On Fri, Apr 12, 2019 at 12:19 PM Miles Daniels - NOAA Affiliate <[miles.daniels@noaa.gov](mailto:miles.daniels@noaa.gov)> wrote:  
Hi Evan,

Sorry for the delay in replying. Yes, it is fine with me if you include those figures. Responses to questions below, but feel free to follow up with more questions if I'm not being clear.

1) Water cost is showing the estimate of how much more water (TAF) would be needed to conduct the spring pulse, which is just taking the discharge time series of the pulse scenario and subtracting it from the discharge time series of no pulse scenario. The reason why this is not just a single number for a given year is because we ran a series of model simulations for each year, where the pulse started on a different day from May 1st to May 15th for a given year to quantify the range in expected water cost.

2) Yes, the mortality results are essentially showing an estimate of how using the additional volume for the pulse will impact temperature management later in the season and impact temperature-dependent egg survival. In this example we are considering the entire time period from the pulse to the end of December for a given year to look at temperature effects on survival. It is important to recognize that even though the pulse occurred in May, the impact to temperature management might not occur till the end of the season as that is when the volume of cold pool is likely at its lowest.

-Miles

On Wed, Apr 10, 2019 at 12:05 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hi Miles,

Thanks, but yeah that doesn't provide much more information.

After looking, I found your IEP presentation which Katrina Harrison (@ BOR) had forwarded to me. Could you (with supervisor approval) provide some detail on slides 6 and 7? Also would it be alright to use the figures on those slides (they say draft preliminary results <-- which is ok to use in a BiOp)?

Can you help explain slide 6 and 7 where you have figures of "Pulse water cost" and "winter-run egg survival" and how you got the results? Some specific questions:

- (slide 6) I don't understand what is meant by "water cost associated with sensitivity to pulse start date"?
- (slide 7) Are the survival/mortality results based on the change in survival caused by the change in Shasta storage associated with the pulse volume? For example in 2012 (BN) it looks like the mean pulse water cost would be ~26 TAF and the change in mean WR egg survival is a little less than 2%, is the change in survival just because of the ~26 TAF change in storage? Is that for a particular date of storage?
  - This may also be important as we're also trying to assess the relative effect of Reclamation's allocation of the (discretionary) agricultural service contracts which have a relatively small impact on Shasta storage but maybe (looking at your figures) could have an impact on temps/survival?

Thanks,  
Evan

On Wed, Apr 10, 2019 at 10:57 AM Miles Daniels - NOAA Affiliate <[miles.daniels@noaa.gov](mailto:miles.daniels@noaa.gov)> wrote:  
Hi Evan,

Attached is the IEP abstract, but it does not provide much detail. Let me know if you want more details or to talk about it more.

-Miles

On Wed, Apr 10, 2019 at 9:29 AM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hi Miles,

Do you have a summary or abstract for your IEP presentation on the relation between a spring pulse and summer storage/temp? I had included some information based on the presentation slides and our discussion of them but Maria is asking for some more details including any figures (apologies I know you sent me the presentation but I can't seem to find it atm).

Thanks,  
Evan

--

**Evan Bing Sawyer,**  
Natural Resource Management Specialist  
*NOAA Fisheries West Coast Region*  
*U.S. Department of Commerce*  
Office: (916) 930-3656  
[Evan.Sawyer@noaa.gov](mailto:Evan.Sawyer@noaa.gov)  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



--

Miles Daniels, Ph.D.  
Assistant Project Scientist  
University of California, Santa Cruz  
Phone: 831-420-3946

--

**Evan Bing Sawyer,**  
Natural Resource Management Specialist  
*NOAA Fisheries West Coast Region*  
*U.S. Department of Commerce*  
Office: (916) 930-3656  
[Evan.Sawyer@noaa.gov](mailto:Evan.Sawyer@noaa.gov)  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



--

Miles Daniels, Ph.D.  
Assistant Project Scientist  
University of California, Santa Cruz  
Phone: 831-420-3946

--

**Evan Bing Sawyer,**  
Natural Resource Management Specialist  
*NOAA Fisheries West Coast Region*  
*U.S. Department of Commerce*  
Office: (916) 930-3656  
[Evan.Sawyer@noaa.gov](mailto:Evan.Sawyer@noaa.gov)  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



--

Miles Daniels, Ph.D.  
Assistant Project Scientist  
University of California, Santa Cruz  
Phone: 831-420-3946

--

**Evan Bing Sawyer,**  
Natural Resource Management Specialist  
*NOAA Fisheries West Coast Region*  
*U.S. Department of Commerce*  
Office: (916) 930-3656  
[Evan.Sawyer@noaa.gov](mailto:Evan.Sawyer@noaa.gov)  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



--

Miles Daniels, Ph.D.  
Assistant Project Scientist  
University of California, Santa Cruz  
Phone: 831-420-3946

--

**Evan Bing Sawyer,**  
Natural Resource Management Specialist  
*NOAA Fisheries West Coast Region*  
*U.S. Department of Commerce*  
Office: (916) 930-3656  
[Evan.Sawyer@noaa.gov](mailto:Evan.Sawyer@noaa.gov)  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



--

Miles Daniels, Ph.D.

Assistant Project Scientist  
University of California, Santa Cruz  
Phone: 831-420-3946