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**From:** Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>  
**Sent:** Friday, April 26, 2019 9:37 AM  
**To:** Howard Brown - NOAA Federal  
**Cc:** Cathy Marcinkevage; Garwin Yip; Ellrott, Brian  
**Subject:** Re: Uncertainties doc update  
**Attachments:** 2019.04.25\_Uncertainties--BB--SG--JS--EBS--BE.docx

Howard, Brian had a few edits to the American River bullets I drafted; his edits are shown in track change to the attached doc (base doc is what Evan sent over yesterday).

On Fri, Apr 26, 2019 at 8:29 AM Howard Brown - NOAA Federal <[howard.brown@noaa.gov](mailto:howard.brown@noaa.gov)> wrote:  
Thank you everyone for contributing to this list of uncertainties! I really appreciate the fast turnaround on this.  
Howard

On Thu, Apr 25, 2019 at 8:10 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Sorry I'm late (still kinda light out),

Added the Sacramento to the document and here they are as well (if you want me to pick a top 5 I can):

- Winter and Spring operations are uncertain in that they are not defined beyond setting a minimum flow. There are no other criteria regarding winter and spring operations that would support the likelihood of Reclamation operating to a given summer temperature Tier.
- It's uncertain whether Reclamation would implement a spring pulse flow in a given year because of the caveats to implementation and whether a spring pulse would cause "Reclamation to drop into a lower Tier of the Shasta summer temperature management or interfere with the ability to meet other anticipated demands on the reservoir."
  - It's also uncertain as to the effect of the spring pulse. There is the indication that a spring pulse would benefit outmigrating juveniles and there is a study proposal ready to examine these effects but there is still uncertainty.
- Uncertainty with the Tiered cold-water Pool temperature management strategy:
  - General concept based on new (not yet published) research.
  - Operations 'within' Tiers 2 & 3 are not defined in a descriptive or measurable way. Uncertainty regarding how Reclamation would calculate the duration of temperature management. I don't believe that modeling of the shutter configurations needed to operate to Tier 2 & 3 years were included in the modeling we've received (we just got the presentation of the 5 example years which attributed most of the increased survival under the PA to a higher initial storage.).
  - Duration of temperature management is uncertain it "would start after May 15, or when the monitoring working group determines, based on real-time information, that Winter-Run Chinook Salmon have spawned, whichever is later. Temperature management would end October 31, or when the monitoring working group determines based on real-time monitoring that 95 percent of Winter-Run Chinook Salmon eggs have hatched, and aelvin have emerged, whichever is earlier."
  - Uncertain what operations would be after temperature management season ends if it ends 'early' per the condition above. High hot flows? Low warm flows?
  - Uncertainty to the temperature effect of these operations on spring-run redds (and fall-run).
  - Tier 4 "interventions" are not defined with enough specificity to understand the impact. The LSNFH increased production is not described either but the general proposal is understood

because it is already covered under the hatcheries HGMP. When increased production would be considered is uncertain. All Tier 4 years? Drought, an undefined (uncertain) term linked to increased LSNFH production in BA table 4-1. Are

- Not enough certainty with (most) of the “conservation measures,” some not enough to even deal with programmatically. Example: Spring management of spawning locations, A single sentence refers to “experiments” as part of “adaptive management”.

Evan

On Thu, Apr 25, 2019 at 4:37 PM Barbara Byrne - NOAA Federal <[barbara.byrne@noaa.gov](mailto:barbara.byrne@noaa.gov)> wrote:  
Here is the latest document. Includes Clear Creek, American, Delta, Stanislaus/SJR

On Thu, Apr 25, 2019 at 2:49 PM Howard Brown - NOAA Federal <[howard.brown@noaa.gov](mailto:howard.brown@noaa.gov)> wrote:  
I think uncertainties regarding effects are the main thing that I am looking for. I think that there are really three tiers to choose from with the first probably being the top priority (sorry Evan, no 4th tier)  
1. Uncertainties in how a species or habitat would actually respond to an actions.  
2. Uncertainties related to process for decision making  
3. Uncertainties related to scientific understanding or interpretation of science  
Hope that helps.  
Howard

On Thu, Apr 25, 2019 at 2:33 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hey Howard,

I have a question regarding the type of uncertainty you're looking for? I don't know about other Divisions but in the Sacramento River there are 2 types of uncertainties: uncertainties related to the way the PA is (or isn't) described (operational uncertainty?), and uncertainty as to what effects are?

Using the proposed spring pulse as an example, that project component has both types of uncertainty.

- First, it's uncertain when Reclamation would implement a pulse because of the caveats to implementation and whether a spring pulse would cause "Reclamation to drop into a lower Tier of the Shasta summer temperature management or interfere with the ability to meet other anticipated demands on the reservoir."
- Second, it's uncertain as to the effect of the spring pulse. There is the indication that a spring pulse would benefit outmigrating juveniles and there is a study proposal to look at these effects but there is still uncertainty.

I think the second uncertainty, the type that would benefit from adaptive management, is what you're looking for?

Thanks,  
Evan

On Thu, Apr 25, 2019 at 2:03 PM Howard Brown - NOAA Federal <[howard.brown@noaa.gov](mailto:howard.brown@noaa.gov)> wrote:  
Sorry for this late-in-the-day request, by I am hoping you folks might be able to pull together a short list of key uncertainties from your effects analysis drafting. I am meeting with Reclamation and FWS tomorrow to discuss adaptive management and it would be more than helpful to get your latest views on uncertainty. I suggest now more than key uncertainties per division. Short bullet points would be perfect. COB today would be ideal!  
Thank you!

Howard

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