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**From:** Cathy Marcinkevage - NOAA Federal <cathy.marcinkevage@noaa.gov>  
**Sent:** Friday, June 14, 2019 2:30 PM  
**To:** Evan Sawyer - NOAA Federal  
**Cc:** Brian Ellrott - NOAA Federal; Garwin Yip - NOAA Federal  
**Subject:** Re: Flow Survival (what you were thinking?)

We had a plot that had EOA and EOS storage. See Figure 2.5.2-3 here, tracks on:

S:\Draft BiOp\2\_ESA\2.5-2.6 Effects of the Action\Shasta Division\Archive\2.5 and 2.6 Upper Sac Effects V15.docx

p values are low, but there's definitely a relationship.

On Fri, Jun 14, 2019 at 2:25 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
I'm not sure. In the "winter minimum flow" and the "fall and winter refill and redd maintenance" sections we point out the in 20% of years modeling indicates EOS storage would trigger the lowest fall, winter and spring flows (3,250). I haven't look at how end of April storage (which determines Tier) correlates to end of September (which determines fall/winter/spring flow) but there's potential there for operations to have a double hit on that brood year. 1) warmer temperature management tier (lower storage) has increased TDM and lower egg to fry survival, then 2) lower (or lowest) fall and winter flows reduce survival of out migrating juveniles. Ugh. I'll take a look at EOA and EOS storages to see if they do line up (which could be bad for the species).

Evan

On Fri, Jun 14, 2019 at 12:58 PM Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)> wrote:  
Thanks for cleaning up some of the grammar issues I mistakenly brought in.

Is there a more specific condition we can refer to wrt the occurrence of the flow reductions than saying they would happen in years when e-of-sept storage is lowest?

On Fri, Jun 14, 2019 at 10:37 AM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hey Cathy,

Within the attached document is a brief write-up of the Flow/Survival relationship. I had drafted it thinking it could go right before Table 2.5.2-18 in section 2.5.2.3.4.1 Fall and Winter Refill and Redd Maintenance. Brian has reviewed and I've incorporated his comments and revisions.

Evan

On Fri, Jun 14, 2019 at 7:51 AM Brian Ellrott - NOAA Federal <[brian.ellrott@noaa.gov](mailto:brian.ellrott@noaa.gov)> wrote:  
Yes! Looks great. I made some suggestions. Let me know what you think and then I'll work it into the I&S. It will be repetitive with your Effect Section write-up but that's what you get when the ship is sinking.

On Thu, Jun 13, 2019 at 10:24 PM Evan Sawyer - NOAA Federal <[evan.sawyer@noaa.gov](mailto:evan.sawyer@noaa.gov)> wrote:  
Hey Brian,

Can you take a look at the attached?

Thanks  
Evan

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