From: Cathy Marcinkevage - NOAA Federal <cathy.marcinkevage@noaa.gov>
Sent: Wednesday, May 1, 2019 5:55 PM
To: Joe Heublein - NOAA Federal
Cc: Page Vick - NOAA Affiliate
Subject: Upper Sac Winter-Spring Minimum Flows

Hey Joe (and cc'ing Page for learning purposes!) --

I'm tying up loose ends on the Shasta division section and have some more questions on the potential effects to GS.

For the Upper Sac Winter-Spring Minimum Flows component of the PA, here's what I have. Is there anything to add to this?

Green sturgeon life history timing is such that spawning occurs from April through July with the median spawning May (Poytress et al., 2015), it is unlikely that green sturgeon will be present in the upper Sacramento River in the December-February period when Reclamation is managing the Winter-Spring Minimum Flow component of the PA. However, adult green sturgeon migrate up river in March to early April, and spawning migrations often coincide with high Delta outflow in the spring. Therefore any reductions in late winter flows that affect Delta outflow in February and March could impact spawning migration cues.

Green sturgeon also over-summer in spawning habitats and may be triggered to outmigrate with the first high flows, which sometimes occur in December. Though the extent of this is not defined, prolonged low winter flows could strand adult green sturgeon in spawning habitat. This was recently observed in the Feather River when green sturgeon outmigrated after 1 year+ in the upper river.

We also had this table (only the bottom line, which is all NA, applies to GS). Given what you told me and what I wrote above, do you agree that these should be NA? Or would the "Altered Flow" stressor apply here?

Species	Life-stage	Exposure	Risk	Stressor	Response as Expected Change in Fitness (Method Used)
				• Loss of Natural River Morphology and Function	
Green Sturgeon	NA	NA	NA		NA

Happy to hear any thoughts you have on this so taht we don't overlook any potential stressors to our old green friends.

Thanks!
Cathy