

Hi Jeff and everyone at the LCFF,

Here's an update on our progress with the food web study:

The main objective of the second phase of our research is to estimate the predation impacts of lake trout (and potentially Chinook salmon) on kokanee under a set of alternative fishery management scenarios. Over the last six months, we have been collecting new field data, analyzing our existing samples, and compiling information from the literature to move towards this goal. This summer, we used hydroacoustics to characterize the distribution of kokanee and their predators during the day-dusk-night time sequence. A large amount of predation typically takes place during dusk, when kokanee have left the protection of schools but enough light is still available for predators to see them. We collected light penetration and water turbidity data during these sampling trips as well to allow us to estimate how effectively predators can search for prey in Lake Chelan. These data will drive visual foraging models specific to each predator species. A foraging model for lake trout has been already published and tested against field data, but no such model currently exists for Chinook salmon. We are reviewing the existing literature on Chinook salmon foraging behavior to develop a preliminary Chinook foraging model.

We are also working on follow-up analyses to make the most of the samples collected during the first phase of the study. The outlook is good for the most ambitious of these analyses, using genetics to determine the species of unidentifiable prey from stomach samples. Earlier this summer, we prepared these prey for analysis and delivered them to a fish genetics lab at UW. This lab recently had great success with identifying pollock remains in the stomachs of Chinook salmon captured in the Bering Sea, a system with dozens of potential prey species. They expect to have little trouble assigning species IDs to our samples from the much smaller pool of species present in Lake Chelan. We are excited to be able to put this powerful technique to use in our study. These results will allow us to estimate with greater precision the predation impacts on kokanee and less abundant salmonids like cutthroat trout.

At this stage, we could use some input from the Forum. We plan to simulate the effects of alternative management scenarios on the balance of predators and prey in the lake. Our first step will be to evaluate the status-quo, and provide some guidance on whether predator and prey populations are currently in balance. What we need from the managers and stakeholders are some suggestions for other management scenarios you would like us to test. These might include changes in stocking and harvest of kokanee, lake trout, or Chinook. For example:

- If kokanee stocking were reduced by 50%, would predation increase on the naturally spawning kokanee population? If so, how many additional adult equivalent kokanee would be consumed?
- If the Chinook salmon population were enhanced to some level (say 10,000 adults surviving to spawn), how many adult equivalent kokanee would they consume?

- If the Wapato Basin lake trout population were reduced to 50% of its current abundance by encouraging harvest with a derby or bounty, how many fewer adult equivalent kokanee would be consumed?
- If a slot limit were put in place to enhance the abundance of Wapato Basin lake trout greater than 30" total length by 75%, how many additional adult equivalent kokanee would be consumed?

We don't need a list of scenarios right away, but if any interested parties can start thinking about this now, we will solicit your ideas in the near future. We can include other pelagic species (e.g. cutthroat trout) as well, but we will be data limited for rare species. Foraging models are not available for littoral species like pikeminnow and smallmouth bass, so we can answer questions about the current predator-prey interactions of these fish, but it will be difficult to evaluate "what if" type scenarios like for the pelagic species.

Of course, no model is fully realistic and we don't expect our models to predict the future perfectly. Instead, we will be better off treating these scenario predictions as useful tools to help explore management options and tradeoffs, which are best balanced with other data, case histories from similar lakes, and intuition.

Hope you are all doing well. As always, please give me a call or email if you have any questions, ideas to share, or would like to see any data.

Cheers,

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