

Humpback Status and Trends (9:45 a.m.) - Questions & Answers for Carl Walters

Questions/Answers:

Bruce Taubert: Got the impression that all HBC seem to be reproductive and return to the LCR to reproduce therefore it seems like the LCR is a broad section of genetics sampling of all the fish available in the Grand Canyon. Am I leaping a little too far?

Carl Walters: That's my personal reading. If we're seeing them in the LCR at spawning time then they are undergoing a spawning migration and probably are going back to where they were born. In the last 2 years some have been found down by river mile 170 that may represent spawning around Lava Falls so it does appear there are fish attempting to spawn in those other areas and not undergoing the migratory trek back to the LCR.

Bruce Taubert: Numbers are important because the recovery goals talk about numbers and we've had a good deal of dialogue in the last 6-8 months concerning numbers. Yours is the first time that I've absorbed 3200. I've absorbed 1800, 2000, and 2200 but never had anything as high as 3200. Your figures actually show that the low estimate in 2002 4+ fish is higher than the highest I've been given. Can you tell us a little bit about that? (Taubert)

Carl Walters: There's no way there are only 2000 fish out there. The whole estimate we have now would be from the cold population accurate marked recapture estimate made within the Little Colorado in the springtime in the last year. What we've now found from looking back at the capture histories of a lot of individual fish in the system is that by the first of April a fairly high proportion of the spawning have already left the system. They've come in much earlier and they're already out so they weren't included in that population estimate. Our longer term analysis scheme keeps track of all the fish over multiple years and it's basically telling us that there must be at least 1000 fish that were missed at the time the 2000 were estimated to be just in the Little Colorado. By that time about 1000 fish had either moved back out after spawning or were skipping spawning. It could be as high as 2000 in the mainstem. In fact, Lew's latest numbers show 2000 or more. We get a lot of uncertainty about that absolute estimate of the lowest number we get for the total is about 3000. The highest estimate is about 2000 in the mainstem at that time. The difference between this fairly large range in our spawning stock estimate from 2,-4,000 comes from our inability to pin down exactly the natural mortality rate of the animal. When we set the natural mortality rate to 16% per year, we get a population estimate of 4,000. When we move it up to 18%, the population estimate drops to 3000. We simply cannot pin down that mortality rate any tighter with the data we have partly because there was a huge change in the sampling. Most of the fish we're studying today for survival work were actually tagged by Mike Douglas in the early 1990's. We're tracking them forward in time but the tracking is confounded because there were only changes in sampling and much less work over the years and we still have a tangle of how much of the effect of looks like survival because there was less science going on. It's going to take us another 5 years to stabilize that. Our absolute numbers aren't going to get any better until we can get the survival pinned down. We could invest in massive marked recapture work in the mainstem to pin the numbers down but all my instincts tell me that that would be a hideous waste of our field time. The most important thing we need right now is to find out whether the mainstem is rearing any juveniles at all. This is why there is a big uncertainty whether it is only the Little Colorado that is rearing. Everyone is spawning up in the LCR. The successful juvenile survivors seem to be the ones that stay there. A lot of juveniles drift out or are forced out into the mainstem. We don't think any of those survive anymore. The main impact of a TCD on a population would be to allow those juveniles to survive.

Bruce Taubert: Define a juvenile for me.

Carl Walters: They are 6-month old baby fish (50 mm)

Sam Spiller: What is a rough estimate in regard to 6-month old juveniles going out into the mainstem and being lost?

Carl Walters: Probably 50-100K per year, less than ½ of 1% of rainbow trout die.

Sam Spiller: What percent of that 50-100K are being lost?

Carl Walters: 100%. The ones that get into the mainstem. When they are flushed out, they go out into the mainstem for a period of a few months or so while it is warm enough, and then most of them move back up as juveniles back into the LCR to rear. If they weren't out in the mainstem as juveniles during the massive scouring and up through the spring, that movement option has been cut off.

Bruce Taubert: In sturgeon both sexes skip spawn. Is your evidence indicating that the males are not in the LCR every year?

Carl Walters: We haven't looked at the sex structure. Rich (Valdez) and I discussed this morning and don't have any guesses.

Bruce Taubert: Your discussion leads me to believe that some of the discussion we've had concerning a more rigorous attempt to put more time in the field to get population estimates may not be as fruitful as we think it would be. Right?

Carl Walters: I would rather see money spent on helping us understand the life history structure and where successful recruitment is being reared. I don't think our population estimates are off that far. I don't think it's a real issue as to whether there is a separate population in the mainstem. We have so many tagged fish turning up in both places. It shouldn't be a priority and it would be a logistical nightmare that wouldn't yield much useful data.

Pam Hyde: Does your spreadsheet take into account the number of recruits coming into the system? Do have any assumptions about carrying capacity? So that if we have virtually no carrying capacity in the mainstem now could there be some limits on the carrying capacity within the LCR itself?

Carl Walters: I think what we're seeing is on the order of 5,000 one-year old recruits per year in the carrying capacity of the LCR. The number is just too consistent over the last 8 years or so to not represent the carrying capacity being filled. The obvious juvenile dispersal pattern is not migration losses so we're also not seeing rearing capacity. There is no question that the 1983 cohort emigrated at much higher rates than typical and that most of them died. Every biology sign we have says the LCR carrying capacity is around 5000. The issue is not about triggering spawning, the issue is about providing juvenile rearing capacity.

Clayton Palmer: Currently the USBR is conducting a wintertime experiment where they're attempting to disadvantage some exotic fish and trout so wouldn't it be a useful idea to do some monitoring of juveniles as they come out of the LCR in the mainstem as this experiment happens to see if there are greater or lesser abundance of juveniles in order to get a quicker

indication of whether the experiment is accomplishing something in terms of getting rid of exotic fish? Can we get some notion about how the experiment is coming along prior to waiting for 4 years to capture adults?

Carl Walters: We've talked it through about 10 times and can't see any way to do it in a logistically affordable way. We would basically have to put a crew sitting at the mouth of the LCR for about 3 months. Lew may be able to say something about this.

Lew Coggins: Associated with our mechanical removal trips, we are conducting hoop netting to look at relative abundance in the mainstem, down from the LCR. We are actually seeing some pretty interesting numbers for the period between January, February, and March for those first three trips and it's too soon to say it has anything to do with our mechanical removal efforts but we caught on the order of over 3 times as many small HBC in our hoopnets during our March trip as we did in our February trip. Typically the pattern that has been observed with electrofishing and hoop netting is that you see fish get pushed out the LCR and then they quickly decay in terms of their abundance in the mainstem. What we have seen over time this early winter and spring is an increase in the numbers of fish we were observing right down stream in the LCR. It's too early to say how that trend might be influenced by our removal efforts. The plan is to continue to use hoop nets to monitor relative abundance downstream of the LCR.

Clayton Palmer: Is this response consistent with Carl's logistical problem?

Carl Walters: They're doing that because they're down there already on the mechanical removal. It's affordable.

Jeff Cross: If the issue is providing juvenile rearing capacity in the mainstem, what kind of management actions would you recommend this group consider to actually accomplish that?

Carl Walters: I think it has to involve warming and so the two options would be warming and stable flows. The warming would be a much safer option in terms that it would make extensive areas potential rearing usable. Stable flows create few little warm spots by the LCR, not much. The problem with both of those is we don't know what the warm water exotics are going to do in response. The models we have of this, one model says oh chubs are going to about double and the other model says chubs are going to go right down because there is going to be river full of channel cats or carp or a number of other juvenile chub predators. We've been doing a bunch of policy analysis on this and those two options are coming out as the strongest we could recommend.

Sam Spiller: Which model is in the lead?

Carl Walters: It's a straight coin toss. We just do not know how the warm water exotics will respond to a warm clear system. There is no historical precedent for it.

Sam Spiller: That's where you see adaptive management coming in?

Carl Walters: Oh yeah, that's why we recommended an adaptive experimental approach.