Clackamas Summer Steelhead Study Debunked
Doubts cast on recent Courter Study

Based on careful review of the recently released Courter Study regarding the effects of hatchery summer steelhead being released on the Clackamas River, the authors made multiple assumptions, several which cripple the study's conclusions.

The most surprising element is examining the trend in Clackamas wild winter steelhead when the hatchery summer steelhead program was in place verses when it was not – an issue is discussed in detail below.

However, a completely fatal flaw is the study's assumption about when wild winter run steelhead were present in the Clackamas, which was assumed to be not before February 15 annually. The study also made assumptions about age class, which is another fatal flaw, particularly as used in steelhead stock-recruitment models.

Overall, the Couter Study tries to focus on effects of summer hatchery program on wild fish above a dam. There are problems with this analysis. First, any fish spawned above the dam had to get downstream. Many juvenile steelhead migrate downstream to rear in lower river reaches prior to smolting. That means these fish must make a successful downstream passage by the dam and also that those downstream migrating fish enter an area with hatchery fish and hatchery x wild hybrids. Thus, even by excluding the hatchery fish upstream, wild juveniles must still migrate downstream to rear in areas with hatchery fish. Further, any wild smolts that are emigrating downstream still face competition and predation effects associated with the hatchery smolts. This is key, because it means they only excluded one type of effect by removing hatchery fish from upriver: the potential for interbreeding adults. Consequently, there still could be other hatchery effects occurring downstream that this model doesn't account for, and those effects can be as strong or stronger than the adult interbreeding issues between hatchery and wild fish.

Second, as mentioned in the introduction, the authors make a faulty assumption that wild winter steelhead in the Clackamas historically only entered from February 15 to May 31. They assume this in order to split up hatchery and wild winter runs. To make it clean, the authors assume no wild fish entered when the hatchery fish were coming in. They even go so far as to say those early fish that did not outwardly appear hatchery were presumably unmarked hatchery fish or hatchery x wild hybrids. No citation was provided for this assumption in either case.

Across the Columbia, in the Washougal River, a substantial portion of the winter steelhead were early-timed adults. In fact, most of them were likely in the river by end of March, just as wild winter steelhead migrate on the Oregon coast. The Courter Study author's assumption is entirely flawed in this regard. Furthermore, they fail to cite anything to support their claim. Importantly, this assumption has a dramatic effect on the study's entire result because since there are more wild winter-run steelhead entering the Clackamas early, it influences the entire stock-recruitment model. The result is that their model makes serious assumptions that are flawed, and they do so without any citation or data to support it.

Third, stock-recruitment models require good data on fish age, which is critical due to the need to reconnect recruits to brood year classes. This is difficult in steelhead because of multiple potential year classes of smolts and adults. Scale data is needed to determine age, and the authors only collected scales from 5-65 fish per year, and only 333 fish in total from 1982-1997. Scientists may be able to fill in missing data using models, but no matter how well you manipulate a model, it's nearly impossible

to expand an analysis when the sampling includes merely about 16.5 fish/year in a population that regularly consists of several hundred to thousands of adults. That type of uncertainty in data leads to lots of uncertainty in model results, which might explain why they excluded one of their stock-recruit models – saying it produced biologically unreasonable results. Regardless, steelhead are highly complex, and therefore, it is difficult to make assumptions about age class.

Fourth, the authors also found a positive effect of hatchery fish on wild fish. That would be extremely unlikely, and especially so for an out-of-basin stock - one which is a completely different life history (summer v winter). It is hard to reconcile, and it suggests that the authors have made multiple assumptions and are trying to reconcile uncertainty in multiple phases of their work.

Fifth, returning to issue of recent trends, the Clackamas differs greatly from the Upper Willamette. The Upper Willamette has had extremely low returns the past two years, while the Clackamas did not. This difference suggests that there are discrepancies in trends. The authors only looked at trends over all the years combined - most researchers would have used a model to parse out the relative strengths of trends over time. Simply examine the nearby Willamette wild winter steelhead that dropped precipitously, while Clackamas wild winter steelhead have a slight upward trend - all since hatchery fish were eliminated in around 2000. The 1975 to 2000 trend for Clackamas wild winter steelhead was downward/declining while hatchery summer steelhead were released.

Lastly, they can't directly counter the most definitive study by Kathryn Kostow. Kostow also used estimates of smolt production, but Courter et al is critical of the data Kostow relied upon. It is an interesting criticism, considering that the Courter Study also appears to suffer from the same issue: missing data that is filled in with assumptions. Reviewers cannot have it both ways – discrediting the Kostow work for lack of complete data and use of assumptions – and standing by their own work which suffers the same deficits.

The study results here suffer from all the uncertainty and assumptions. Further, the Courter Study failed to evaluate what happens when you eliminate all hatcheries from a basin. The managers in the Clackamas only removed one type of hatchery, therefore, the target fish – wild winter steelhead - are still being subjected to hatchery effects from hatchery winter steelhead, coho and chinook.

Overall, if there is a positive hatchery effect in such a study, it would be the first anyone would be aware of. Still, some papers don't find negative effects from hatchery fish. There are always outliers, as we all likely know someone who has bucked the trend - smoking and drinking their entire lives without getting cancer. They are the exceptions to almost any rule. The weight of scientific evidence suggests most people will have shorter lives if they live that way.

The same is true in hatchery science. The weight of evidence is overwhelming. As evidence, one Canadian researcher summarized over 100 hatchery papers and found 88% had a negative effect of some kind on the wild fish. Every study is but a single piece of research. Some more valuable than others. Ultimately however, considering the uncertainty, policy and opinions must be made based on the weight of evidence. In the case of hatchery fish, there is little argument otherwise.

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