

## POLICY NOTE

# Risk and science for Lewis River salmon

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### Key Findings

1. Federal agencies are currently deciding which strategy would best promote salmonid populations along the Lewis River in southwest Washington state.
2. Policymakers often call for following the science, but the science is almost always incomplete, which requires consideration of the perspectives and risk tolerances of the parties involved in environmental decisions.
3. For the federal service agencies, the salmon-protection decision will take into account more than just science and predictive modeling.
4. Studies found that, along with significantly lower cost, the Full In-Lieu option would yield the largest salmonid populations in the Lewis River.
5. If, however, funding does not provide the predicted amount of habitat, fish population projections may fall short of goals.
6. Science provides guidance on environmental questions but on its own, scientific modeling cannot indicate the best policy option.
7. The federal services should be clear about the underlying risk tolerance they are accepting and explain how they considered overall costs and environmental benefits in making their decision.

### Introduction

When policymakers and government agencies make decisions about salmon recovery, or other environmental issues, science is frequently the touchstone they cite as the deciding factor in choosing a policy. This is appealing for several reasons.

First, it seems like an objective standard that puts results ahead of politics. Second, it absolves policymakers of responsibility for choosing between constituent groups and dealing with backlash from those unhappy with decisions. “I followed the science,” they can say. Finally, citing “science” as the justification helps mask more self-serving motives.

Science, however, is almost always incomplete and the vacuum left by uncertainty is filled by the unique perspective and risk tolerance of the parties involved in environmental decisions. The debate about fish passage and recovery at the dams on Lewis River in Southwest Washington offers a case study of how appeals to science can hide differences that have more to do with differing goals and who has skin in the game than objective science.

### Recovery of Lewis River salmon

NOAA Fisheries and the U.S. Department of Fish and Wildlife, commonly referred to as “the Services,” are currently deciding which strategy would promote recovery of salmonid populations along the Lewis River. The options range from creating full fish passage around the dams along the entire length of the river at a cost of \$185 million, to an approach (known as the “in-lieu” approach) that would improve salmon habitat along the river and in the area at a cost of \$40 million.

Despite a significant public and scientific process, there is still dispute about the proper approach. Independent scientific modeling demonstrates the “in-lieu” approach is not only the least expensive for PacifiCorp and its ratepayers, but also yields the greatest number of salmon. That independent modeling has not ended the debate.

An examination of the dispute demonstrates that while science is certainly playing a role in guiding the discussion, the driving factor appears to be a disagreement about goals and values between PacifiCorp and the Cowlitz Tribe.

For the Services, whose responsibility is to “achieve genetically viable, self-sustaining, naturally reproducing, harvestable populations above Merwin Dam greater than minimum viable populations,” the decision will take into account more than just science and modeling.<sup>1</sup> The case provides a lesson for policymakers and agencies making environmental policy across a range of issues.

## **The options for salmonids and Lewis River**

Operated by PacifiCorp, the dams on the Lewis River are managed to generate electricity as well as providing other amenities, including recreation. As part of re-licensing the dams, PacifiCorp entered a settlement agreement with a number of other local parties, including the local utility district, the National Marine Fisheries Service (now NOAA Fisheries), the U.S. Fish and Wildlife Service, sport fishing advocates, two area tribes, and others in the local community.

Among the goals of the agreement is to “adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat).”<sup>2</sup>

The agreement outlines an approach to achieve that goal, but allows the parties to provide information that changes the approach, pursuant to approval by the Services. The agreement notes that “new information” may be provided that “could result in the Services determining that reintroduction or fish passage for anadromous fish is inappropriate.” PacifiCorp argues it has new information that should change the approach to salmon recovery in the river.

There are now two options on the table being considered by the Services and a decision is due in the near future about whether there should be a change in approach. One would create Full Fish Passage, allowing the fish to move from the body of the Lewis River, past the Merwin Dam and through Lake Merwin, then past the Yale Dam, through Yale Lake to Swift Dam, and then move into Swift Lake. This would cost an estimated \$185 million in total.

The second option, called “Full In-Lieu,” would spend \$40 million to create habitat in the lower Columbia, including the Lewis River, that would improve overall salmon habitat but would not provide full passage for fish up the Lewis.

## **Request for independent modeling**

Since the goal is to promote sustainable fish populations, the key question is which of these approaches does best. That question was put to ICF International, a consultancy providing ecosystem modeling to determine which of the strategies would yield the greatest population of salmonids.<sup>3</sup> ICF is well known and was hired by the Puget Sound Partnership, EPA, and the Northwest Indian Fisheries to

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1 Settlement Partners, “Settlement Agreement Concerning the Relicensing of the Lewis River Hydroelectric Projects,” November 30, 2004, p. 17, [http://www.pacificorp.com/content/dam/pacificorp/doc/Energy\\_Sources/Hydro/Hydro\\_Licensing/Lewis\\_River/sad/Lewis\\_River\\_Settlement\\_Agreement\\_Final.pdf](http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Lewis_River/sad/Lewis_River_Settlement_Agreement_Final.pdf)

2 Settlement partners, p. 13

3 ICF International, “Fish & Aquatic Sciences,” <https://www.icf.com/work/environment/aquatic-sciences>

analyze the impact of Shoreline Management Plans in Washington counties along Puget Sound.

After comparing the Full Fish Passage and Full In-Lieu options, ICF found that, despite the significantly lower cost, the Full In-Lieu approach, as proposed by PacifiCorp, would yield the largest salmonid populations in the Lewis River. There is a significant amount of habitat enhancement available, and the funding would improve the habitat downstream of Merwin Dam and upstream of Swift Dam.

In the “Fish Passage Decision Support Document,” ICF’s model results found that, “For all species combined, the most adults (18,344) were produced under” the Full In-Lieu alternative. They also found that, “The lowest performing alternative was Alternative 2 [Full Fish Passage] wherein fish passage is provided at all three projects and no restoration of habitat occurs.”<sup>4</sup>

One key factor in this result is that salmonids passing through Lake Merwin are subject to high predation by Northern pikeminnow. As a result, bypassing that body of water and artificially moving fish all the way upstream would significantly reduce the mortality of fish, yielding higher overall populations.

The Full In-Lieu approach yielded higher populations for spring Chinook, Coho, and winter Steelhead. For example, the population of spring Chinook would be about 40 percent larger under the Full In-Lieu approach than the Full Fish Passage approach.

Finally, Pacificorp notes that full passage could increase competition for bull trout in Yale Reservoir, which is also a listed species. If full passage ends up harming one listed species to help another, it would be one-step-forward and one-step-back, especially since Pacificorp has already invested \$5 million to improve bull trout habitat.

## **Objection to findings**

The Cowlitz Tribe has objected to the conclusion, focusing on a few concerns. They believe the Full Fish Passage option is most likely to be more effective.

With regard to predation, the Cowlitz Tribe believes the concern is exaggerated. In a letter to NOAA Fisheries, they argue research from a University of Washington student shows, “Merwin predation posed a modest, lower-than-expected risk to reintroduced salmonids.”<sup>5</sup>

They note that much of that research was used by the U.S. Geological Survey in their analysis of the options, although the conclusions were changed by USGS. As a result, the tribe argues that salmonids should be introduced to Merwin Lake and along the entire range of the Lewis River because the risk of predation is manageable. Although they did not provide revised models with this changed

4 Lewis River Science Work Group, “Lewis River Hydroelectric Project: Fish Passage Decision Support Document,” July 28, 2017, p. 15, [http://www.pacificorp.com/content/dam/pacificorp/doc/Energy\\_Sources/Hydro/Hydro\\_Licensing/Lewis\\_River/li/acc/Final\\_Decision\\_Support\\_July\\_28\\_2017%20\(website\).pdf](http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Lewis_River/li/acc/Final_Decision_Support_July_28_2017%20(website).pdf)

5 Cowlitz Indian Tribe, Letter to Chris Oliver from William Iyall, July 20, 2018

assumption, they argue the burden of proof is on PacifiCorp to provide “new information” to justify the Full In-Lieu approach.

### **PacifiCorp’s response**

PacifiCorp representatives disagree and responded with their own analysis. In a response to the tribe’s letter, they argued more recent information demonstrates that salmonids would, in fact, be subject to significant predation. As noted above, the US Geological Survey appears to agree. In a December, 2018 report, the USGS study found, “The current size distribution of northern pikeminnow suggests extensive predation” of Chinook salmon.<sup>6</sup>

They concluded that, “The small amounts of existing habitat likely controlling salmon production (that is, smolts) combined with extensive predation potential suggest available habitat may limit the likelihood of developing self-sustaining populations within Lake Merwin.” There is some conflict about this resolution, since USGS uses much of the analysis cited by the tribe but comes to different conclusions. As a result of concerns raised by the Cowlitz and others, USGS had their report peer-reviewed, and the final report confirmed their earlier conclusions.

The Washington State Department of Fish and Wildlife lends credibility to the USGS concerns about predation, noting in a letter that their preference is “adding adult and juvenile passage in Yale Reservoir, in addition to the existing adult and juvenile passage at Swift Reservoir.” They did not support passage above Merwin Dam.<sup>7</sup>

Second, the tribe points out the ICF modeling is based on an assumption that \$40 million will achieve a certain amount of habitat restoration. However, if the restoration costs more than expected, it could result in less habitat than had been modeled and, therefore, fewer fish than projected.

Put another way, the In-Lieu approach has a higher potential upside, as the ICF model demonstrates, but if the funding provided by PacifiCorp is unable to purchase the predicted amount of habitat, it may fall short of the goals. WDFW hints at this concern in its letter, noting, “we strongly recommend quantitative salmon performance and habitat condition and function goals,” be part of the agreement.

### **Partnership with National Fish and Wildlife Foundation**

To ensure the funding meets the population results reflected in the modeling, PacifiCorp is partnering with the National Fish and Wildlife Foundation (NFWF). The benefit of working with NFWF is that it can help coordinate with other habitat projects in the region, so the benefits can be consistent with other efforts.

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6 U.S. Geological Survey, “Development of New Information to Inform Fish Passage Decisions at the Yale and Merwin Hydro Projects on the Lewis River, Washington—Final Report, 2018,” p. 3, <https://pubs.usgs.gov/of/2018/1190/ofr20181190.pdf>

7 Susewind, Kelly, letter to Chris Oliver, NOAA Fisheries and Jim Kurth, U.S. Fish and Wildlife Service, September 28, 2018

Additionally, PacifiCorp argues the funding level is based on scientific information and should “be more than sufficient to achieve modeled results.” The National Fish and Wildlife Foundation may also be able to raise additional funding as part of the In-Lieu proposal, increasing the potential amount of habitat restoration and salmon populations. Ultimately, however, there are no guarantees on habitat quantity and this uncertainty makes the tribe nervous about the In-Lieu approach.

Finally, as mentioned, the Cowlitz Tribe believes the burden of proof is on PacifiCorp to make changes to the agreement, providing new information that shows the existing approach is “inappropriate.” Even if an alternative approach may be better, the new information must show the existing approach is “inappropriate.”

It could certainly be argued that ignoring a superior alternative is inappropriate when the goal is salmon recovery, but the debate is not about science but the understanding of obligations under the 2004 agreement. This is a legal, not a scientific question, but it is worth noting because it affects how the Services may conceive of their role in the decision.

### **A conflict of risk tolerance and rewards**

The role of the Services is to make a decision about the science and how to achieve salmon recovery. On the surface, the dispute appears to be about the credibility of the science behind each proposal. In reality, however, the dispute is over risk tolerance and uncertainty.

The key uncertainties involve expectations of predation levels, whether the funding will be adequate to create the amount of habitat modeled by ICF International, and whether the models accurately reflect the situation on the ground. Although science provides guidance on these questions, it cannot answer them. The gap left by that uncertainty is filled by the risk tolerance of the parties involved.

The Cowlitz Tribe believes predation levels in Merwin Lake are manageable and it is willing to take the risk that predation may be worse than predicted. The tribe argues fish passage is effective and worries that the funding for the Full In-Lieu effort would not be adequate to create the necessary habitat.

Additionally, since they are not paying for the restoration, they do not have to consider the cost of the strategy and are willing to have someone else pay a great deal for risk reduction.

### **Creating significant fish habitat**

PacifiCorp, on the other hand, presents evidence from credible organizations, including ICF International and the USGS, that given the amount of projected habitat they would create with the funding, the potential increase in salmonids would be significant. If, however, the funding falls short, even credible projections would be inaccurate.

Additionally, PacifiCorp has a financial incentive to find the lowest-cost, highest-reward approach to salmon recovery. That financial incentive means they

may be willing to risk falling short of the goals, because if the results are not as hoped, PacifiCorp is not liable for additional funding.

This is not a critique of either the Cowlitz Tribe or PacifiCorp. Both parties are working from sincere, but different, perspectives. In my conversations, both parties were complimentary of the other.

The Cowlitz have a justifiable interest in policies they believe have a high chance of increasing fish populations. In their letter to the Services, the tribe notes, “Since Time Immemorial, the Cowlitz Indian Tribe has fished the Lewis River basin.” If it costs more to increase the likelihood that they can create an abundant fishery, it is worth it to achieve that goal, especially since they believe they have treaty rights and an agreement that guarantees improved fish runs.

For PacifiCorp, they have a legal obligation to manage costs to their customers as a regulated utility. It would be easy to see their interests as that of a faceless corporation, but they are also representing their customers who don’t have a seat at the table in this debate. They have an interest in finding an effective, but lower cost, approach to salmon recovery.

Ultimately, the choice is about more than whose science is best. Both parties have quality science from which to draw. PacifiCorp’s proposal has a higher potential upside and their argument is bolstered by credible scientific organizations, but there is uncertainty about whether that upside will be achieved since it is unclear if what was modeled can be replicated on the ground.

For the Cowlitz, the Full Fish Passage option may not have the potential that the Full In-Lieu option does, but they see it as having a higher likelihood of success at achieving recovery, although the science raises concerns about this conclusion. That is the choice to be made by the Services – what is more important, potential upside or predictability?

### **Not overlooking cost**

It should be noted that cost is too often overlooked in these discussions. It should not be. Adequate funding for salmon recovery is a challenge and utilities (and their customers) are under pressure to achieve other, energy-related, environmental goals as well. Maximizing the amount of salmon recovery per dollar is an important consideration that would increase the likelihood of meeting habitat goals on the Lewis River, the Columbia River, and across the state.

Although the Services and others may not want to consider overall costs, that is risky at a time when every dollar must be used to maximize positive environmental results. Dollars spent here may not be spent elsewhere, either on environmental priorities or other worthwhile goals. With the utility’s mandate to keep rates down, saddling ratepayers with \$185 million in additional costs when \$40 million would produce similar or better results makes little sense.

### **Conclusion: Balancing risk and reward**

The Services have the job of determining if the new information provided by PacifiCorp is enough to support their proposal to create habitat that has the





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potential to create larger salmon returns than the more expensive approach of creating fish passage past each of the dams on the Lewis River.

The decision comes down to the risk the Services are willing to accept and the reward for that risk. It is likely that whichever decision the Services make, they will claim it is based in the most credible science. That, however, will obscure the underlying values that may be the real deciding factor.

To be sure, both PacifiCorp and the Cowlitz Tribe have valid arguments. In making a decision, the Services should be clear about the underlying risk tolerance they have chosen and why. They should explain how they considered the overall cost and why they did or did not consider the cost per fish recovered in their decision. These are important parts of decision making and should not be obscured or ignored.

One thing that is clear from the modeling and projections is that habitat restoration offers a better cost-benefit ratio than creating full fish passage. That reality, which seems indisputable from the science, should guide the discussion about Lewis River salmon populations, independent of the Services' decision in this particular instance. That provides the opportunity for a win-win outcome – one that protects PacifiCorp ratepayers, and achieves the goal of salmon recovery that is desired by all parties.