

Turbulence in the Klamath River Basin

SHARON LEVY



In the summer of 2001, potato fields in the arid upper Klamath Basin turned to barren dust in the sun. In that drought year, federal biologists insisted that water usually diverted to irrigate farms on the Oregon–California border instead remain in Upper Klamath Lake or flow downriver to protect endangered fish. Farmers staged a

series of angry protests and stormed the head gates that had been closed, keeping water back from their crops. For the first time since the inception of the Klamath Irrigation Project in 1906, farmers lost out to fish, and the economic toll was severe: Agricultural losses in the basin were estimated at more than \$200 million.



The two images (above and on preceding page) were taken 23 September 2002 during a helicopter flight over the Klamath River Basin. All the fish visible in these aerial photographs are salmon, and the majority are chinook. Areas with the most dead fish are within five miles of Blue Creek. Photograph: Tim McKay, Northcoast Environmental Center.

After a hot summer of controversy, the Bush administration reversed course and put the needs of irrigators first. Despite warnings from biologists and from members of the Yurok and Karuk Tribes, which depend on the Klamath River's salmon runs, downstream flow levels dropped as water was diverted to farms during another dry season. In late September 2002, the lower Klamath was the scene of one of the worst fish kills in the history of the western United States. More than

30,000 salmon died, trapped in warm, shallow water as they tried to migrate upstream to spawn.

Over the past two years, the war for water in the Klamath has translated into a battle of conflicting scientific opinions—and a struggle to shape the public perception of environmental science as it is used to enforce the Endangered Species Act (ESA). Interior Secretary Gale Norton based her decision to keep the full complement of water flowing to farmers

in 2002 on an interim report from a National Research Council (NRC) panel, which found that the federal biologists' decision to maintain higher water levels in Upper Klamath Lake and in the river had "no sound scientific basis."

Advocates for Klamath farmers took that quote and ran with it. Several members of Congress saw the NRC report as proof that the Endangered Species Act needs a serious overhaul. Rep. Greg Walden, whose Oregon district was affected by the irrigation shutoff, cosponsored a bill labeled the "Sound Science for Endangered Species Planning Act of 2002," which cited the "Klamath crisis" as justification for modifying the ESA. Pundits and politicians encouraged the common public perception that any good scientific report reveals an undisputable truth—and that the biologists who wanted to keep water back for the fish were now revealed to be wrong.

But in the Klamath Basin everything is subject to dispute. Solid data on the minimal needs of the basin's sensitive fish are hard to come by, and one man's commonsense conclusion is another's outrageously biased assumption. Perhaps the situation is best summed up by a nonscientist, Glen Spain, a lawyer for the Pacific Coast Federation of Fishermen's Associations. "A lot of people in the basin are in denial, and they will use this to bolster their denial," he says of the NRC report. "But like many scientific reports, this one is a Rorschach blot. You can read into it what you want."

The Klamath controversy engulfs two very different but intimately linked habitats: the shallow lakes of the upper basin, the largest being Upper Klamath Lake, and the river, which twists through mountainous country and empties into the Pacific amid stands of tall redwoods. Each of these habitats hosts endemic fishes that are now in trouble. In the upper basin, the Lost River sucker and short-nose sucker, once the basis of a thriving fishery, have been listed as endangered since 1988. In the river, coho salmon have dwindled and were listed as threatened in 1997.

There are many reasons why Klamath fishes are in trouble. Before they were protected by the ESA, overfishing took a

heavy toll on populations of suckers and salmon. Runoff from farms and logging sites pollutes upper basin water, leading to nutrient overload and algal blooms that deplete dissolved oxygen, turning the lake water deadly. Suckers are often killed when they are pulled into the Klamath Project's irrigation canals; since 1992 the US Fish and Wildlife Service (FWS) has been asking the Bureau of Reclamation, which manages the project, to build fish screens to counter this problem, with no results to date. Many important spawning areas have been destroyed both in Upper Klamath Lake and in the river. The water has grown so warm that salmon running upstream in late summer and fall routinely encounter lethal temperatures. And, since the Klamath Project was built, there is simply less water for fish.

Undercurrents

The debate has focused on the issue of water levels—the one variable that can be easily controlled by opening or closing the gates at a dam. Opening or closing a water gate may be easy, but making and enforcing those decisions—which ration the most precious commodity in the basin—are hard.

The idea that more water would help the endangered fish seems easy to accept. Higher water levels in Upper Klamath Lake can dilute pollutants and increase the size and number of spawning areas available to suckers. An increase in downstream flows can protect salmon by lowering the water temperature, providing more habitat, and reducing the chance that fish will be stranded in isolated backwaters when flows suddenly drop.

Fish need water, but proving that they need a certain amount of water to be protected is difficult. Yes, water levels are lower than they were before the Klamath Project was built, but at what point does low water present an identifiable danger to the fish? “The baseline environmental condition is a good frame of reference for the evaluation of native species,” says William Lewis of the University of Colorado, chair of the NRC committee on the Klamath. “It does not follow, however, that any action causing a system to move



Farmers protest on 31 August 2001 as federal officials guard the headgates that control the flow of irrigation water to the Klamath Project. Photograph: Mike Neuman, US Bureau of Reclamation.

back toward its origins will benefit a particular species. The idea behind recovery plans is to identify the key factors that are repressing a species and to focus financial resources on these particular factors.”

The NRC committee reviewed the biological opinions written by biologists with FWS and National Marine Fisheries Service (NMFS) in 2001, which advocate more water for the fish. The committee concluded in its interim report that “a substantial data-collection and analytical effort by multiple agencies, tribes, and other parties has not shown a clear connection between water level in Upper Klamath Lake and conditions that are adverse to the welfare of the suckers.” The committee stated there was no clear scientific support for increasing minimum flows in the Klamath River main stem, either. The interim report mandated a continuation of the status quo, saying that water levels in the lake and river should not deviate from the averages recorded during the previous decade.

“Keep in mind that it is an *interim* report, written to help the federal agencies

make decisions in 2002,” says Peter Moyle of the University of California–Davis, an expert on native California fishes and a member of the NRC committee. “Thus the previous ten years made a reasonable template to work with, especially because they encompassed a wide range of climatic conditions. Equally important, the best data overall were available for that period.”

The idea that the committee's recommendations were for the short term and the understanding that the NRC is continuing to work on a much more detailed and comprehensive final report are subtleties that were lost in most media reports and political responses. Farmers cheered the report as vindication of their stance that federal fishery biologists had gone overboard when they withheld water from the Klamath Project. But environmentalists—and some biologists who study fish in the Klamath—object to the idea that the conditions of the past decade can be used as a standard for the needs of the fish.

Douglas Markle, an Oregon State University professor who studies Klamath



Protestors gather at a tractor rally outside the US Bureau of Reclamation's Klamath Basin Area Office in March 2001. Photograph: Mike Neuman, US Bureau of Reclamation.

Basin suckers, is an outspoken critic of the NRC report. When the committee chose to label the recommendations of FWS and NMFS biologists as “not sound science,” he says, it fueled public misperceptions of the scientific process. “The public equates science with truth,” he says, and most people don’t understand that disagreements between scientists and differing interpretations of data are normal, especially in a complex system as little understood as the Klamath Basin.

In a peer-reviewed critique of the NRC interim report, coauthored with Michael Cooperman and published in the March 2003 issue of *Fisheries*, Markle argues that the committee oversimplified the relationships between lake levels, water quality, and the health of sucker populations. Those relationships, he says, are not simple and not linear, but they do exist. Higher water in the lake benefits suckers in many ways, providing access to spawning habitats and moderating problems with water quality.

Everyone agrees that water quality in Upper Klamath Lake is terrible. Mass die-offs of suckers in the lake occurred in 1995, 1996, and 1997, apparently from depletion of dissolved oxygen in the water. But there is no direct correlation between low-water years and fish kills in the lake, or between low-water years and

worsened water quality. As the NRC report notes, a graph of water level versus concentration of chlorophyll *a*, an indicator of the density of algal blooms that occur when water quality is very poor, shows no discernible pattern. Sometimes the water is relatively clean in a low-water year or relatively polluted in a higher-water year.

If water level were the only factor affecting water quality, a direct correlation would be expected. But the situation is complex; conditions in the lake are affected by weather and runoff as well as water depth. Water quality may be surprisingly good in some low-water years of cool and windy weather, when breezes keep lake water circulating and oxygenated. But, as Markle points out, weather management is not an option, whereas water management is.

Markle also takes issue with other aspects of the NRC’s analysis. He believes the data he and his colleagues have collected suggests that young suckers thrive to the extent that shallow habitats thick with bulrush and cattail are available to them during the spring. These areas dwindle during times of low water. The interim report used the high survival of suckers born in 1991, a dry year during which average lake levels were among the lowest since 1950, as evidence that low

water doesn’t harm young fish. But the NRC committee failed to note that in the spring of 1991, the lake level was high.

“Shortnose suckers show a stronger response to lake elevation than Lost River suckers,” says Markle, describing results reported in an as-yet unpublished paper that he presented to the NRC committee. According to Markle, the committee grouped the two species together in its analysis, muting the trend toward a response to higher lake level and obscuring what he believes is a logical chain of conclusions that can be made based on his work in Upper Klamath Lake: Higher water levels lead to more weedy habitat for fry in the spring, and more habitat leads to more fry.

Lewis, the NRC committee chair, disagrees. “The committee was well aware that fry are associated with shallow water and with macrophytic vegetation, and that both of these habitat features are influenced in extent by variations in water level in Upper Klamath Lake,” he writes in a rebuttal to Cooperman and Markle’s critique. “It does not necessarily follow, however, that variations in the amount of this habitat are sufficient to influence the welfare of fry.” In his view, research by Markle and his colleagues has produced no evidence of any relationship between water levels in Klamath Lake and the abundance of sucker fry.

Markle’s view that Upper Klamath Lake is too complex to easily reveal such direct relationships “could be true,” Lewis adds, “but it begins to look like an attempt to salvage a hypothesis rather than to test it, as required by standard scientific practice.”

Moyle sympathizes with the frustration of biologists who have been studying the basin for years while their recommendations were ignored and conditions continued to decline. “The Klamath Basin is suffering from over 100 years of water and land management decisions that have been made primarily to benefit agriculture, forestry, and mining, to the detriment of aquatic systems,” he says.

Keeping lake levels high is the one major action that can be taken on a short-term basis. “I think it’s important to note that we did not say higher lake levels

would not benefit suckers, only that existing information did not support the idea” that it would help them, he says. “This is an important distinction if you are claiming that decisions are based on scientific analysis. Along the same lines it is important to note that we found no evidence to justify saying that dropping the lake to exceptionally low levels [as Klamath Project managers wanted to do] will *not* harm the fish.”

Lewis, Moyle, and other committee members seem to agree that the authors of the biological opinions did an excellent job under difficult circumstances. In the face of scientific uncertainty, FWS and NMFS biologists erred in favor of the fish. Under the ESA, that’s their job.

The NRC committee saw its task as identifying the uncertainties, rather than deciding them one way or the other. And they don’t seem to interpret their interim report in the same light as anti-ESA zealots do.

“Using our interim report as a reason to revise the ESA is not justified at all,” says Moyle—“quite the contrary.”

“The committee was not asked to evaluate the Endangered Species Act as applied in the Klamath Basin or in general,” says Lewis. “The committee has no control over the uses to which its report might be put.”

Controversy flows downstream

As the NRC interim report acknowledged, conditions facing coho salmon and other anadromous fish in the Klamath are dire. Coho spawn in tributary streams, but much of their traditional habitat is now lost to the fish, made inaccessible by dams, and what’s left is deadly hot in summer.

The Klamath main stem is even hotter than the tributaries. The NRC committee disagreed with the recommendation of NMFS biologists to let more water flow downstream from Iron Gate Dam in the summer to protect coho. More water would not help coho, the committee wrote, at least not much, because too little was available to create much additional habitat. Coho survive by hiding out in tributaries and avoiding the main stem, so more water in the main stem wouldn’t matter. The dammed-up water



Protest sign speaks for itself at the March 2001 tractor rally. Photograph: Mike Neuman, US Bureau of Reclamation.

would be warm, too—so warm that the committee hypothesized that higher flows might make things worse for the coho, not better.

In the spring of 2002, NMFS biologists Jim Lecky and Mike Kelly, assigned to write the new biological opinion on Klamath coho, once again asked for more water to flow downriver. They were told that they must rewrite their opinion to “stay consistent” with the NRC report and not ask for higher flows than had occurred during the last decade. Kelly refused to sign the document, seeing it as arbitrary and contrary to the requirements of the ESA. Months later, in the aftermath of the mass fish kill on the lower Klamath, he would seek whistle-blower protection when he reported the political pressure he’d experienced from above.

Higher-ups in the Department of Interior, he says, seemed to assume that jeopardy to coho could be avoided by operating the Klamath Project just as it had been operated during the NRC’s “period of record,” 1990–2000. “To make that assumption, you have to accept that specific, arbitrarily derived flows are what the fish need,” he says. “The flows that occurred during the first half of the ‘period of record’ were never designed to

provide coho salmon habitat. The flows were essentially made up of the water left over after other uses, and the NRC didn’t provide analysis to legitimize or reconcile the arbitrary nature of the resulting flows.”

As spring wore on, water levels in Upper Klamath Lake and flow levels in the river dropped below the benchmarks biologists had asked for, while Klamath Project farmers received their full allotment of water. In April, groups of salmon fry were discovered stranded in backwaters that had become isolated from the main stem. Biologists from the California Department of Fish and Game (CDFG) and the Yurok Tribe rescued as many fry as they could.

Near Independence Creek, the stranded fish were mostly coho, recalls Mike Belchik, fisheries biologist with the Yurok Tribe. “When we analyzed what kinds of fish were in there, it was 90 percent coho fry, 10 percent chinook fry. That blew me away, because the NRC report is built on the premise that the Klamath main stem is not important to coho fry because they are primarily tributary rearers. We’re finding a lot of evidence that that is not true.”

By late summer, both coho and chinook were running upstream to spawn.



Canada geese and white pelicans tarry on a desiccated wetland in Tule Lake National Wildlife Refuge, in the upper Klamath Basin, in early May 2001. Photograph: Mike Neuman, US Bureau of Reclamation

The chinook run looked particularly promising, and Yurok tribal members asked the managers of the Klamath Project for more water to support the run. They were refused.

On 19 September 2002, the first reports of a mass fish kill on the Klamath reached the CDFG office in Eureka. Over the next few days, the kill worsened. Belchik and his colleagues spent their days walking and boating the river, examining heaps of dead salmon. "It was the worst week of my professional career," he remembers. "This year's run, the fish themselves were magnificent, they were bigger than normal. It was awful to walk the shoreline, literally ankle deep in rotting fish."

More than 30,000 dead salmon were counted; more than 95 percent were chinook, 2 percent were steelhead, 1.5 percent coho. Because the coho is the only fish in the lower Klamath protected

under the ESA, the needs of chinook, steelhead, and other native fish had not been part of the NRC's analysis.

The fish died of infection with two organisms that attack the gills, a protozoan and a bacterium. Both parasites are present at all times in the Klamath and are common in waters worldwide. The critical factor this past September seems to have been a densely packed crowd of salmon, held up low in the river, waiting for a break in the weather to cool the water down so they could move on upstream. As they waited together in the warm water, they weakened and became unusually susceptible to infection.

The first report on the Klamath fish kill and its causes was released in January 2003 by CDFG. The report concludes that low flows, and problems with fish passage and high fish densities that followed from the low flows, were the root cause of the kill. Other causes, in-

cluding high water temperatures, were certainly involved. But, says the report, "of the conditions that can cause or exacerbate a fish kill, flow is the only factor that can be controlled to any degree."

The scientific debate over the cause of the fish kill is just starting. Members of the NRC committee, still at work on their final report, are unwilling to comment on how the kill affects their view of the water wars on the Klamath.

Jim Lecky, one of the NMFS biologists who had asked for higher flows in the river, says the fish kill took him by surprise. The scenario of a mass death of migrating adults was not one that he was able to foresee—and he's not sure that higher flows would have prevented the disaster.

Lecky believes that there is widespread public misunderstanding of the biological opinions he and his colleagues write. "People like to believe that these biological opinions are science documents," he says. "I try to emphasize that they're not science documents, they're policy documents. If a biological opinion was a science document, on a par with those that appear in peer-reviewed journals, it would conclude that we don't have enough information to make a decision."

A river awash in dead salmon is a compelling argument that the Klamath can't afford to wait for scientific certainty and that maintaining the status quo won't protect vulnerable fish. In its final report, the NRC committee has a rare opportunity to shape the future of the basin and of resource management in the United States.

Sharon Levy (e-mail: levyscan@humboldt1.com) is a freelance writer based in Arcata, California.