

SALMON

Time running out for crusading biologist's war on dams

Jeremy P. Jacobs, E&E News reporter Published: Wednesday, September 25, 2019



Former Idaho Fish and Game biologist Steve Pettit's efforts to save Snake River salmon and steelhead have made him a legend among conservationists and anglers. Here, Pettit stands on the banks of the Selway River, a tributary of the Snake. Jeremy P. Jacobs/E&E News; Aerial support provided by Lighthawk

ALONG THE SELWAY RIVER, Idaho — The only time in his life that he was near water without a rod and reel, Steve Pettit fished with grenades.

He was then a helicopter gunship pilot in Vietnam, and it was an out-of-character fishing technique for someone who would go on to become a champion for Columbia River salmon and steelhead.

And by the time the final dams in the Columbia River basin came on line in the mid-1970s, Pettit was an Idaho Fish and Game biologist.

He saw the dams' impacts and spearheaded challenges to federal managers, surreptitiously capturing video footage inside the dams to use as legal evidence and bird-dogging officials at meetings across the state. He did it for the love of salmon and steelhead.

"I dedicated my whole career to trying to save them," Pettit, 76, said. "I thought I would retire before the fish went down."

But Pettit now gives some runs of salmon and steelhead a decade or less before they disappear.

"It's pretty depressing," he sighed.

Stocky, goateed and frequently profane, Pettit is instinctively combative, possibly the result of what he says is PTSD from his tour in Vietnam and probably the result of years of fighting for fish — often to no avail.

The goal of his long battle for salmon: the removal of four dams on the Lower Snake River in eastern Washington that he and other experts say are the proverbial straw that broke the camel's back for these fish.

The dams, he insists, must be breached if there is any hope of recovering the fish.

"If you don't," he said, "you are just dooming them."

Going back millennia, 10 million to 16 million salmon and steelhead returned to the Columbia River in the Pacific Northwest. Many navigated hundreds of miles into wilderness areas in central Idaho, home to the Snake River, a tributary of the Columbia, and some of the best freshwater spawning habitat in the Lower 48 states.

Those numbers plummeted starting in the 1960s, the result of commercial harvest, development and rampant dam building that included the four dams on the Lower Snake River: Ice Harbor (completed in 1961), Lower Monumental (1969), Little Goose (1970) and Lower Granite (1975).

Since then, 13 runs of salmon and steelhead in the Columbia Basin have been listed as threatened or endangered. They include the Snake River runs, which historically produced almost half of the salmon and steelhead in the basin.

The salmon and steelhead have become some of the most studied fish on the planet. Forced by courts, federal managers have tried virtually everything at these dams to boost survival rates — except breaching.

But even though there have been some good years where numbers have ticked up, the fish are not recovering despite the most expensive endangered species program in U.S. history.

These fish are also the most political.

Every stakeholder in the basin has different statistics and talking points. Many of those arguments are misdirection, and the system's backers have sought to undermine independent science on the fish over the years, including trying to defund a key research center.

Now, conservationists are pointing to a new related problem. A pod of orcas off Washington's coast appears heading for extinction partly due to dwindling numbers of chinook salmon, their main food. From 2015 to 2018, not a single killer whale calf born in the pod survived, according to a task force convened by Gov. Jay Inslee (D).

Pettit has been at the center of it all. He became Idaho Fish and Game's expert on fish passage at dams. He was the expert witness in the first challenge to their federal management, which led to the first of five court rulings against the feds.

"He comes at this as a lifelong fisheries biologist and fisherman who has known the river before it was dammed and after," said Todd True, an Earthjustice attorney who has worked with Pettit on a number of cases.

"He has come to the conclusions he has come to based on his experiences. ... His knowledge of that river is pretty much second to none," True said.

Pettit is also relentless. As a fisheries biologist, he would raise fire and brimstone about what needs to be done to save the fish at public meetings. Conservative Idaho governors were forced to dispatch a staffer who subsequently would renounce Pettit's remarks.

"Disregard what Mr. Pettit said," the staffer would inevitably say. "I speak for the governor's office, and we don't want to do that."

Pettit's doggedness has made him a legend among conservationists. To them, the solution is simple: Breach the four dams.

They point to a 2017 report from the Fish Passage Center, an independent research institution, which predicted an estimated fourfold increase in the number of salmon and steelhead returning to the Snake River system if the four dams were removed and spill over dams lower on the Columbia River was increased.

Others agree with the center. In a letter to Inslee's task force, a group of orca scientists recommended "permanently restoring the Snake River by removing the lower Snake River dams."

"Orca need more Chinook salmon available on a year-round basis, as quickly as possible," they wrote.

But again and again, Pettit and his comrades have been rebuffed, sometimes in ways that Pettit equates to an ostrich jamming its head in the sand. Idaho Gov. Brad Little (R), for example, recently launched a "salmon workgroup." But he immediately took dam removal off the table.

To Pettit, that's what makes Idaho Republican Rep. Mike Simpson's recent remarks and new effort to address the region's energy and fish crises paramount ([*Greenwire*](#), Sept. 3).

Otherwise, Pettit said, it's just more of the same. And asked if the current regime could ever recover the fish, Pettit was characteristically blunt: "F— no."

"It's like the definition of insanity," he said. "Doing the same thing every year and expecting a different result."

'The best rivers'

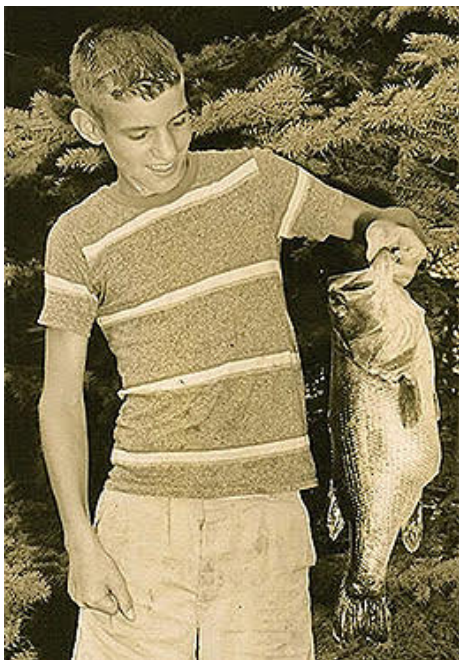


Pettit when he was a gunship pilot in Vietnam. Steve Pettit/Special to E&E News

Pettit grew up in Mountain Lakes, N.J., and at 15 held the state record for catching the biggest largemouth bass.

During the Vietnam War, he became a helicopter pilot. His job was to provide cover for special forces on the ground. Or, as he put it, to "shoot the shit out of the jungle."

Upon his return home, he wanted to become a fish biologist. He applied to several schools, eventually enrolling at the University of Idaho in Moscow because "it has the best rivers."



Pettit held the New Jersey record for largemouth bass at 15. Steve Pettit/Special to E&E News

Pettit graduated in 1973, right before Dworshak Dam came online. The more than 700-foot-high dam blocked fish passage to the north fork of the Clearwater River, a tributary of the Snake. That included pristine Idaho fish habitat like Kelly Creek.

Pettit conducted research on cutthroat trout there during grad school with professor Don Chapman. He watched as his beloved steelhead were cut off from those spawning grounds by the dam.

"It blocked the most magnificent run of summer steelhead in North America," Pettit said. "They were huge fish, lots of them, and they become extirpated

from the drainage."

Pettit found a way to memorialize the run: He named his son Kelly.

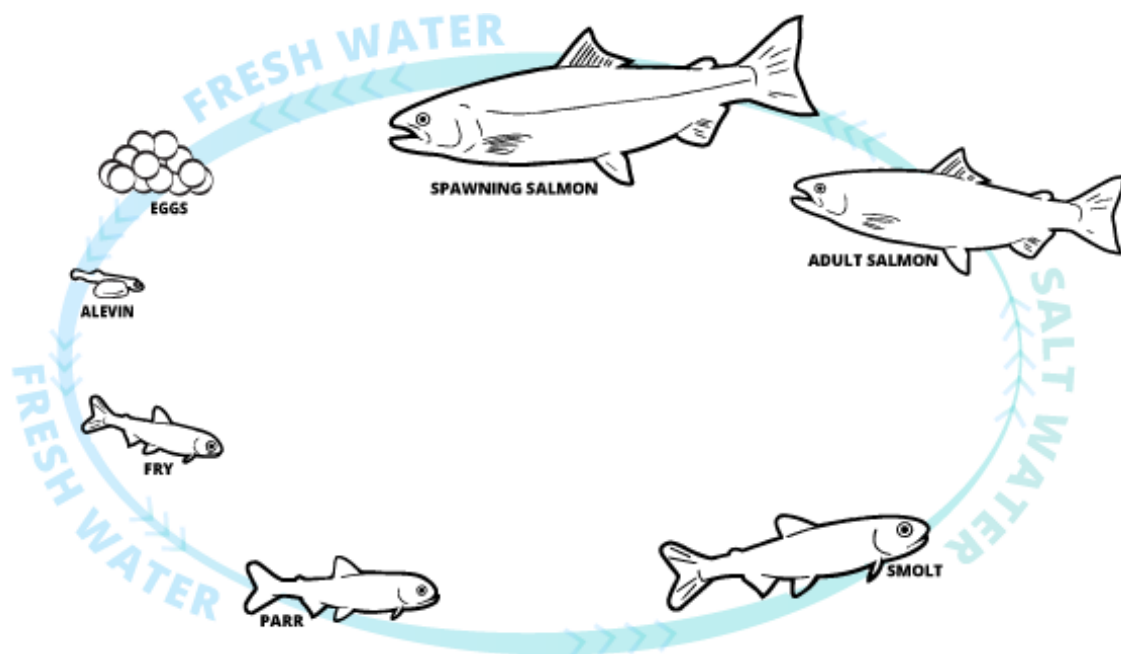
The fisherman would build his home on the banks of the Clearwater River. In those days, he rarely saw anyone else and there were plenty of fish. It was a fly fisherman's Shangri-La.

At Idaho Fish and Game, Pettit drafted the first catch-and-release regulations for steelhead, according to journalist Steven Hawley's 2018 profile of Pettit in *The Drake*, a fly-fishing magazine.

At the time, it was thought catch and release wouldn't work for steelhead. Despite their tremendous strength, most believed steelhead would die after being hooked.

Pettit's research changed that, and those regulations are one reason why the species is still on the planet given what would come next.

Falling far short on restoration



[+] Claudine Hellmuth/E&E News(graphic) [freevector.com](https://www.freevector.com) and Freepik(salmon)

Salmon and steelhead are anadromous fish, meaning they're born in freshwater, spend most of their lives in the sea and return to freshwater.

They lay their eggs in freshwater creeks and riverbeds. The offspring, or "fry," spend up to two years maturing to migration size. When they are ready, they migrate downstream, pushed mostly tail-first by the current.

Hundreds of miles later, they reach the ocean and their physiology changes. Their kidney function reverses, and they transition to saltwater fish, or "smolts."

They then spend up to four years in the ocean, swimming north to Alaska, growing and storing energy for their return trip.

When the time comes, they reenter freshwater and that physiological process again reverses. They smell their way back to where they were born, swimming some 900 miles against the current to high elevations to spawn and die.

In 1975, Lower Granite Dam on the Lower Snake River was completed, one of the last in the Columbia River system.

Lower Granite was the eighth dam separating the ocean and the prime salmon-spawning habitat in central Idaho — Snake River tributaries like the Salmon, Clearwater and Selway rivers.

The dams had an immediate and deadly impact on the fish.

Without the eight dams, the juvenile migration would take about a week or two. Now, it takes up to six.

The dams create slack water reservoirs, dramatically slowing the current. That makes it harder for the fish to get downstream and easier for predators to hunt them. They also allow temperatures in the river to rise to unhealthy and sometimes lethal levels.

By the time they reach the ocean, the various stressors take their toll. Many of the Snake River juveniles don't return as adults.

The Northwest Power and Conservation Council is, by law, responsible for fish recovery in the region. It's focused on a specific metric: smolt-to-adult returns, or SARs. It measures the number of adults who return from a specific number of smolts, or juveniles. Five percent, for example, means five adults out of 100 smolts made it back.

The council — but, importantly, not federal scientists — has adopted a goal of a 4% average SAR coming from a range of 2% to 6%.

Four percent means the species recovering at a rate that could lead to delisting the run as endangered or threatened.

Less than 2% means the species is dying out; the fish aren't replacing themselves.

The Snake River salmon and steelhead are far from the council's 4% goal.

In fact, they have continued to decline despite the billions of dollars spent on their recovery.

From 1994 to 2017, the SAR for spring-summer run chinook salmon averaged less than 1%, according to the Fish Passage Center. It has only exceeded 2% twice in the last quarter century. The SAR for the species has declined by three-quarters since the dams went in, according to the research center.

Steelhead did slightly better but still haven't reached even the 2% mark, averaging just over 1% since 1997.

Put another way for a different salmon run: Historically, an estimated 150,000 sockeye salmon returned to the Snake River every year. The recovery goal for the endangered run is now 2,500 adults getting over Lower Granite Dam. In the last 10 years, the average has been almost 1,100 — less than half of the goal.

Salmon and steelhead from other, smaller Columbia tributaries are doing better. Spring-summer chinook salmon and steelhead in the Yakima and John Day Rivers are either meeting or nearly meeting the SAR goal. Those fish must navigate fewer dams to reach the ocean — four in for the Yakima and three for the John Day.

The Fish Passage Center is the leading expert on SARs. In 2017, it analyzed various scenarios and how they would affect fish runs.

The most effective for the Snake River runs: breaching the four Lower Snake River dams and increasing spill at other dams downstream was the most effective. That would result in an estimated fourfold increase in returns, it concluded.

Federal focus on fish passage



Federal agencies have spent millions of dollars building elaborate fish facilities in an attempt to help them recover. Jeremy P. Jacobs/E&E News

Federal scientists and dam managers don't see it that way.

Their approach is fundamentally different: Instead of tearing down dams, let's build our way out of the problem.

On a tour of the Lower Granite Dam, the most impressive engineering feat wasn't the 100-foot impoundment and its eight spillway gates.

It was what might be called an amusement park for fish.

When a juvenile fish runs into the dam on its way to the ocean, it encounters a choose-your-adventure game built by the Army Corps of Engineers.

If the fish is lucky, it'll flow over the surface of the reservoir and down a "removable spillway weir," an enormous slip-and-slide that runs from the top of the reservoir, over the spillway to the river below.

Or the fish could dive down 50 feet to reach the entries to the dam's other spillways. Diving that deep isn't easy for juveniles, and it makes them easy hunting for predators.

Or the fish can swim toward the light. Bright beams shine through a series of 10-inch holes in the dam that lead to the fish "bypass" system. It shuttles the fish down a several-hundred-foot slide that starts straight, then corkscrews around a series of turns before reaching a research lab.

There, it's anesthetized and tagged. Then it's off to a holding tank for the anesthesia to wear off, and either onto a barge to be shipped downstream or returned to the river.

The last option: going through the hydropower turbines. Only a small percentage of fish end up going through the turbines anymore, about 10% or less, according to the Army Corps.

If the fish doesn't get onto the barge, it must repeat that process at three more dams on the Lower Snake River, then face four more on the Columbia.

The entire program has cost billions of dollars, and the Army Corps, Bureau of Reclamation and Bonneville Power Administration, which pays for the program, take pride in the passage improvements.

The survival rates for juveniles at each dam are generally good.

According to NOAA Fisheries' statistics, about 96% of juveniles make it through each of the Lower Snake River dams, and roughly 75% make it through all four. They also point out that even if there were no dams, juvenile survival wouldn't be 100% due to predators.

BPA has also spent billions of dollars trying to improve habitat both upstream and downstream for the fish.

It has acquired and set aside more than double the amount of land that was inundated by the dam system. And BPA says it has opened 4,406 river miles of spawning and rearing habitat. Most recently, they broke ground on a \$25 million, 1,000-acre floodplain restoration near the ocean estuary, the largest such project ever attempted.

Ritchie Graves, the leader of NOAA's Columbia Hydropower Branch, said these and other measures have helped. He also criticized the SAR metric, saying it doesn't reflect habitat problems that make spawning difficult.



Ritchie Graves. Graves/LinkedIn

"The ability of habitat to produce smolts is quite variable," he said. "You could have a SARs of 5%, but you still wouldn't make it in some streams because the habitat is limiting the number of smolts."

NOAA spokesman Michael Milstein said the agency views the 4% SAR target as an "aspiration goal" but they are "not sure how achievable it is" given other factors.

But there are fundamental problems with this entire approach, critics say, including the emphasis on juvenile survival rates at each dam.

Even if 96% of juveniles make it through each dam, that 4% mortality rate compounds on itself at each of the eight dams, gradually and continually cutting

down the population of fish.

Add in predators and other factors like warm reservoir temperatures, and what looked like a good survival rate quickly evaporates.

It is not unusual to lose half of a juvenile run in a year, and in bad water years that number can be as high as 85%.

The juvenile survival rate per dam also doesn't take into account "latent" or "delayed" mortality, the theory that stress on the fish accumulates through the system, culminating in their death in the ocean.

Further, critics argue that the agencies frequently rely on hatchery fish to highlight raw numbers of juveniles in the system.

But hatchery fish are less robust. They are weaker and dumber and, importantly, they generally don't make it back as adults. Their SARs are even lower than the wild fish's.

Courts have also criticized the focus on habitat.

In May 2016, Judge Michael Simon of the U.S. District Court for the District of Oregon ruled that there were "significant deficiencies" with the agencies' focus on habitat mitigation.

He cited studies that found existing pristine spawning habitats were not producing many fish, suggesting the problem lay elsewhere.

And he bluntly said that other measures may be a better use of money.

"[T]he option of breaching, bypassing, or even removing a dam may be considered more financially prudent and environmentally effective than spending hundreds of millions of dollars on uncertain habitat restoration and other alternative actions," Simon wrote.

Jim Norton of the Columbia Rediviva project and the Idaho Conservation League put it another way.

The agencies, he said, are "giving the region a mani-pedi when it is having a heart attack."

Simon ordered the agencies to do another environmental analysis that considers dam removal. The first draft is due next February.

Back at the dams themselves, Army Corps' own data suggests that despite the millions of dollars spent on the program, juvenile survival at Lower Granite Dam has stayed roughly the same since 2006.

Yet the fish have continued to decline. This year's Idaho steelhead count is so low, Idaho Fish and Game closed the fall fishing season on the Clearwater River last week.

Army Corps fisheries biologist Ann Setter said that shows the agency has done pretty much everything it can at the dams for the fish. Other factors, such as a warming ocean driven by climate change, are harming the fish.

The Army Corps' position: Those aren't our problem.

"We can't control that at all," Setter said. "What we impacted was freshwater habitat. So what we've tried to do is mitigate for that impacted freshwater habitat and provide a safe fish passage corridor. That's our responsibility."

Heartbeats for salmon



The Selway River in Idaho. Jeremy P. Jacobs/E&E News. Aerial support provided by Lighthawk

The Army Corps' reasoning terrifies Pettit.

He says the agencies are latching on to climate change and cycles of warming ocean that have returned this year to renounce their responsibility for the problem.

"The greatest fear is that they glob onto climate change," he said. "Climate change is going right into their wheelhouse."

On a flight over the Nez Perce National Forest, Pettit pointed out fish habitat on the Selway River, a tributary of the Snake.

The only thing you have control over is the migration corridor, it's the only thing that would possibly have a chance to save our fish.

Steve Pettit

He looked straight down at the "salmon hole," a 30-foot deep pool in Bear Creek so clear you can see the bottom.

It's perfect habitat for adult salmon on their way back upriver to spawn.

Pettit has seen it teeming with as many as 100 adult salmon. He couldn't see any on this trip.

He looks at climate change another way: If ocean conditions are deteriorating, the only hope for the fish is to improve their path to places like the salmon hole. And that means tearing down the four dams.

"The only thing you have control over is the migration corridor," he said. "It's the only thing that would possibly have a chance to save our fish."

Pettit's own fishing has slowed down. In 2007, his heart stopped, a health scare he attributes to exposure to Agent Orange, the toxic herbicide used in Vietnam to thin forests.

Technically, he said, he died four times on the way to the hospital. His doctor has installed a pacemaker.

But the allure of steelhead is still strong. The fisherman, who has caught more than 6,000 steelhead on the Clearwater River, hunts for them anywhere he can find them.

Next month, he'll depart for the Kamchatka Peninsula — in Russia.

'BLOODBATH'
RED INK POURS OVER
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