

# Restoring Rogue River Resiliency

## As climate change stresses salmon, benefits of Rogue dam removals stand out

By Jim McCarthy

**T**he Rogue River, in Oregon, is one of the most productive salmon and steelhead rivers in the Pacific Northwest, with five runs of salmon and steelhead, plus lamprey and cutthroat trout. Yet, for over one hundred years a series of dams on the mainstem and spawning tributaries severely impacted Rogue Basin fish.

After persistent leadership over three decades from WaterWatch of Oregon, Savage Rapids Dam, the City of Gold Hill Diversion Dam, and Gold Ray Dam were all removed in a three-year span from 2008 to 2010, providing unimpeded fish and boat passage on 157 miles of the mainstem Rogue from William Jess Dam to the Pacific Ocean. During that timespan, the U.S. Army Corps of Engineers notched its partially completed Elk Creek Dam, freeing up access to important salmon, steelhead, and cutthroat trout spawning areas on Elk Creek. In 2015, WaterWatch and our partners removed Wimer Dam and Fielder Dam, providing unimpeded access to 70 miles of high quality habitat in Evans Creek, another important salmon and steelhead spawning tributary. These two barriers had both been ranked in the top ten on the Oregon Department of Fish and Wildlife's statewide fish passage priority list.

Depending on the barrier, fish passage improvement may not always result in dam removal, although removal is generally the most effective option. In 2016, WaterWatch, in conjunction with the Gold Hill Irrigation District, completed a project to improve fish passage at a diversion located between the old Gold Hill and Gold Ray dam sites. This diversion was the most harmful remaining on the mainstem Rogue below the William Jess Dam and complemented the benefits of the mainstem dam removals.

These success created momentum for additional barrier removal and other river restoration projects in the basin. Because the larger fish barriers on the mainstem Rogue River have come

down, the dam removal and restoration focus has shifted to tributary streams. At the same time, Rogue Basin communities have joined together to increase their capacity to get this important work done. In 2015, four watershed councils merged to create the Rogue River Watershed Council (RRWC), bringing more muscle and expertise to deliver high quality restoration projects in the Upper Rogue Basin. Among other projects, in 2017 RRWC removed the Beeson-Robison diversion dam on Wagner Creek, replacing it with a more fish friendly diversion to maintain the

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gravity-fed irrigation system at the site. Watershed councils and other groups doing restoration in the basin have also formed the Rogue Basin Partnership and developed an action plan to coordinate efforts, increase restoration funding capacity, and increase the effectiveness of restoration efforts in the basin.

### **Fish Response**

Since this unprecedented restoration effort began, evidence — both scientific and anecdotal — has begun to emerge about the benefits to the Rogue Basin. For example, the Oregon Department of Fish and Wildlife (ODFW) recently released a summary of early observations of fish response to Rogue dam removals, which contained good

news as well as detail. The report noted that for five years following the removals of Gold Ray and Savage Rapids dams, biologists surveyed the formerly inundated salmon spawning habitat in the two reservoir sites, and found that “Chinook re-colonized the habitat immediately, and large numbers of redds [salmon egg nests] were observed.”

ODFW also observed benefits for Rogue steelhead, stating, “With the exception of 2015, returns of wild half pounders since 2013 have been in the top ten largest returns observed during ODFW fish monitoring in the lower Rogue (Huntley Park seining project). The three largest counts of wild half pounders are 2018, 2013 and 2017, which is encouraging for biologists and anglers, and coincides nicely with dam removal.”

There is other good news. This year, the Rogue River was projected to have the biggest fall Chinook salmon return on the Pacific Coast south of the Columbia River for the third year running. In 2017, ODFW projected 246,900 fall Chinook would return in the Rogue. In 2018, the department projected a whopping 462,800 would return to the Rogue with the fall run. This year, 383,500 are anticipated. The Rogue has maintained this welcome abundance even as salmon populations in nearby rivers have declined due in significant part to drought and water management decisions which discount or ignore the critical value of healthy rivers facing increasing strain under climate change.

While initial evidence is promising, it will take a few generations of salmon and steelhead going through their varied life cycles before some of the benefits are fully realized. Ocean conditions and flow conditions can obscure the benefits of dam removals. What we do know is conditions for salmon and steelhead in the Rogue Basin have greatly improved because of dam removal. Good years will be better and bad years will not be as bad because of these important river restoration projects.

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There is now greater resiliency in the system, and one of Oregon's most spectacular rivers is now healthier, and has a better chance of maintaining salmon and steelhead runs into an uncertain future.

### Unimpeded Fish Passage/Elimination of Delays

Dams have multiple impacts on fish and river systems. One of the most significant impacts is as a barrier impeding fish passage. 2008 to 2010 were big years for upper Rogue migratory fish. The removal of Savage Rapids, Gold Hill, and Gold Ray dams — alongside the notching of Elk Creek Dam — turned migration bottlenecks into free-ways. The three mainstem Rogue dams impeded passage of significant portions of the basin's five runs of salmon and steelhead, Pacific lamprey, and cutthroat trout to over 500 miles of upstream habitat, including 50 miles of the mainstem. Spring Chinook salmon were particularly hard hit, having to navigate the three mainstem dams to get to their upstream spawning areas.

Anglers are also reporting fish in the upper river earlier than in the past, and that the fish are strong and in good shape. Eliminating the delays in adult upstream migration allows the fish to access their upper basin spawning areas in better condition and with more energy reserves for spawning effort. Having more early and healthy fish increases the likelihood that fish can take advantage of optimal flow conditions to move into tributary spawning areas, and have more energy to access habitat higher up in the system. For example, in the wake of the 2015 removals of two dams on Evans Creek, ODFW biologists observed fall Chinook spawning in the high quality habitat of tributary West Fork Evans Creek for the first time on record. This all translates into increased spawning success, and ultimately more fish.

Besides impeding fish passage for upstream migrating adult salmon, dams can completely block upstream access for juvenile fish and cutthroat trout. Juvenile fish must be able to move up and down in a river system to avoid high and low flows, and access rearing habitat. Once juvenile fish move below a dam they can no longer access important rearing habitat upstream.

Cutthroat trout in the upper Rogue are called fluvials, meaning they use the

mainstem Rogue like the ocean, and use spawning tributaries the way sea-runs use coastal streams. Cutthroat trout are not good jumpers and have trouble navigating fish ladders. The mainstem dams isolated cutthroat populations. Tributary dams such as Elk Creek, Fielder, and Wimer blocked access to cutthroat spawning habitat.

### Reduction in Mortality and Injury

Dams injure and kill fish. Adults migrating upstream can jump out of fish ladders, where they are stranded and die. Adults jumping against the face of dams are injured or killed, and adults and juvenile fish spilling over the tops of dams also suffer injury and mortal-



**The Rogue River flows free at the site of the Savage Rapids Dam shortly after it was removed in 2009. The dam was considered to be the biggest fish killer on the Rogue River system. Photo by Jim Yuskavitch**

For example, in 1992 the U.S. Army Corps of Engineers began trapping migrating salmon and steelhead below what was then half-built Elk Creek Dam and hauling them to upstream spawning habitat. Technicians also hauled what cutthroat they caught in the trap. That first winter, only nine cutthroat were trapped. Three years later, the numbers grew to 68, and by winter of 2001-02 crews captured and hauled triple-digit numbers of cutthroat to spawning grounds. Since the Elk Creek Dam notching in 2008, cutthroat trout have unimpeded access to their historic spawning areas. The removal of the Evans Creek dams should similarly benefit the cutthroat in that system.

The combination of dam removals and protective fishing regulations has sparked a resurgence of cutthroat trout on the Rogue. As reported in a July 26, 2013 Medford Mail Tribune article by Mark Freeman, *Big Bite, Big Fight*, Rogue anglers are reporting tremendous catches of cutthroat trout with some more than 20 inches long.

Predators concentrate below and above dams because fish are more available and vulnerable prey at these sites. Juvenile fish are much more susceptible to predation in the slow moving water created by reservoirs upstream of the dams. At Savage Rapids Dam, there were high juvenile losses because of entrainment through and impingement at the inadequate fish screens on the irrigation canals and pump turbine system. These sources of injury and mortality are entirely eliminated by dam removal.

### Reclaimed Habitat and Water Quality Improvements

The reservoir behind Savage Rapids Dam inundated approximately 3.5 miles of prime fall Chinook habitat. The reservoir behind Gold Ray Dam inundated another 1.5 miles. In a true if-you-remove-it-they-will-spawn fashion, big fall Chinook are now spawning by the hundreds in what used to be sterile sections of the Rogue inundated by water and silt behind what used to be Savage

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Rapids and Gold Ray dams. With the dams gone now and the accumulated sediment washed away, the exposed gravel bars now teem with big Chinook digging and spawning in their egg nests, called redds.

In less than a month after the removal of Gold Ray Dam in 2010, fall Chinook salmon made use of spawning gravel exposed in the old reservoir pool. The Oregon Department of Fish and Wildlife counted thirty-seven redds that first fall in the old reservoir pool. By 2013, biologists had counted 111 redds. In 2010, one year after removal

of Savage Rapids Dam, there were 91 fall Chinook salmon redds in the former reservoir area. By 2012 there were 195 redds. This redd revival is a telling example of the restoration benefits of dam removal.

The notching of Elk Creek Dam also created tremendous habitat reclamation potential. This is because the U.S. Army Corps of Engineers still owns approximately 3,000 acres of what was to have been a reservoir pool for the dam. Four miles of low gradient, undeveloped Elk Creek runs through this land, which is slated for riparian and flood plain restoration. This work should make this area even more productive

for salmon, steelhead and cutthroat trout in the future.

The reservoirs also harbored invasive warm water species such as largemouth bass, Umpqua pike minnow, and reddsie shiners. The removal of the dams has eliminated strongholds for these harmful and unwanted species.

With the elimination of the reservoir pools there are also some temperature benefits, as the reservoirs slowed the river and allowed it to warm. The cooling benefits of removing the reservoirs will become more and more important with climate change bringing higher temperatures and more severe droughts to the region.



The partially constructed Elk Creek Dam blocked salmon and steelhead from important spawning habitat, while serving no useful purpose. It was notched in 2008, opening access to upstream habitat. Photo by Jim Yuskavitch



Ceasing to produce hydropower in 1972 due to obsolete generating facilities, the Gold Ray Dam was a liability to Jackson County, which owned it. The dam was removed in 2010. Photo by Jim Yuskavitch

### Restoration of Natural River Processes

The removal of the dams helps restore natural river processes such as sediment transport, gravel recruitment, and increased flood plain complexity. This helps improve overall river spawning, rearing and high flow refugial habitat. There are always some short term impacts involved in dam removal, but findings from an Oregon State University study on the impacts of the Rogue Dam removals and dam removal on the Calapooia River show that the impacts are small while the recovery is quick. Interestingly, the study found biologic recovery was even faster than physical recovery in these rivers after dam removal.

Unfortunately, there was some public scaremongering after the dam removals that attempted to spread false claims about the contamination of water supplies. These claims were shown to be totally unfounded and have been soundly debunked. The truth is these dam removals demonstrate that dam removal can be an extremely valuable restoration tool, with the benefits greatly outweighing the short-term minor impacts. That these facts are now becoming better understood — alongside public awareness that dam removals provide real benefits to rivers, fish, and local communities — is a major achievement for river conservation.

### Recreational Benefits

With the removal of the mainstem dams there is not only 157 miles of unimpeded fish passage, but also 157 miles of unimpeded boat passage, increasing run of the river boating opportunities and offering one of the longest

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free-flowing reaches of river in the west for multi-day trips. In addition, more high quality day trips have opened up with dams no longer blocking passage. The stretch of the Rogue River between Touvelle State Park and Fisher's Ferry takeout is now getting a lot more use from rafts, kayaks and drift boats. The area has become popular with sportfisherman, commercial rafting companies and fishing guides, drawn to the increased access and the number of new and productive runs that hold fish. The long term benefits of an improved salmon, steelhead and cutthroat trout fishery will surely enhance the recreational experience on the Rogue.

There is also improved public access to some 500 acres of public land located upstream of Gold Ray Dam site, and 3,000 acres of public land upstream of the Elk Creek Dam site, where the public is now enjoying new outdoor recreational opportunities.

### Hope for Future

Three decades ago, the idea of removing dams to benefit fish and rivers conflicted with widely held values and beliefs. For many, dams were — and for some, still remain — symbols of progress and monuments to the control of nature. But not all dams are still providing the benefits for which they were originally designed. Many have become functionally or economically obsolete. Some have been abandoned.

Today, the negative impacts of dams on river systems and fish are much better understood. The growing number of successful removals of obsolete dams on fish-bearing streams has itself become a celebrated symbol of progress, and represents a fundamental change in our relationship with rivers. Dam removal is now recognized as a legitimate river management option for restoring rivers and fish runs. The communities of the Rogue Basin have good reason to be proud of our significant contribution to this profound change. Together, we are trailblazing one of the most successful dam removal and river restoration efforts in North America.



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## Dams Begone!

To date 8 Rogue River dams have been removed or decommissioned

### Savage Rapids Dam

Savage Rapids Dam was a 39-foot high, 500-foot long irrigation diversion dam that spanned the mainstem of Oregon's Rogue River at river mile 107. The structure's fish ladders and screens did not meet current standards, and at times the dam completely blocked upstream fish passage. Savage Rapids Dam had long been considered the biggest fish killer on the Rogue. It was removed in 2009, after a 21 year long legal and political battle led by WaterWatch. The dam's irrigation diversion function was replaced by a modern pumping system.

### City of Gold Hill Diversion Dam

Gold Hill Diversion Dam was an 8-foot high concrete dam spanning the Rogue River a mile upstream of Gold Hill, Oregon. The dam was a defunct hydro-facility only used by the city to divert its municipal water needs. It had no ladders and was the second greatest barrier to fish passage in the Rogue River Basin. The diversion function was replaced by a new municipal water pump system, and the obsolete dam was removed in 2008.

### Gold Ray Dam

Spanning the mainstem of the Rogue at river mile 12, this 38-foot high, 360-foot long dam was built in 1904 to generate power, but by 1972, power generation at the dam ceased permanently because the facility was obsolete and no longer economically viable. At that point, Jackson County took ownership of the dam and agreed to its removal as it was a liability to the county. It was removed in 2010. With the removal of Gold Ray, the Rogue River flowed freely from the Lost Creek Project to the Pacific Ocean for the first time in 106 years — a distance of 157 miles.

### Elk Creek Dam

This dam was a partially completed U.S. Army Corps of Engineers Dam spanning Elk Creek, completely blocking fish access to an important spawning tributary of the Rogue River. For decades, the Elk Creek Dam sat par-

tially constructed and served no useful purpose. Historically, an estimated thirty percent of the Rogue Basin's coho salmon spawned in Elk Creek, alongside populations of Chinook salmon, summer and winter steelhead, and cutthroat trout. It was notched in 2008, allowing fish back to historic spawning areas.

### Fielder and Wimer Dams

These abandoned obsolete irrigation diversion dams were located on Evans Creek another important Rogue River spawning tributary with 70 miles of high-quality salmon and steelhead habitat above the dams. The Oregon Department of Fish and Wildlife ranked them both among Oregon's top 10 statewide fish passage priorities. Both these dams were removed in 2015, based on landowner agreements secured by WaterWatch.

### Gold Hill Irrigation District Diversion Dam

WaterWatch and others worked with the Gold Hill Irrigation District (GHID) to improve fish passage at its irrigation diversion system on the mainstem of the Rogue River. This project benefits spring and fall Chinook salmon, summer and winter steelhead, coho salmon, cutthroat trout, and lamprey. The changes in the diversion system, which were completed in autumn 2016, also increased flows in a one-quarter mile stretch of the Rogue River, improving navigation through Nugget Falls, and allow for safer public access.

### Beeson-Robison Dam

Removed by the Rogue River Watershed Council in partnership with the private landowners, Beeson-Robison dam was a 5.5-foot barrier during irrigation season and a 3-foot impediment in the winter for both adult and young salmon and steelhead accessing the cool water and spawning and rearing habitat of Wagner Creek, a tributary of Bear Creek. Workers installed a new concrete intake system and pipes, along with a flow meter, to ensure that water users receive their full water rights.