



The Klamath Watershed

Restoration Edition - 2024

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...from the Project Leaders

The Klamath River watershed extends over thousands of miles of farms, ranches, private timber holdings, national forest, and Tribal lands. One of the largest rivers in northern California and southern Oregon, the Klamath River was once among the top producers of salmon and steelhead on the West Coast. Since late last year, it has been undergoing a dynamic transformation with the removal of four large dams that blocked fish passage to essential habitat for over a century.

For many communities and Tribal citizens who have fished and lived alongside the river and its headwaters, this is a time of immense healing and excitement. Some of these residents are already reporting having observed colder, clearer water this summer. Dam removal has also been viewed with apprehension and varied levels of uncertainty at times. After a century of build-up behind the dams, the amount of sediment in the reservoirs was considerable and caused genuine concern as it washed downstream. Although this was an anticipated temporary effect of the dam removal and associated drawdown, over time we expect this to result in vastly improved conditions for the return of salmon.

With these landscape-level changes in mind, we chose the theme of restoration for this edition of our Klamath River watershed newsletter. Our lead article highlights the Service's provision of \$162 million received in Bipartisan Infrastructure Law funding to support people and communities in their efforts to restore, protect and manage this watershed for future generations.

Collaborative efforts with state, federal, Tribal, and private partners are key to restoring ecological processes for federally listed and sensitive species. For example, you will learn how beaver dam analogues enhance bull trout habitat, how removing barriers improves fish passage, and how reconstructing floodplain connectivity can restore habitat for Coho salmon.

Included are articles that focus on endangered, threatened, and at-risk species, such as the Behren's silverspot butterfly, the Oregon spotted frog, and the western ridged mussel, as well as unique partnerships and collaborative efforts to recover and protect these special creatures. You will read how Tribal youth are working closely with Service staff to monitor at-risk species of bats that inhabit the cliffs above the river. And we share an update on the innovative work in the upper basin to expand the Klamath Falls National Fish Hatchery for rearing two endangered species of sucker, the *c'waam* and *koptu*.

Also featured is the Klamath Basin National Wildlife Refuge Complex, a critical migratory bird stopover on the Pacific Flyway. Learn how they are connecting people with nature in the fabulous new Visitor Center at Tule Lake! This facility will soon house hands-on interpretive exhibits that underscore how water and wetlands are central to sustaining both the wildlife and people who call this place home.

Please enjoy this watershed-wide look at ongoing efforts to restore and preserve the species and ecological processes that account for the special beauty of the Klamath!

Ken Griggs, Acting Project Leader
Klamath Basin NWRC

Jennie Land, Field Supervisor
Klamath Falls Fish and Wildlife Office

Jenny Ericson, Field Supervisor
Yreka Fish and Wildlife Office

Vicky Ryan, Acting Field Supervisor
Arcata Fish and Wildlife Office



Restoring a Watershed



For two decades, the Klamath River watershed (referred to as Klamath Basin in articles in this issue) has relied on collaboration and partnerships to address its diverse water needs in the face of ongoing drought and limited water supplies. Clean, healthy water and fertile land make the watershed home to Tribal communities, productive agriculture, and abundant populations of migratory birds, suckers, salmon, and other important aquatic and terrestrial species. The Service is providing \$162 million in Bipartisan Infrastructure Law (BIL) funding to support the people and communities in their efforts to protect, restore, and manage this watershed for future generations.

The Service has been working closely with many partners, including the states of California and Oregon, the Klamath Tribes, the Yurok Tribe, the Karuk Tribe, the Hoopa Valley Tribe, Quartz Valley Indian Reservation, Pulikla Tribe of Yurok People (formerly the Resighini Rancheria), private landowners, farmers and ranchers,



conservation organizations and local sportsmen and women to improve conditions for fish, birds, and local communities with BIL funding.

Supported projects will create habitat for fish, monitor water quality, quantify ecosystem recovery, improve hydrologic models and better track salmon and sucker populations. This funding will enable installation of pumping stations to improve water availability for Klamath Basin wildlife refuges and farms, support post-wildfire stream restoration activities in the Sprague River watershed after the Bootleg Fire and restore natural springs.

Investments in the Klamath Basin through the BIL are also supporting a wide-reaching network of conservation projects. These projects improve water availability, fish habitat, and restore natural functions to the ecosystem, helping to build a more resilient Basin that can support the communities that call it home.

So far, the Service has allocated almost \$90 million in Bipartisan Infrastructure Law funding to support more than 40 projects driven by partners and communities in the Klamath Basin.

One local example is the culvert replacement project on Waukell Creek and Junior Creek in Del Norte County, CA.

The current culverts hinder passage for migrating salmon and cause flooding during storms that can cut off the single access road to the Pulikla Tribal community, isolating them from emergency services. Replacing these culverts illustrates how ecosystem restoration, community health and safety, and infrastructure can go hand in hand.

On a wider scale, the Service is also investing in a significant expansion of the Klamath Falls National Fish Hatchery (*below*). The Service has invested \$30 million through the Bipartisan Infrastructure Law to support this project. This investment will increase rearing capacity for two species of suckers found only in the Klamath Basin and which are central to the culture of the Klamath Tribes.

- Hannah Moore, BIL public affairs specialist, Region 8



Top: Projects funded by the Bipartisan Infrastructure Law will create habitat for ESA-listed fish in the Klamath River watershed.

Above: expansion of the Klamath Falls National Fish Hatchery to increase endangered sucker rearing capacity will be completed in 2026.

Left: Waukell Creek culvert replacement will prevent flooding of a Tribal community and restore fish passage to the Klamath River.

All photos USFWS

Fish Habitat Returns



In 2021, Dan Gale, a biologist with the Arcata Partners for Fish and Wildlife Program, collaborated with representatives from the Northwest California Resource Conservation and Development Council and the Weaverville Community Services District to remove a dilapidated diversion dam from East Weaver Creek, a tributary to the Trinity River in northwest California.

The dam was originally installed in 1958 to create a surface flow diversion for the City of Weaverville's water supply. This structure was 12-feet high with a 25-foot-long concrete and boulder spillway, which resulted in a complete barrier to upstream anadromous fish passage. East Weaver Creek is a pristine watershed draining out of the Trinity Alps Wilderness Area. Removing the dam restored access to over two miles of spawning and rearing habitat for steelhead trout, Coho salmon, and Pacific lamprey.

The project was implemented in two phases. First, a new gravity-fed water intake structure with a self-cleaning screen was installed to provide the Weaverville CSD with increased reliability for their water supply without the need for the dam.

Top: Old concrete barrier on East Weaver Creek, a Trinity River tributary, blocked access to spawning habitat for migratory fish species.

Right: The East Weaver Creek project will remove the dilapidated diversion dam and open up over two miles of spawning and rearing habitat for steelhead, salmon and Pacific lamprey.

All photos USFWS

This phase was constructed in summer 2022, and after testing the system during high stream flows in the winter and spring, the dam was removed during fall 2023. Additional stream channel and riparian restoration will occur in the project area during summer 2024 after the stream channel is allowed to adjust during winter high flows.

This cooperative project not only resulted in restored access for anadromous fish but also greatly increased the reliability and substantially lowered the maintenance needs for Weaverville CSD water diversion.

The diversion also includes a self-cleaning fish screen, which will eliminate juvenile fish mortality problems that occurred with the original unscreened diversion dam. Crews will be monitoring fish use of the area upstream of the dam site in the coming years to assess recolonization of the previously blocked habitat.

- Dan Gale, biologist, Arcata FWO Partners for Fish and Wildlife



Salmon Salvage Surveys



Population monitoring is an important part of understanding an ecosystem's needs and its response to restoration. As the Klamath River dams are removed, fisheries biologists from the Arcata Fish and Wildlife Office and their many partners will use salmon spawning data to learn about the effects of the dam removal on native fishes.

Each fall, these groups conduct Chinook and Coho salmon spawning surveys in the Klamath and Trinity rivers. Multiple small crews work long days on the river through a variety of weather conditions to collect the data for these projects.

Chinook salmon spawning in natural areas of the mainstem Klamath River is most concentrated between Iron Gate Dam and the Shasta River confluence. Crews from the Arcata office and the Yurok Tribe raft downstream counting and marking salmon carcasses to estimate the number of fish that spawn there each year.

Other information collected includes size, number spawned, if hatchery-raised or wild fish, and age.

Downstream of the Shasta River where spawning is sparse, redds (salmon egg nests) are counted by staff and the Karuk Tribe to estimate salmon abundance.

In the mainstem Trinity River, the Arcata office works with California Department of Fish and Wildlife, Hoopa Valley Tribe, Yurok Tribe, and U.S. Forest Service to conduct annual salmon carcass and redd surveys to inform the distribution and abundance of spawning activity. Spring- and fall-run Chinook salmon spawn sequentially from September through December and Coho begin their spawning season in December.

Wild Chinook redds are typically found throughout the Trinity River while hatchery-origin fish tend to spawn close to the Trinity River Hatchery. Redds are mapped to analyze long-term trends in spatial distribution of spawning salmon and to monitor the response of these fish to restoration efforts.

Data from these surveys and other monitoring efforts in the Klamath Basin are compiled at the end of the season to estimate the total in-river salmon run size.

The annual run size determines the status of salmon within the Klamath River, helps to prioritize restoration and management efforts and is combined with other data collected throughout the range to inform salmon harvest management.

- Steve Gough, Arcata FWO fish biologist



Top: An icy fog on the lower Klamath River shrouds a salmon survey crew. Courtesy: Yurok Tribe

Left: Chinook salmon carcass collected on the river provides data for fish population research. USFWS photo.

Above: Chinook salmon spawning in the Trinity River. USFWS photo.



Fluttering Back from the Edge



In 2020, the Bureau of Land Management and California Department of Parks and Recreation didn't find any Behren's silverspot butterflies during their annual survey. The official count was zero. However, in an unsurveyed area, Asa Spade, consulting biologist for Wynn Coastal Planning, found one Behren's silverspot. This single butterfly indicated the species needed help and time was running out.

Clint Pogue, a U.S. Fish and Wildlife Service biologist in the Arcata Fish and Wildlife Office, began securing funding, developing contingencies, evaluating logistics, and establishing permits while gathering a dedicated team of individuals to help prevent this species of butterfly from going extinct. The ultimate goal was to bolster the population through captive rearing while restoring habitat so that the butterflies could exist in the wild again.

Dr. Christine Damiani of the Sequoia Park Zoo Foundation is one of the team leaders. She and her group of technicians collect eggs from female butterflies captured after successfully mating in the wild.

Top: Behren's silverspot caterpillars feeding on their host plant, early blue violets, prior to release in their native habitat on the northern California coast.

Right: A newly eclosed, or emerged, adult Behren's silverspot butterfly in a rearing cage at the Sequoia Park Zoo prior to release.

All photos USFWS

The butterflies were brought to the Zoo where they lay their eggs before being released in the wild. The eggs are tended through each caterpillar life stage leading to pupation and then released in their natural habitat the following year. While the caterpillars are growing at the Zoo, habitat that once supported Behren's silverspot butterfly is being restored on state and federal lands.

Enter Terra Fuller and Kay-Leigh Barnitz who are tasked with managing grazing to reduce non-native grass density to maintain the open prairies that contain the primary host plant the butterfly caterpillars need to survive - the early blue violet.

Together, important and appreciable first steps to recovering the species are being made.

After the zero count in 2020, the team was able to capture seven adult female Behren's silverspot butterflies in the summer of 2021 to begin the captive rearing program at the Zoo.

Last year, 245 healthy adult butterflies and 310 mature caterpillars were released back into their native habitat. This resulted in 56 adults observed during surveys in 2023, a welcome improvement from the zero count just three years before.

Although the true population estimate of this species remains unclear at this time, the team has breathed a collective sigh of relief that Behren's silverspot butterfly is fluttering back from the brink of extinction.

*- Clint Pogue, Arcata FWO
fish and wildlife biologist*



French Creek Coho Come Home

French Creek in Siskiyou County, northern California has long been considered a key stream for maintaining and improving Coho salmon populations. However, past activities including road and bridge construction, mining, agriculture, and levee construction for flood control have artificially straightened and confined sections of Middle French Creek, disconnecting the creek from its floodplain and reducing instream habitat diversity. As such, Coho salmon spawning and rearing habitat in Middle French Creek was limited.

Between 2017 and 2023, the Scott River Watershed Council with support from the U. S. Fish and Wildlife Service and other partners, implemented a series of restoration projects designed to restore spawning and rearing habitat and improve Coho salmon populations in Middle French Creek.

These included a series of beaver dam analogs in an existing side channel and the construction of an additional side channel in the floodplain to create slow water refugia essential for successful juvenile salmon rearing.

Two large wood loading projects with gravel augmentation in the mainstem of Middle French Creek were also implemented to restore spawning habitat. Augmented gravel increased the amount of spawning habitat immediately, whereas the large wood will improve spawning conditions over time by sorting existing gravels as they are transported downstream.



The large wood structures also added habitat complexity and provided additional pockets of slow water habitat.

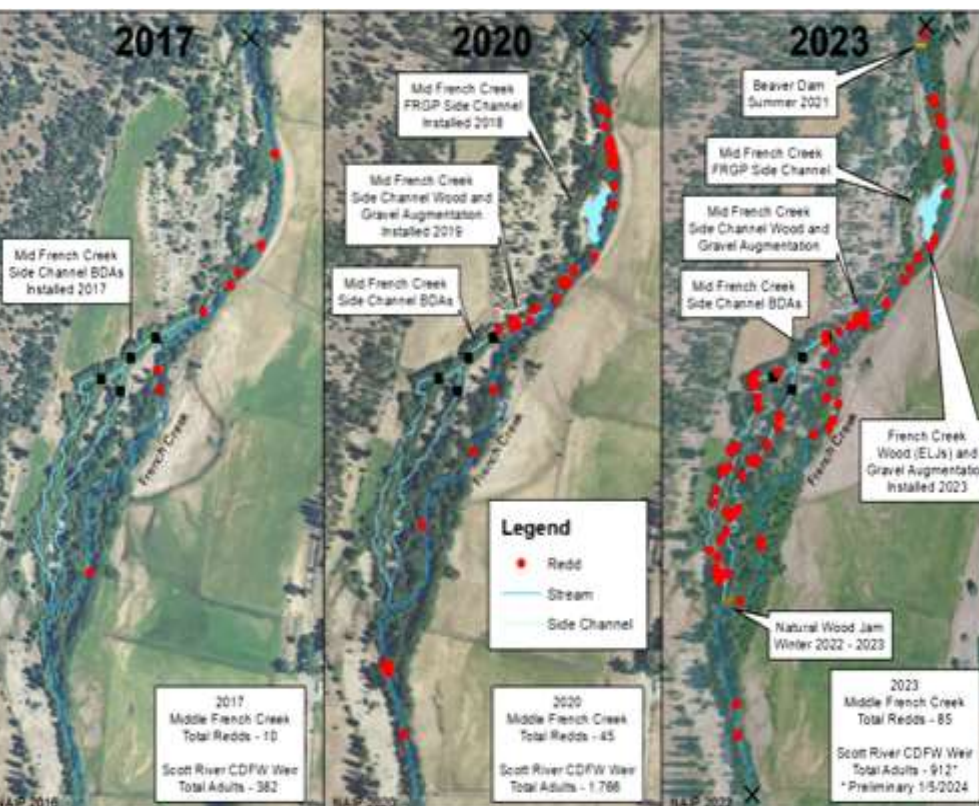
Survey efforts show these restoration projects were effective in improving Coho salmon in Middle French Creek. Coho salmon spawning surveys conducted concurrently with restoration projects showed a steady increase in spawning redds in Middle French Creek.

Redds are depressions in the gravel excavated by female salmon using their body and tail so they can deposit their eggs. Eggs incubate in the gravel over winter and juvenile salmon emerge in the spring.

The surveys recorded 10 spawning redds in 2017, 45 redds in 2020, and 85 redds in 2023. The 53.3 redds detected per survey mile in Middle French Creek in 2023 were among the highest redd densities observed in the Scott River watershed.

The Coho salmon spawning survey results suggest that restoration actions at least in the short-term are having a positive impact on Coho salmon populations in Middle French Creek and are effectively contributing to the recovery of the species.

- Dave Johnson, Yreka FWO fish and wildlife biologist



Top: Slow water rearing habitat created by a beaver dam analog in Middle French Creek side channel.

Above: Coho salmon building redds and spawning.

Left: Timeline of Coho salmon redds located pre/post-habitat restoration on Middle French Creek in 2017, 2020 and 2023.

All images USFWS

Moving Mussels in the Klamath



Freshwater mussels have historically played a significant role in the Klamath ecosystem and have been an important resource for Tribal people throughout the Klamath River since time immemorial. They function as a filtration system helping to improve water quality and as a source of food for people and wildlife. Their shells have also been known to be used as tools by local Tribes.

Surveys conducted in preparation for removal of the four lower Klamath River dams indicated the presence of western ridged mussels. This species is considered at risk throughout their range from central California to British Columbia with the Klamath River being a known mussel stronghold.

A significant concentration of western ridged mussels occur at the base of Iron Gate Dam, one of the dams being removed in 2024. Experts expect the mussels could be impacted by dam removal since they are less mobile than other mussel species and are at high risk when sediment or water quality become deadly. In collaboration with partners, the Service concluded the best solution is to move the mussels to a safer area through a process known as translocation.

Working with the Xerces Society and the California Department of Fish and Wildlife, the necessary permits for translocating the mussels were processed and issued last summer. Xerces mussel expert Emilie Blevins trained staff from multiple agencies in the appropriate methods for marking and moving individual western ridged mussels.

Several Tribal nations including the Yurok, Karuk and The Klamath Tribes were actively engaged in discussions about translocating the mussels early in the planning process due to their relationship with the species.

“It was incredible to have the robust support from our partners,” shared former Service aquatic biologist Christie Nichols. “With their invaluable help we could see the restoration aspect of our agency’s mission fulfilled, especially for invertebrates that don’t have the benefit of being considered as a charismatic species.”

Of the almost 7,000 mussels collected last fall, over 2,000 were fitted with PIT (passive integrated transponder) tags and left in place to assess impacts of sedimentation during the dam removal process while the other 4,000 mussels were relocated downstream.



The results of this effort will advance our understanding how translocation can play in the conservation of freshwater mussels for future dam removal and river restoration actions.

- Derek Harvey, Yreka FWO
fish and wildlife biologist

Top: Biologists survey the Klamath River for western ridged mussels.

Middle: A handful of western ridged mussels collected in the mid-Klamath River as part of the translocation study.

Right: Christie Nichols, former Service biologist, applies a tag to a mussel prior to translocation below Iron Gate Dam.

All photos USFWS



Jenny Creek Flows Free



In 2023, the Yreka FWO partnered with Trout Unlimited to provide funding to deliver engineering designs for the removal of a fish passage barrier on Jenny Creek in Siskiyou County. The creek is a major tributary to the Klamath River and located just upstream from Iron Gate Dam, which is currently being removed.

The barrier on Jenny Creek is a small abandoned concrete dam that was constructed to divert water through a pipeline leading to a campground that is no longer in use.

Historical accounts show that habitat in Jenny Creek was utilized by Chinook and Coho salmon prior to construction of Iron Gate Dam. In preparation for removal of this large dam, the reservoir behind it was drawn down which opened nearly two miles of both spawning and rearing habitat for salmonids in Jenny Creek.

In addition to removal of Iron Gate, three other dams have been or will be removed from the Klamath River by late 2024.

Once removal is complete, over 400 hundred miles of instream aquatic habitat will be available to native anadromous fish such as Chinook and Coho salmon, and steelhead trout.

Iron Gate is the southern-most dam of the four being removed from the Klamath River; it was also the last dam constructed on the river in 1962. Because no fish passage structures were included in its design, upstream fish migration beyond this point was effectively cut off, leaving fish without access to vital tributaries for spawning and rearing their young.

Many more Klamath River tributary barriers are being considered for removal now that anadromous fish migration above Iron Gate is becoming a reality.

The Jenny Creek barrier removal is expected to occur prior to the return of adult salmon in the fall of 2024, which will be the first time in over a century that mature adult salmonids will have access to their historical spawning grounds.

*- Ryan Fogerty, Yreka FWO
fish and wildlife biologist*



Top, left: Two views of Jenny Creek and an abandoned concrete dam that will be removed later this year, opening up nearly two miles of salmon habitat in this tributary of the Klamath River.

Above: View downstream of Jenny Creek dam prior to removal, during a high flow event. The structure prevents mature salmon from reaching native spawning grounds.

All photos USFWS

Bats in the Basin: *Tribal Interns Learn by Doing*

What is seldom seen, rarely heard, always nearby and helping to keep the natural world in balance? Bats! These flying furry mammals have intrigued humans and societies for centuries, although not many people know much about bat populations or their many species.

The Karuk name for bat, *timshúkriih*, roughly translates as 'living inside the edge'. The translation indicated recognition that bats emerge from the shadowy crevices in cliffs along the river and are seen during the edge between night and day, between visual clarity and obscurity. The name also implies that for many humans our understanding of bats is on the edge between obscurity and clarity, without full knowledge of the role bats play in our world.

At the national level, efforts are underway to better understand and manage one of the primary threats to the bats, white-nose syndrome. Within the Service, biologists are working with federal and state partners to monitor bat species along the Klamath River. Our approach also includes engaging support from a young generation of wildlife students associated with local Tribes.

With funding from the Service's regional and national [White Nose Syndrome program](#), an internship opportunity was created for Native American college students to study bats in the Klamath Basin. One such student had a passion for bat research within Tribal communities along the Klamath and Trinity Rivers.

Ryan Matilton, a member of the Hoopa Valley Tribe, is a graduate degree student at Cal Poly Humboldt and was the first to assist the Service with bat monitoring in the Klamath River corridor in coordination with the Yurok Tribal Wildlife Department. The Yurok have been conducting acoustic bat surveys as part of the North American Bat Monitoring Program with funding from the WNS Grants to States and Tribes.

Jesse Campbell, a member of the Cachil Dehe Wintu Tribe, is also a student at Cal Poly Humboldt and was selected for the project through a Science in the Service fellowship. She plans to continue work on the Klamath River and expand bat monitoring within her Tribal community in Colusa, in the Sacramento Valley.



The Karuk Tribe is also expressing interest in expanding bat surveys after gathering initial acoustic data using equipment loaned by the Service. The Tribe plans to take advantage of funding opportunities through the WNS Grants to States and Tribes Program, to acquire more modern acoustic equipment with a goal of implementing bat surveys and developing protocols contributing to national bat monitoring efforts.

This data will help bring Tribal concerns together with river health and other impacts on the plants and animals that are an important part of their world.

- Trevor Super, Yreka FWO
Native American Specialist

- Bronwyn Hogan, Region 8
Ecological Services, wildlife
biologist

Above: A long-eared myotis bat after being caught as part of the bat relocation effort at the Copco 1 Dam gatehouse, prior to the dam being removed. Credit: Gwen Santos.

Left: Ryan Matilton with an ultrasonic detector that records bat calls made in flight. Courtesy: Cal Poly/Humboldt





Busy Beavers Heal Bootleg Burn

In the summer of 2021, the Bootleg Fire blazed through large parts of rural Klamath and Lake counties, Oregon. The fire impacted over 400,000 acres, including lands owned by Green Diamond Resource Company, an industrial timber company. The affected Green Diamond acreage included a large area of designated bull trout critical habitat in both counties.

This catastrophic wildfire resulted in a nearly complete loss of vegetation and organic matter on the forest floor that would otherwise slow the flow of surface water, minimize erosion, and hold soils in place. The landscape transformed into something akin to a moonscape.

Further compounding the negative effects of the wildfire, the winter snowpack of 2021- 2022 and the spring rains that followed sent rivulets of mud and silt into the main creeks flowing into the Sprague and Williamson Rivers and eventually Upper Klamath Lake.

The Klamath Falls Fish and Wildlife Office Partners for Fish and Wildlife Program took an all-hands-on-deck approach to address the overwhelming ecological disaster created by the fire.

Biologists along with local partners such as Trout Unlimited and Klamath Watershed Partnership, quickly developed a plan to “hold back” silt and ash released by the fire. The restoration plan was based on the work of nature’s engineers, beavers. Biologists designed and installed beaver dam analogs - called BDAs - in the impacted bull trout critical habitat streams to create complex habitat for fish including spawning, rearing, overwintering, and cold water refugia.

The biologists worked together to expedite ESA section 7 consultation to ensure instream work could be implemented as soon as weather conditions were favorable.

The success of the BDAs was apparent almost immediately. The water flow slowed, allowing the sediments and ash to settle out which prevented tens of thousands of tons from traveling downstream into Upper Klamath Lake.

Probably the most visible sign of success was when beavers moved in after the BDAs were installed and began renovating one of the structures by adding woody material and mud.

Thanks to the beavers, the scar of the Bootleg Fire is on its way to healing as these furry engineers work around the clock to restore the landscape of Klamath and Lake counties.

*- Brian Hidden, biologist
Partners for Fish and Wildlife*



Top: The Bootleg Fire burn scar in 2022, prior to restoration work.

Above: A completed beaver dam analog colonized by a beaver family shortly after installation. Note the new woody material and fresh mud placed by beavers.

Left: A new backwater pond as a result of the BDA installation in the Bootleg Fire scar.

All photos USFWS





Growing Together

The Lost River and shortnose suckers which are known to The Klamath Tribes as *c'waam* and *koptu*, were federally listed as endangered in 1988. The Service created the Sucker Assisted Rearing Program in 2015 to rear both species of these suckers.

Since it began, the program has released 126,930 suckers. Now known as the Klamath Falls National Fish Hatchery (NFH), the new facility was officially designated in 2022 and expansion began soon after, made possible by a multi-million dollar investment through the Bipartisan Infrastructure Law. Once completed in 2027, the new facility will have an annual production capacity of 60,000 sucker fish to stock throughout the Klamath Basin.

The Klamath Falls NFH staff work closely with The Klamath Tribes and their Ambodat Sucker Rearing Program to aid in sucker recovery. Lost River and shortnose suckers live throughout the Upper Klamath Basin, spawning in the Williamson and Sprague rivers, Willow Creek, and shoreline springs in Upper Klamath Lake in the spring. After larval hatch, larval suckers drift downstream at night, and during the day they swim into the shoreline vegetation to seek refuge.

Staff from the NFH and Ambodat collect larvae from the Williamson River beginning in May by setting driftnets overnight and by using dip nets along shoreline vegetation in the daytime. Both methods ensure as many larval suckers are collected as possible to rear in captivity for two years which will enable them to mature past the critical juvenile survival stage.

Once collected, larvae are transported to the hatchery or Ambodat where they are acclimated and treated for external parasites. The larval suckers are placed in ponds where they will live for up to 18-24 months to reach the target length of 200 millimeters (eight inches). Compared with their wild counterparts, fish in captivity can reach the same target length sooner and have significantly higher survival than if they remain in the lake.

Once suckers have reached target size, a small portion are retained for future broodstock and the rest receive a tracking tag before being released in waterways in the Klamath Basin. After release, fish are tracked to help identify habitat use and overall hatchery release success. The hatchery also conducts ongoing research to improve sucker rearing practices.

The Klamath Falls NFH looks forward to continued collaboration with The Klamath Tribes to enhance recovery efforts for the *c'waam* and *koptu*, bringing hope for the future of these ecologically and culturally important fish found nowhere else on Earth.

- Charlee Cramer, fish biologist
Klamath Falls NFH



Top: Adult Lost River suckers in Upper Klamath Lake.
Credit: Jason Ching/USGS

Above: Graphic render of hatchery expansion project that will increase rearing capacity to 60,000 suckers annually.

Left: Author with an adult Lost River sucker in Upper Klamath Lake. USFWS photo.



Species Spotlight: *Oregon spotted frog*



The Oregon spotted frog, whose scientific name means "precious frog", is a medium-sized frog with large eyes that are upturned. Adult frogs have moist bumpy reddish-brown skin covered in black spots with light centers that darken with age. Adult females are about four inches in length and males grow to three inches.

If lucky enough to spot this camouflaged critter amongst the aquatic plants, don't be surprised if it barely moves. Oregon spotted frogs are 'sit-and-wait' predators, meaning they remain still with their sticky tongue at the ready before pouncing on unsuspecting prey that wanders by. Their diet consists mostly of beetles, flies, water striders and spiders, although these frogs have been known to eat water plants and even juvenile frogs of other species.

Reproduction for the Oregon spotted frog is strictly aquatic and occurs over four weeks in late winter. Males call to locate females near where eggs are laid in large group masses. These communal piles are fully exposed in shallow waters where they are warmed by the sun which hastens development.

However, this also puts eggs at risk for drying out and/or freezing. Four months from fertilization, frog larvae undergo metamorphosis into tadpoles and in a few years, mature into breeding adults.

Like many amphibians, adult frogs have a 'hands-off' parenting style and will not feed or guard their young. Adult frogs hibernate during the winter in water sources that don't freeze, or even burrow in mud under water at least a foot deep.

The lifespan of the Oregon spotted frog is between two and five years.

Oregon spotted frogs are relatively rare within their range and were listed as threatened under the Endangered Species Act in 2014. Sadly, this little amphibian is no longer present in 76% to 90% of its historical range. They are completely extirpated from California, much of western Oregon and Washington. Threats to their survival include livestock grazing, loss of habitat, competition with non-native plants and animals and predation by water birds and bullfrogs.



Only 33 known populations of Oregon spotted frog exist in the Pacific Northwest, and 20 of those in Oregon.

The Klamath Falls FWO continues to work closely with our federal partners to survey for and monitor this species and are currently working with private landowners to improve and increase wetland habitats that ensure the future survival of Oregon spotted frogs.

- Susan Sawyer, Klamath Basin public affairs officer



Top: Adult Oregon spotted frog in its natural habitat of marsh-wetlands. Credit: USFWS

Above: Map depicting current known range where Oregon spotted frogs occur in the Pacific Northwest (dark green areas.)

Left: Service staff conduct seasonal frog egg mass sampling in Upper Klamath Marsh. Credit: USFWS

The Importance of Connecting with Nature

The Klamath Basin, once known as “the Everglades of the West,” historically contained more than 350,000 acres of wetlands vital to wild birds and animals. Today within that historic footprint is the Klamath Basin National Wildlife Refuge Complex, made up of six refuges: Tule Lake, Lower Klamath, Upper Klamath, Klamath Marsh, Bear Valley, and Clear Lake - whose combined mission is to protect the remaining 5% of what was once the largest area of wetlands west of the Mississippi River. Even at its current capacity, the area is still a critical part of the Pacific Flyway where migrating water birds can rest, nest, breed and feed.

President Theodore Roosevelt was one of the few leaders of the 20th century who understood that our natural resources are not inexhaustible. He established a precedent at an important time in our nation's history by creating 51 federal bird preserves during his administration that later became national wildlife refuges. Lower Klamath National Wildlife Preserve - later National Wildlife Refuge - was designated in 1908 as the nation's first refuge for waterfowl.

Twenty years later, Tule Lake National Wildlife Refuge was established by President Coolidge as “a preserve and breeding ground for wild birds and animals” which prevented further conversion of these important wetlands into farmsteads.

National Wildlife Refuges are places where visitors can participate in a wide variety of outdoor recreational activities. Refuge managers do their best to balance the needs of wildlife, wetland preservation, and people by providing opportunities to connect with these wild places, many within an hour of most metropolitan areas.



One approach to attracting visitors is by providing hiking trails on refuge lands. At Tule Lake NWR, there are family friendly trails such as Discovery Marsh and Sheepy Ridge that offer up-close wildlife viewing opportunities, which is one of the six priority visitor uses determined to be compatible with the refuge mission.

Discovery Marsh, a popular day use area open year-round, is located just east of the new refuge visitor center on Hill Road. Here, visitors can enjoy an easy, level and accessible stroll on the one mile loop pathway and learn about life in the marsh from the interpretive panels. Wildlife abounds on this trail, from mule deer to waterfowl, coyotes and birds of prey.

Completed in 1995 as a "demonstration marsh," Discovery Marsh has proven to be a showcase for the feasibility of converting agricultural land back into productive wetland. It is managed through a water control system which mimics the natural process of a seasonal wetland.

Discovery Marsh also boasts a little known non-motorized float trail. The refuge supplies all the gear needed for this self-guided paddle from mid-April through October, weather dependent. Details and equipment are at the visitor center at no cost, so call ahead for availability. A picnic area is nearby so visitors can make a full day of fun on the marsh.

Sheepy Ridge Trail is located across from the visitor center parking lot. The trail was constructed by the Civilian Conservation Corps in 1936 and climbs one-third of a mile to a rocky overlook at the top of the ridge, 200 feet above the parking lot and offers an impressive, expansive view of the Tule Lake Basin.

For more information, visit: <https://www.fws.gov/refuge/tule-lake/visit-us/tours>

- John Fitzroy, Klamath Basin NWRC Visitor Services Manager



Above: Visitors connect with nature on a paddle in the wetlands of Tule Lake refuge. Kayaks and canoes can be checked out from the refuge visitor center.

Left: The Discovery Marsh pathway leads visitors into the Tule Lake wetlands on a short, easy interpretive trail.

All photos USFWS

Discover Klamath Basin Refuges

The new Klamath Basin National Wildlife Refuges Visitor Center at Tule Lake is open and ready to provide a wide range of benefits to the visiting public. Construction of this building, which also houses administrative offices for the refuge complex, was made possible with funding from the Great American Outdoors Act of 2020.

The building was designed to generate awareness and understanding of the Basin's wetlands and their importance to the Klamath Basin watershed. The exhibits will tie into the theme that all things living in the basin - including wildlife and people - are united by and dependent on its water.

Ken Griggs, acting refuge manager, said the benefits of a facility to greet and orient the public are a top priority, even in the midst of drought and limited wildlife viewing.

"The visitor center is the go-to place to learn about the area and its history. Our knowledgeable staff and skilled volunteers offer expert advice, factual answers and up-to-date information to provide the best experience for new and returning visitors, even when refuge conditions are less than ideal," said Griggs.

The building's unique architectural structure blends with the natural environment, while establishing a modern sense of place and community for all visitors. Once the new hands-on interpretive exhibits are installed, visitors can explore the rich cultural and natural history of the area that will enhance awareness of the refuge and its mission.



In addition, indoor and outdoor classrooms offer schools and other groups a chance to take a deep dive into and connect with the natural world.

"Although refuges are places where wildlife comes first, refuge visitor centers add real value to local economies by attracting recreational users," said Griggs. "Some out-of-area visitors take part in hunting and fishing, others enjoy hiking, paddling, wildlife viewing and nature photography. All of these user groups contribute to the local economy by supporting local businesses."

Klamath Basin National Wildlife Refuges are places where visitors can participate in world-renowned wildlife-related recreation activities. Making the visitor center the first stop will ensure a more fulfilling refuge experience, one that instills a deep appreciation and stewardship ethic for our public lands so that they are conserved and protected for future generations.

*- John Fitzroy, Klamath Basin NWRC
Visitor Services Manager*



Top: The new refuge visitor center at Tule Lake provides visitors with an overview of the refuge complex before heading out to explore.

Above: An indoor classroom with a full wet lab is available for onsite nature education programs.

Left: Large viewing windows in the main building and hands-on, up-close exhibits are just some of the features at the new Klamath Basin refuge visitor center.

All photos USFWS



We are the Klamath: *Greg Austin*

On May 31, Greg Austin, Klamath Basin NWRC Project Leader, retired after a 30-year career with the U.S. Fish and Wildlife Service, the last half of which was at the Klamath Basin National Wildlife Refuge Complex.

Greg developed a love for the outdoors while growing up in southern California, where he and his friends spent a lot of time hiking and camping in the San Geronio Wilderness, Joshua Tree National Park and the Sierra Nevada backcountry. He was inspired to become a wildlife biologist by one of his favorite TV shows - Mutual of Omaha's Wild Kingdom hosted by Marlon Perkins and his sidekick Jim.

"I loved that show; I wanted to do everything they did - field surveys, trap and handle wildlife and all that cool stuff. I figured the best way to do that was to get a wildlife biology degree and work on a refuge."

Greg's first job after earning his wildlife biology degree from UC Santa Cruz was doing Peregrine and Aplomado falcon reintroductions. From there he worked with the first California condor captive rearing and reintroduction program, then as a wildlife biologist for Channel Island National Park. He also worked as an Assistant Refuge Supervisor for the Pacific Southwest Region.

As for his time at the Klamath refuge complex, Greg admits there were many challenges over the years but he is hopeful that the Klamath will recover. He gives credit to the staff, which includes maintenance, wildland fire, administrative, visitor services, wildlife biologists and refuge managers. He feels one of his greatest accomplishments was to guide his staff to be the best team possible to achieve the primary refuge purpose.

"I give credit to the staff for their daily support and dedication to the Service mission. One of our main objectives is to create wildlife habitat, and we worked really well as a team towards that goal. With all the challenges we face in the Basin we still were able to get a lot of diverse work done."

Greg says finding those creative solutions to a long-term reliable water supply for the refuge and the wildlife it supports was often difficult when considering the needs of farmers, Tribes and citizens of the Klamath Basin. This made the efforts rewarding and challenging yet necessary to accomplish the refuge objectives while working through those issues as a community.

"At times it feels like the Klamath is on the edge, where it could go either way - success or failure. The only way its going to be effective is if we work together. Everyone involved in these collaborative efforts wants to do the right thing, but there may be a point where we need to be willing to try new ways to fix the problem."

As evidence of his ability to lead, inspire and get the job done, Greg received two prestigious career recognitions in the past four years. In 2020, he was selected as Refuge Manager of the Year by the National Wildlife Refuge Association. "This award meant a lot because refuge employees nominated me. It was a surprise and very humbling."

Then in May of this year, he received the Department of Interior Distinguished Service Award for outstanding leadership and commitment to conservation in the Klamath Basin. "My supervisor sent in my name, which also meant a great deal to me. Both of these awards were such an honor to receive."



As advice to anyone interested in joining the federal workforce, Greg said being prepared is key.

"There is so much you can do on refuges, but you need to have a plan - whether its visitor services, wildlife research, wetlands management, habitat restoration or a species-specific focus. Refuges are a great place to start."

As the last days of his career came to a close, Greg reflected on his time in the Klamath, and what he will miss most about the job.

"Being out on the refuge itself, seeing the birds and wildlife all interacting, especially when we have water on the landscape. I could always count on the refuge to give me that sense of accomplishment and that my efforts here were worthwhile. I'll miss that."

And the refuge will miss you, Greg.

- Susan Sawyer, Klamath Basin public affairs officer

Above: Greg Austin, former Klamath refuge complex Project Leader, retired in May 2024 after a 30-year career with the Service.

Left: Austin made a final visit to one of his favorite places on Tule Lake refuge before retiring in May. He felt the refuges were in a good place to return to what they once were - important Pacific Flyway stopovers full of water and birds.

All photos USFWS



Klamath Basin Refuge Complex

email: r8kbwebmaster@fws.gov

web: www.fws.gov/refuge/tule-lake

Klamath Falls Fish and Wildlife Office

email: kfalls@fws.gov

web: www.fws.gov/office/klamath-falls-fish-and-wildlife

Yreka Fish and Wildlife Office

email: yreka@fws.gov

web: www.fws.gov/office/yreka-fish-and-wildlife

Arcata Fish and Wildlife Office

email: fw8_afwo_comments@fws.gov

web: www.fws.gov/office/arcata-fish-and-wildlife

***Front:** The Klamath River finds its way past the former site of Copco 2 dam after its removal in 2023. Courtesy: Swiftwater Films*

***Back:** Symbol of restoration success - a California condor at Hopper Mountain NWRC. Credit: John Heil/USFWS*