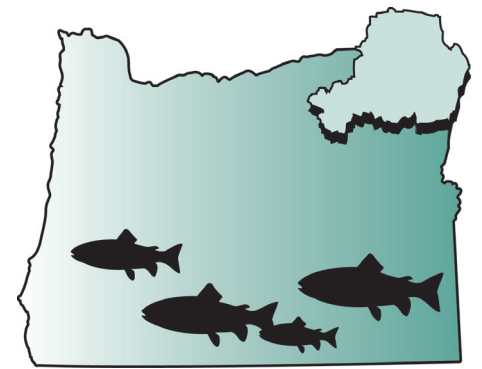


# RIPPLES IN THE GRANDE RONDE



SUMMER  
FALL  
EDITION 2025

RIVERS UNITING NEIGHBORS · NEWS FROM THE GRANDE RONDE MODEL WATERSHED

## Double-crested Cormorants and Their Impacts on Fish Populations in the Pacific Northwest: A Case Study from the Grande Ronde Valley

by Joe Lemanski, Oregon Department of Fish and Wildlife

hundreds of thousands of breeding pairs across the continent. Historically, persecution, habitat loss, and pesticide use reduced their numbers, but following protections under the Migratory Bird Treaty Act (MBTA) and reduced pesticide use (DDT ban), cormorant populations rebounded dramatically. This recovery has been hailed as a conservation success, yet it has also generated

juvenile salmon and steelhead were consumed annually by cormorants and other piscivorous birds nesting on East Sand Island and nearby colonies. In years where predation by colonial waterbirds was estimated to be in the tens of millions, these losses rivaled those associated with individual dams on the hydropower system. In response, management actions

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intense conflict with human fisheries interests, especially where ecologically, culturally, and economically vulnerable fish stocks are concentrated.

### Management History of Double-crested Cormorants

The management of Double-crested Cormorants in the United States has been complex and often controversial. Protected under the MBTA, lethal control requires federal permits. In response to growing complaints from aquaculture facilities, sport fisheries, and conservationists worried about salmonid survival, USFWS has periodically allowed limited culling.

From the 1990s onward, large colonies in the Columbia River estuary became a focal point. Research demonstrated that tens of millions of

### Introduction

Few wildlife species in North America spark as much management debate as the Double-crested Cormorant. These fish-eating waterbirds are widespread across the continent, breeding in colonies from the Great Lakes to the Pacific Coast. Their presence has long been a natural component of aquatic ecosystems, but the rapid recovery and expansion of cormorant populations in recent decades has drawn concern from fisheries managers. At the center of this debate lies a critical question: how much impact do these native colonial waterbirds have on already vulnerable fish populations? And, how much is too much?

The U.S. Fish and Wildlife Service (USFWS) describes Double-crested Cormorants as one of the most abundant and adaptable North American waterbirds, numbering



**Double-crested Cormorants** (K. Cole, Copyrighted, All Rights Reserved - Used by Permission, USFWS)

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included lethal removal of adults, oiling or destruction of eggs, and habitat modification to disperse colonies.

Cormorant management remains controversial, in part because the nature of their impact on fish populations is not fully understood. A key question is whether predation represents additive mortality - losses above and beyond what fish would have experienced in the absence of cormorant predation - or compensatory mortality, in which cormorants are primarily removing individuals that would have died from other causes such as disease, poor condition, consumed by other predators, or passage through dams. If predation is largely compensatory, then management actions targeting cormorants may have little effect on overall survival. However, if predation is additive, then losses to birds directly reduce the number of fish that return as adults. Given the threatened status of many salmon and steelhead populations, understanding which of these dynamics is at play is central to deciding whether, and how, to intervene in managing avian predators.

## Effects on Fish in the Pacific Northwest

In the Pacific Northwest, cormorant predation on salmonids has been most intensively studied in the Columbia River Basin. Colonies in the estuary, such as East Sand Island, consumed staggering numbers of juvenile salmonids during spring migrations. One study estimated that more than 10–15% of outmigrating smolts (ocean-bound juvenile salmonids) were lost annually to avian predators in the Columbia River



**ODFW's Life Cycle Monitoring crew uses "snorkel-herding" to capture juvenile Chinook salmon for PIT tagging.**

(Courtesy of Joe Lemanski)

corridor, with Double-crested Cormorants contributing the bulk of that mortality.

The effects are not limited to large estuarine colonies. Research across reservoirs, tributaries, and inland valleys has shown that smaller colonies may have disproportionately large impacts on local fish populations. Tributary-level predation can be especially damaging when small populations of threatened salmon or steelhead are forced to migrate through areas where cormorant colonies are established.

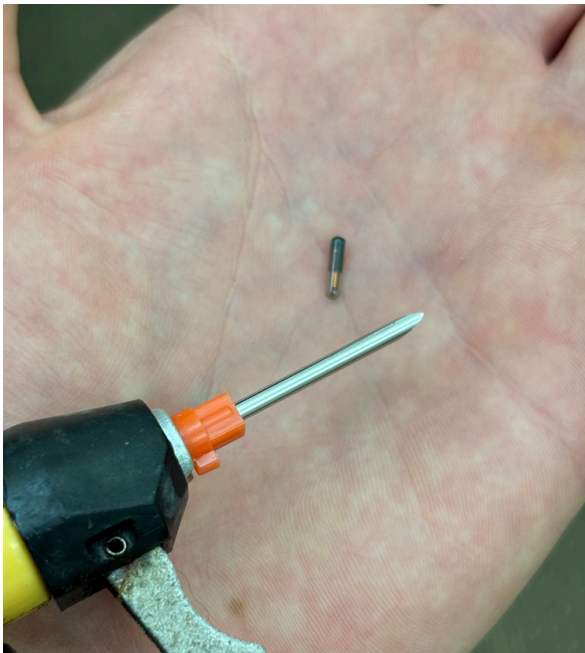
Importantly, cormorants are generalist predators. Their diet includes many species of fish, from invasive forage fish to juvenile salmon. This feeding flexibility enables them to thrive in diverse aquatic settings, but it also means that in regions where vulnerable fish like salmon migrate in predictable pulses, predation pressure can be concentrated and significant.

## Case Study: The Grande Ronde Valley

Interestingly, cormorants are not believed to have historically occupied the Grande Ronde Valley. The best available information suggests they first began occupying the valley and the local colony around 2000, roughly coinciding with the start of salmon hatcheries in Catherine Creek. Their presence has raised concerns among local biologists about whether this newcomer to the colony was impacting the local imperiled and federally protected salmon populations.

The Oregon Department of Fish and Wildlife (ODFW) has been investigating the growing role of tributary-level avian predation as a limiting factor for salmon recovery – a study funded through the Bureau of Reclamation. In the Grande Ronde Valley of northeast Oregon, a mixed-species rookery along Catherine Creek has in recent years been dominated by Double-crested Cormorants. In 2024, surveys documented 69 active cormorant nests, alongside smaller numbers of Great Blue Heron, Great Egret, and Black-crowned Night Heron nests. The rookery sits directly in the migration path of juvenile Chinook salmon and steelhead produced in Catherine Creek and the upper Grande Ronde River.

Every year since 1995, ODFW biologists have captured juvenile salmonids to estimate the number of those fish attempting to migrate to the ocean (smolts) as part of tracking progress towards recovery. These estimates show roughly 40,000 wild Chinook smolts leave Catherine Creek and the Upper Grande Ronde every year, joined by about 400,000 hatchery-reared juveniles. Many of these juveniles are marked with PIT tags - tiny devices about a quarter the size of a Tic Tac - that allow biologists to track fish as they migrate through the



**Passive Integrated Transponder (PIT) tag used to track individual juvenile fish for research and monitoring.**

(Courtesy of Joe Lemanski)

Columbia Basin and later return as adults. These tags also provide a unique record of predation: when birds consume tagged fish and return to feed at the rookery, the tags are deposited on the forest floor where they can later be recovered by researchers.

ODFW biologists surveyed the rookery floor for PIT tags multiple times between 2007 and 2024 and have recovered more than 22,000 tags from consumed salmon and steelhead over that timeframe. Most of these came from hatchery-reared juvenile Chinook released in Catherine Creek, while a considerable number of the tags detected were from naturally produced juveniles. Based on these detections, at least 5–11% of wild juveniles and 2–4% of hatchery fish were taken by birds each year. Because only about half of deposited tags are typically detected, and taking into account that not every tag consumed makes it back to the rookery, true predation on wild juvenile Chinook salmon is likely closer to 15–30% of the total number of migrants. In a system with already limited smolt production, losses of this magnitude can erase the benefits of

costly habitat restoration. For natural-origin Chinook from Catherine Creek, predation in one year reached a minimum estimate of 11.6%, helping to explain why survival through the valley is consistently lower than in neighboring populations where avian predation pressures are not present.

Cormorants are not the only avian predators present. Great Blue Herons, Black-crowned Night Herons, and Great Egrets have long been part of the valley's ecosystem, though they are not believed to be major contributors to smolt losses. More recently, American White Pelicans, which are highly efficient fish predators, have become regular visitors during outmigration. Groups of 50 to 100 pelicans are often seen in the valley each spring, making a pit-stop along their foraging route. Pelicans forage daily across a much broader range as compared to the birds which occupy the local colony; numerous studies have documented American White Pelicans foraging more than 50 miles from their nesting areas to feed and provision their young, and in some cases well over 100 miles. Knowing the pelicans observed in the valley are likely stopping by day-to-day, ODFW conducted a survey at one of the pelican loafing areas which revealed over 150 PIT tags from salmon and steelhead originating at 32 different release sites, stretching from Idaho's Sawtooth Mountains to Washington's Wenatchee River. It is believed these fish were consumed during their migration to the ocean on the Columbia River near McNary Dam, and the tags deposited in the valley later the same day during the birds daily foraging route. Even so, Double-crested Cormorants remain the most numerous and impactful avian predators in the Grande Ronde Valley and are the primary focus of management concern.

## Broader Implications for Salmon Recovery

The Grande Ronde Valley case study underscores a larger theme in Pacific Northwest salmon recovery: predator management is increasingly becoming a necessary but uncomfortable component of conservation. Billions of dollars invested in habitat restoration, hatchery reform, and hydropower mitigation may not achieve intended results if substantial predation losses persist. Yet predator control raises ethical, ecological, and political challenges, particularly when native species like the Double-crested Cormorant are involved. The Catherine Creek rookery poses this same dilemma for our local fish and wildlife managers. On one hand, Double-crested Cormorants are native birds which shouldn't be blamed for eating and raising their young, and are protected under federal law. On the other, shifts in cormorant management and anthropogenically driven simplification of our stream corridors have allowed for more concentrated cormorant predation on another federally protected species. This suite of conflicting fish and wildlife management

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**Juvenile Chinook salmon.** (Roger Tabor, USFWS, Public Domain)

# From Eroding Banks to Thriving Floodplain: THE LOSTINE TOWN PROJECT STORY

by Montana Pagano, Nez Perce Tribe Fisheries

For more than two decades, restoration partners and Wallowa County residents have worked hard to restore the Lostine River and to recover the salmon population. In 1997, state and tribal fisheries managers counted only 11 Spring Chinook Salmon redds (nests) in the Lostine River. This shocking number triggered a series of crucial management actions to save salmon in the Lostine. On the habitat restoration side one major effort includes a minimum flow agreement. Since 2004, this agreement, established between the Freshwater Trust (continued through Trout Unlimited) and irrigators, has ensured enough water remains instream for adult salmon survival and migration. Providing fish passage became the next priority to help salmon move upriver to spawn. Since 2012, four partial-barrier irrigation diversions have been replaced. Following these flow and fish passage efforts, improving floodplain connectivity has become a recent priority to address limited juvenile rearing and adult spawning habitat.

The “Lostine Town” project, aptly named, is located immediately west of the town of Lostine, Oregon. This opportunity initially came

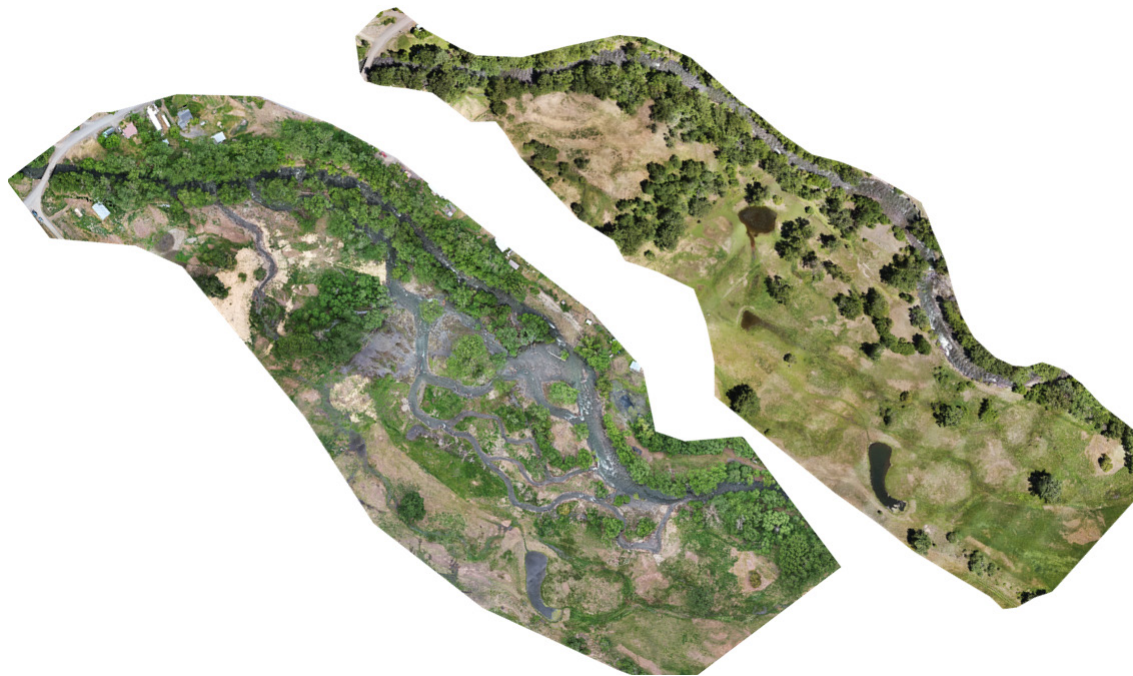


**Looking downstream in September 2022 from the west bank at the 40+ foot tall eroding bank.** (Courtesy of the Nez Perce Tribe)

to the Grande Ronde Model Watershed (GRMW) in 2018 as a plea for help from landowners who watched their property slough off into the Lostine River over the years. This erosion was primarily caused by bank stabilization efforts upstream. During high flows, water would hit the hardened riprap levee on the west bank and, as physics would have it, redirected energy into the loose alluvial substrate that composed the east bank downstream. The result over several decades was a more than 40-foot-tall eroding cliff in several people’s backyards.

Fortunately, roughly 10 acres of privately owned floodplain pasture lying just beyond the levee to the east were generously offered up in the name of salmon habitat and floodplain restoration. With funds granted by Oregon Watershed Enhancement Board and Bonneville Power Administration, along with strong partner support and a river engineering design team, local Nez Perce Tribe (NPT) staff blazed the long trail of planning and implementing a half-mile-long restoration project involving more than half a dozen landowners.

Since completing on-the-ground construction in September 2024, life in the new floodplain channels and adjacent ground has been budding. This spring, landowners observed



**Aerial views of the project reach: June 2025 after restoration (left) and June 2021 before restoration (right).** (Courtesy of the Grande Ronde Model Watershed)

steelhead spawning for the first time in more than 30-years, and NPT staff observed numerous steelhead and Chinook redds throughout the new channel network. The newly formed habitat also welcomed hundreds of juvenile salmonids in what was formerly Timothy grass-dominated pasture.

In addition to the hydroseeding and native plantings installed last fall and this spring, thousands of volunteer cottonwood sprouts now carpet the freshly exposed soils, propagated from nearby senescent trees. An old aspen gallery is also producing new shoots among emergent sedges and rushes, co-populating the recently flooded soil.

These fresh signs of life are the direct result of moving water out of the singular straightened channel and redistributing it across the adjacent valley bottom. This change will both eliminate bank erosion on the right bank, and simultaneously enable natural riverine processes to evolve within the new channel network and the river left floodplain, benefiting flora, fauna, and the fine folks that call this stretch of the Lostine River home. ■



**Before and after construction of the new co-dominant channel, which helps the river split its flow and improve habitat for fish and wildlife.** (Courtesy of the Nez Perce Tribe)



**Before and after construction of secondary channels designed to enhance habitat and natural flow patterns.** (Courtesy of the Nez Perce Tribe)

## State of the SCIENCE

Each year, the Grande Ronde Model Watershed hosts a State of the Science Meeting. This annual gathering provides an opportunity for stakeholders, including scientists, restoration practitioners, board members, and landowners, to come together and exchange information. The primary goal of the meeting is to review current developments in habitat restoration, research, and monitoring within the Grande Ronde Basin, and to explore how these findings can be applied to inform future restoration activities through adaptive management.

The meeting will feature a series of presentations covering a wide range of topics related to research, monitoring, and effectiveness. In addition, a poster session will highlight the work of restoration implementers, offering a chance to share accomplishments from the past year as well as preview projects planned for the year ahead.

The event spans two days. The first day and the majority of the second day will be devoted to presentations and poster sessions. The meeting will conclude with a focused session dedicated to adaptive management, with particular attention to the Restoration Atlas and strategies for project implementation.

This year's State of the Science Meeting will convene on November 18 at 8:30 a.m. and adjourn on November 19 at 12:30 p.m. The meeting will be held at the Presbyterian Friendship Center, located at 1204 Spring Avenue in La Grande. We invite all partners, collaborators, and community members interested in the science and practice of habitat restoration to join us.

# MEET KELLY HENDRIX

## the GRMW's new Wallowa County Project Coordinator

by Alexandra Towne, GRMW staff

**B**orn and raised in Montana's Flathead Valley, Kelly grew up with rivers, lakes, and mountains as her playground. Summers meant boating and floating, fall and spring were for hiking, and winters were all about skiing. With parents who worked in natural resources, it was almost inevitable that she would find her way into a career tied to the outdoors.

Kelly knew from a young age that she wanted to work with water. At first, she imagined a career helping provide clean drinking water in developing countries. But as she got older, she saw just how much need there was for similar work closer to home. That realization shifted her focus from safe drinking water,



**A happy hiker! Kelly enjoying the great outdoors.** (Courtesy of Kelly Hendrix)

toward ecosystem and environmental health. A path that eventually led her to her current role with the Grande Ronde Model Watershed (GRMW).

Her education reflects these interests. Kelly studied Environmental Science at Montana State University in Bozeman, focusing on soil and water, with minors in water resources and GIS. From there, she went on to earn her master's degree in Environmental Sciences at Oklahoma State University. Her graduate research looked at harmful algal blooms in Oklahoma reservoirs, using remote sensing to study their patterns and impacts.

Before joining the GRMW, Kelly worked as a program coordinator for the Western Montana Conservation Commission. That job gave her a chance to dive into big-picture watershed issues like non-point source pollution (storm-water and septic systems) and aquatic invasive species. A major part of the job was working with partners across all levels of government and communities (federal, state, county, and tribal). She also spent a lot of time on public outreach, helping people understand the issues and how they could help. That experience of bringing people together around shared goals has prepared her well for her new role.

What drew her to the GRMW was both the organization's successful history and its collaborative approach. "I really value that these projects I will be involved in have not been developed in a vacuum, and are a key result of the work and time our partners are willing to put in" she says. She also adds that the GRMW team itself has been nothing but welcoming since day one.

As the Wallowa County Project Coordinator, Kelly's role is all about, well, coordination.

She helps make projects happen by working with local landowners, and partnering agencies with an interest in watershed restoration. While she loves the science side of the work, what she's really looking forward to is building relationships with local landowners, partners, and community members. She says, "I firmly believe that the success or failure of any undertaking lies almost entirely with the team so I am looking forward to fostering the relationships and open communication to see the continued success that my predecessors have shown."

Outside of work, Kelly and her partner, who works as a fish biologist for ODFW, stay busy with their four dogs, who she jokes feel like a full-time hobby on their own. She loves being outdoors, whether it's hiking, skiing, or spending time on the water. Indoors, you're most likely to find her in the kitchen. Cooking and baking are lifelong passions, and in her early twenties she even trained under a Michelin-starred chef, an experience that still inspires her today.

Moving to Wallowa County has been a big but welcome change. With Joseph's population smaller than her high school, Kelly admits it's a very different experience, but one she's truly enjoying. She's excited to become part of a close-knit community, and feel that sense of connectedness to the land that living and working in a rural place makes possible.

She also has a personal goal for her first year here: catching her very first Chinook salmon and steelhead. She's cautiously optimistic but looking forward to the challenge.

With her background, energy, and genuine love for both people and place, Kelly Hendrix is a wonderful addition to the GRMW team. She's excited to build on the organization's history of restoration and collaboration, and equally excited to put down roots in Wallowa County. ■



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Artwork by Nick Wroblewski

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perspectives is not unique to the Grande Ronde Valley either; consider changes to habitat on the Columbia River resulting from the operation of the hydroelectric facilities. It should come as no surprise that pelicans can flourish in areas where the habitat has been modified in such a way that greatly improves their ability to forage effectively, especially on juvenile salmon which are not well-adapted to the slower river environment that dams create during their migration to the ocean. The crux of this dilemma is the mixture of these circumstances could very well undermine ongoing recovery investments in habitat restoration, hatchery supplementation, and passage improvements for salmon.

## Conclusion

Double-crested Cormorants exemplify the complexities of modern fish and wildlife management. Once persecuted and reduced to small numbers, they have rebounded to become both a conservation success story and a source of new conflict. In the Pacific Northwest, their predation on juvenile

salmonids is undeniable, with tributary-level impacts in places like the Grande Ronde Valley posing obstacles to recovery. The Catherine Creek rookery highlights how even relatively small bird colonies can exert substantial pressure on vulnerable fish populations. Management decisions will require careful consideration of ecological integrity and fish recovery priorities. Ultimately, the story of cormorants in the Pacific Northwest reminds us that conservation is rarely straightforward. The ecological questions, such as whether predation represents additive or compensatory mortality, are complex and the answers carry real consequences for management decisions. Restoring balance among species demands choices that are not only grounded in the best available science but also shaped by the values of the people most connected to these landscapes. From tribal co-managers with deep cultural ties to salmon, to agricultural stewards working the valley floor, effective solutions will require honoring this diversity of perspectives alongside our shared commitment to sustaining both fish and wildlife for future generations. ■

## Grande Ronde Model Watershed UPCOMING BOARD MEETINGS

Tuesday, October 28, 2025

9:00a.m - 3:00p.m.

Urban Vine

10107 W 1st St

Island City OR 97850

Tuesday, November 25, 2025

5:00 p.m.

Wallowa Senior Center

204 E 2nd St.

Wallowa OR 97885

*The public is welcome to attend.*

Meeting dates are subject to change.  
Please call (541) 663 - 0570 to confirm.

Thank you!

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