

From the *Archives*

Union County, The Former Grass Seed Capital of the World

by Lacey Moore, GRMW

The Grande Ronde Valley is the largest agricultural valley in the northern hemisphere that is completely encircled by mountains, according to the Natural Resources Conservation Service. Although impressive, this agricultural title is not the only such distinction that has been attributed to Union County. During the tough economic times of the 1930s, industrious local farmers cultivated a product that would earn Union County the title of "Grass Seed Capital of the United States" for much of the 20th century.

In 1933, H.L. Wagner was the first person in Union County to commercially plant and harvest grass seed. E.R. Jackman, a prominent figure in Oregon's agricultural industry and extension service from 1929 to 1953, recognized Wagner as the first person in the United States who raised grass seed in wide rows, a method which vastly improved both crop yields and the purity of the seed.

The success of this innovative grass seed production method led to the incorporation of the Blue Mountain Seed Association in 1936. By 1937, the Blue Mountain Seed Association was the largest distributor of Crested Wheatgrass in the Pacific Northwest; in the following year, the seed association contracted 475,000 pounds of grass seed varieties. As Union County emerged as a prominent force in the grass seed industry in the late 1930s and 1940s, scientists and specialists from Oregon State University (OSU) made regular visits to the valley. For



ABOVE: H.L. Wagner & son Marion Wagner, 1939. Source: Union County Extension Office
many years, Union County was advertised as the sole cultivator of Illahee Fescue, a variety developed by Dr. Harry A. Schoth, an agronomist from OSU. Nearly 43 percent of the seed grown in Union County during the last 75 years has been Kentucky Blue Grass.

Celebrated Union County agriculturalist Clayton Fox was a charter member of the statewide Fescue Commission and a member of the National Blue Grass Association.

The Willamette Valley is currently the largest producer of grass seed in Oregon and is commonly referred to as the "Grass Seed Capital of the World." Presently as well as historically, the Union County economy receives substantial income from a variety of crops and livestock production. Although the Grande Ronde Valley may no longer be the flagship for grass seed, residents can certainly take pride in the knowledge that the valley made remarkable contributions to the industry at its origin, an industry that now drives more than \$1 billion in economic activity in the state of Oregon.



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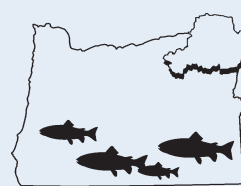
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Ripples

Fall 2013

in the Grande Ronde

RIVERS UNITING NEIGHBORS · QUARTERLY NEWS FROM THE GRANDE RONDE MODEL WATERSHED

Laurie Hewitt

The Fish Whisperer

by Jeff Oveson, GRMW

No doubt about it, Laurie Hewitt believes with all her heart that salmonids (in this case, spring Chinook and summer steelhead) are the essential link in Mother Nature's food chain. Salmon provide nutrients they have imported from the far reaches of the Pacific Ocean to everything from "bugs to bears," but in the early 1990s, not many nutrients were delivered via salmon to Catherine Creek. At this time, only a few handfuls of salmon carrying marine-derived nutrients journeyed up the Columbia, Snake, and Grande Ronde Rivers to take a left turn and swim up Catherine Creek to spawn. It was an arduous journey even in the best conditions.

While Catherine Creek populations of salmonids were in perilous shape, Laurie was facing a crossroads in her life. Her youngest son, Scott, marched off to kindergarten in Union, and shortly thereafter, close friend Carla Putnam asked Laurie, "Well, what are you going to do now? You can't just clean your house all day." Laurie said her friend challenged her to "fill her life" and suggested college, specifically biology, as a new direction to pursue. Laurie agreed and enrolled at Eastern Oregon University (EOU),



LEFT:
Laurie Hewitt processing an adult Chinook salmon at the adult fish weir on Catherine Creek.

graduating with a Bachelor's degree in biology after developing the passion for science shared by many EOU faculty members, including Burr Betts, Denny Swanger, former Grande Ronde Model Watershed (GRMW) Board member Anna Cavinato, and current GRMW Board member Laura Mahrt.

Mahrt introduced Laurie to the world of macro-invertebrates, or what many scientists call macros and most of the rest of us simply call bugs. Laurie saw the link between macros and water quality, salmon populations and macros, and macros as a way of controlling some invasive plants. She worked seasonally after college with

the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) to use specific macros for the biological control of weeds. During the same period in her life, she gained seasonal employment with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Department of Natural Resources.

The capstone of her career was 11 years in the making, beginning when Laurie was hired full-time by the CTUIR to operate the adult fish weir on Catherine Creek. Two miles upriver from the city of Union, the adult weir is a facility through which almost all adult steelhead and salmon must pass on

Continued on page 2

Continued from page 1

their way to upstream spawning grounds. A set of pickets across the river direct fish into the weir, where a fike gate below and a screened gate above keep them from going upstream or turning around to go back down. When Laurie and her crew members, Nick Allamand and Ken Walker, arrive early in the morning during the seasonal migration, they find these fish waiting somewhat impatiently to pass through the weir. Every adult will be processed separately, with some being released to continue on to spawning grounds and some being loaded in a tank to be delivered to the Lookingglass Fish Hatchery. The latter group will be held in the hatchery until spawning so that the offspring can be raised in the hatchery and then released to begin their outward migration.

The adult weir is a cleverly designed mechanism that eases stress on both fish and humans, and Laurie has overseen the modification of several components of the weir during her tenure operating it. Technology and equipment are important, but after having spent several mornings down in the weir with Laurie when she is processing returning adults, it is apparent that the human element is an even more critical component of the weir than are the gates, screens, nets, and other paraphernalia. I have heard more than one person refer to Laurie as the “Fish Whisperer,” and some observation of her in action will show you why. Adult salmon who have just swam more than 600 miles of river in addition to negotiating eight major dams, countless predators, nets, and sharp hooks are not in the mood to hang around in the weir, nor are they comfortable with the idea of a human putting them on a work bench to be measured, tagged, gill-punched, and subject to having a sample of their scales taken. It is fascinating to watch Laurie gently rub the belly of a five-year-old Chinook while she softly talks to it until it calms down and submits to the handling. It reminds me of persuading a colt to take the saddle for the first time without throwing a fit (I, personally, have never been successful at either endeavor).

Laurie has overseen the beginning and the end of thousands of salmon and steelhead life cycles, a veritable chicken-and-egg conundrum in the water. In June or July, a certain percentage of returning adult salmon are taken from the weir to the Lookingglass Hatchery, where they are held until they are ready to spawn in August or September. After spawning, the fertilized eggs are incubated in trays until they hatch in January or February, after which time the juveniles are raised until the smolt stage in March or April of the following year. As smolts, they are taken to acclimation facilities on upper Catherine Creek, held for a short time, and then released to begin their outward migration to the ocean. After only a short time in Catherine Creek, they are imprinted and prepared to return to their natal waters after their adventures to the ocean, which might last from one to five years. Amid much speculation, no one has a definitive understanding of how the imprinting process works.

Salmon and steelhead do not always return to their natal streams. When they leave the ocean and go to a different stream to spawn, it’s called “straying,” but in reality, it is one of the ways Mother Nature assures a constant variation in the gene pool. In spring 2013, Laurie witnessed what she called “The Holy Grail” of genetic transfer when she trapped one specific steelhead. Because this fish was fixed with a Passive Integrated Transponder (PIT), her history was well-documented. She had been released as a juvenile at Murderer’s Creek on the South Fork John Day River in 2008 and had made the trip down the John Day River, down the Columbia River, and to the Pacific Ocean. For some unknown reason, when she was ready to spawn in 2012, she came up Catherine Creek to Laurie’s weir, where she was trapped and then released upstream to spawn. Although this “straying” is not uncommon, particularly among steelhead, this persistent fish reconditioned herself, became what biologists call a “kelt,” and headed back to the ocean. Sure enough, she was knocking on Laurie’s weir door again this spring, having made the round trip

in less than a year.

Laurie and her crew have “seen it all” in terms of salmon, steelhead, suckers, Bull Trout, lamprey, rainbow trout; if it swims up Catherine Creek, then they will see it and document it. Although not a scientifically proven fact, Laurie opines that the numerous fish passage projects completed by the GRMW and partners on Catherine Creek during the last few years have led to a much larger population of Bull Trout, a species that has been on the Endangered Species Act list for more than a decade and that is not especially skilled at clearing barriers when migrating upstream. For more than a decade, Laurie has been the Catherine Creek gatekeeper, but the spring migration of returning adults in 2013 was her last. No more standing in waist-deep, 40-degree water for hours processing fish. No more trips to Lookingglass with a tank full of adults. No more PIT tags, no more spawning the adults held in the hatchery, no more wondering whether the weir will hold up during high flows (well, she will probably continue to worry about things like that).

It is a bittersweet time for Laurie. She leaves a career and, more importantly, the fish that she came to know and love like they were her own offspring; as she puts it, “I will miss them so much. They are a part of me.” Laurie is all too familiar with painfully moving on. Her son, Brian, was only 29 years old when he passed away after serving his country through three tours of duty in Iraq. As we spoke about her life and her career, the pride of being Brian’s mother resonated through the tone in her voice and glistened in her eyes, which are seemingly capable of telling a story all by themselves. Laurie is going to spend more time with Stephen, her best friend and husband. Although they are scattered all over the country, Laurie and Steve hope to see more of Scott, Christopher, and Anthony, their sons in San Diego, Minnesota, and Louisville, respectively. The rest of us hope to see more of Laurie and Steve at their favorite haunts on the Deschutes and the Lower Grande Ronde Rivers.

Meet the Board Member

Troy Abercrombie

by Jeff Oveson

The Grande Ronde Model Watershed (GRMW) added two positions to the Board of Directors in May 2012 to include members from the FFA and Eastern Oregon University (EOU)/ Oregon State University (OSU). By serving on the Board, these new members will become more aware of the importance of watershed health as they learn from the perspectives of restoration professionals and concerned, involved citizens. Serving on a Board such as that of the GRMW is a “value-added” experience with the potential to benefit students well beyond their formal education. Participating in Board functions and decision-making as well as visiting the sites of restoration projects broadens students’ understanding of how volunteers work in cooperation with professionals. Serving on the Board also will demonstrate to students the real-world challenges faced by private landowners who strive to meet production objectives while improving the ecological health of their properties. Troy Abercrombie is the first student to fill the EOU/OSU seat on the GRMW Board.

Tobias Saxifrage (sacks-uh-fraj); a real bell-ringer of a name, right? This moniker has been bestowed to a perennial herb that is only known to grow in the Payette National Forest in west-central Idaho. Troy Abercrombie spent the summer of 2010 building a relationship with Tobias Saxifrage and other rare plants as part of a team working in the Payette National Forest, an experience that catalyzed his interest in rangeland ecology. Troy is pursuing this interest along with a Bachelor’s degree in rangeland ecology as a senior in OSU’s College of Agricultural Sciences at EOU.

Troy’s path to college has not been as traditional as that of some students. Like a lot of kids, he dreamed of someday becoming a game warden until an actual game warden came to his high school in Emmett, Idaho, and shared the realities of the “dream job,” an insight that persuaded Troy to look elsewhere for a career. It was just after the turn of the 21st century and the construction boom was in full swing when Troy began his work life, so he took his work ethic and a hammer to McCall, Idaho, where it seemed as though the building and construction projects would never stop. He worked full-time, stayed busy, enjoyed life, and made a good living. But in 2008, the building did stop. Suddenly unemployed, Troy took advantage of



ABOVE: Troy Abercrombie

the Workforce Reinvestment Act and enrolled at Treasure Valley Community College (TVCC) in natural resources and range ecology programs. Toward the end of his freshman year, he visited the EOU campus and met with OSU faculty. His visit was positive, and he already knew he wanted a Bachelor’s degree, so he transferred after one year at TVCC rather than completing the two-year Associate’s degree. Troy will minor in soil sciences and chemistry and is scheduled to graduate in spring 2014.

Troy spent the summer of 2011 working with Catchlight Energy, LLC, a joint project of Chevron, Weyerhaeuser, and Mississippi State University. Catchlight Energy’s vision is “to become a major integrated producer of biofuels derived from non-food sources and to deliver renewable transportation products produced from biomass in a manner that is scalable and sustainable, both environmentally and economically.”

During the two most recent summers, Troy has served on a tri-forest team conducting stream surveys in the Malheur, Umatilla, and Wallowa-Whitman National Forests. The team assesses both the physical and biological status of streams and aquatic populations in the thousands of miles of streams across the three forests. As summer comes to a close and Troy begins his senior year in college, he has given a lot of thought to how he might put his experience and education to work. He likes the idea of being an independent contractor someday and helping landowners meet production goals with long-term sustainability in mind.

Troy’s term on the GRMW Board of Directors comes to an end in spring 2014, just prior to his graduation from college, but in serving as the first EOU/OSU student Board member, he has helped to pave the way for more interactions among universities, the GRMW, and their many partners around the Grande Ronde River basin and beyond.

Fish Online!

www.grmw.org

- Adult salmon counts at the dams
- Snake River Basin stream flows
- Snow and precipitation reports
- Habitat enhancement projects
- Meetings, activities, and events
- Past issues of *Ripples* and more!

Grande Ronde Model Watershed

Upcoming Board Meetings

The public is welcome to attend

- Tuesday, October 22: 5:00 p.m.
Wallowa Community Center
204 East Second
Wallowa, Oregon
- Tuesday, December 10: 9:00 a.m.-3:00 p.m.
Location: TBA

*Meeting dates are subject to change.
Please call 541-663-0570 to confirm.
Thank you!*

Alpine Meadows Golf Course

by Coby Menton, GRMW

A tributary to the Wallowa River, Trout Creek is a steelhead-producing stream that provides both spawning and rearing fish habitat in Wallowa County. Juvenile Chinook salmon also rear in lower Trout Creek. The Alpine Meadows Golf Course (AMGC) is located at the lower end of Trout Creek approximately 1.5 miles from its confluence with the Wallowa River. The City of Enterprise (COE) wastewater treatment facility is adjacent to the golf course, and the wastewater effluent pipeline that discharges to the Wallowa River runs through the course.

Prior to implementation of this project, the golf course was irrigated with an underground system, which included an aging and inefficient 40-horsepower pump, and the pump was served by a pumping pool constructed in Trout Creek. This pool not only inhibited fish passage upstream but also involved annual maintenance that caused erosion and sedimentation in the creek. Each spring, the pool in front of the dam is cleaned, the intake pipe and fish screen is installed, and any spoils generated are used to maintain the dam. The intake pipe and screen are removed in the fall following irrigation season. Although it provides a



ABOVE: The removed golf course pump station. Notice how the pool above the dam has widened the creek channel and is causing erosion under the power pole and pump house.

reliable irrigation source, water flow in Trout Creek can be very low in the mid- to late-summer months, and the irrigation system had the capacity to consume nearly all flow.

For several years, the Grande Ronde Model Watershed (GRMW) has been working in partnership with the COE and the AMGC to develop a project that would allow the AMGC to use COE wastewater effluent as an alternative source of irrigation water. This effort had been stalled early on due to the poor quality of the water released from the wastewater treatment facility in Enterprise. Prior to 2010 and the construction of a new wastewater treatment facility, the COE's effluent water was not of sufficient quality to be applied to a public-use facility. After construction of state-of-the-art disinfection facilities in the new wastewater treatment plant, effluent not only met but also exceeded water quality standards for irrigation application on the golf course.

With sufficiently high water quality, the project moved from the conceptual phase to design in 2011. The final design involved four major components, including a storage pond, a wastewater transport pipeline, a new pump and pump house, and modifications to the existing underground irrigation system. Each project component was designed to achieve the following objectives:

1. Improve stream flow volume in Trout Creek by 40 acre-feet during the irrigation season by using COE wastewater effluent as the irrigation water source.
2. Remove the pumping pool, which through annual maintenance causes erosion and sedimentation and creates a fish passage barrier to two miles of habitat upstream.

Construction began in January

2013. All construction is taking place on grounds managed by the AMGC and will be complete in September 2013. The primary feature of the project is the storage pond. Located at the lower end of the golf course near the seventh fairway and between the fourth tee and the sixth green, this pond both stores water for irrigation and adds a water feature to the course while offering play diversity. Storing water in the pond prior to application provides an additional water quality benefit, as the water is further treated through evaporation and settling of residual treatment compounds.

A buried 12-inch mainline connects



ABOVE: This photo was taken on the first day of pond construction on January 3, 2013. The COE wastewater mainline runs along the toe of the hill in the background. The storage pond and pump house will be installed in the foreground.

the pond to the wastewater effluent pipeline. This line starts on the east side of the course, crosses the eighth fairway and Trout Creek, and discharges water into the storage pond. The operation of the line is non-mechanical, has no electronic or moving parts, and will stop flowing water when the pond is full; the elevation of the line at the COE wastewater mainline is equal to the full pond elevation. This feature not only reduces maintenance but also serves a safety function, as it prevents pond overflow and potential damage to the course and infrastructure.

The pump station installed at the north end of the pond is the heart of the system. By pulling water from the storage pond, the pump is able to completely irrigate the 40-acre golf course more efficiently and in less time than the previous pump. The old pump was beyond maintenance, ran far too long, and incurred significant power and maintenance costs to the AMGC. In addition to reducing operation and maintenance costs, the pump location away from Trout Creek eliminates flood damage that may be caused when Trout Creek floods, protecting the public investment in the project.

At this time, all operational aspects of this project are completed, including the irrigation system modifications. Many sprinklers had to be moved in order to accommodate construction, and because the irrigation water is wastewater, it cannot be directly applied to Trout Creek. In this case, this rule enforced by the Oregon Department of Environmental Quality (DEQ) precludes water from being applied within 10 feet of Trout Creek, which required the adjustment or relocation of several sprinklers in the system. In fall 2013 and spring 2014, reclamation activities will continue, including planting in construction areas and re-surfacing damaged ground. The largest aspect of the reclamation work will involve shaping the spoils generated by the pond excavation. The spoils were spread between course fairways to add topographic diversity. This use of the material on-site eliminated a haul and disposal cost to the project.

AMGC superintendent Gregg Sturtevant managed overall project construction. This responsibility included ordering and staging materials, coordinating sub-contractors, and building a large percentage of the project with the assistance of AMGC employees and AMGC member volunteers. Sub-contractors excavated the pond, completed electrical work at the new pump, and relocated the power supply. The rest of the project, including irrigation, trenching, pond finish work, and course restoration, was accomplished by the AMGC. According to Gregg Sturtevant,



ABOVE: This photo taken from the same location as the photo in the middle of page 4 shows the completed and operational storage pond and pump station. The bare ground border around the pond will be landscaped in spring 2014

“The project as a whole is going to greatly approve the aesthetics and playability of the course as well as generate interest with the water feature and the topography improvements. The real improvement is going to be getting the pump out of the creek so that sand, silt, and dirt are not pumped into the irrigation system. The water source is much cleaner, reducing pump and irrigation system maintenance. The biggest benefit is getting the pump out of Trout Creek.”

In spring 2013, 21 steelhead redds were counted and nine live steelhead were observed in Trout Creek on the golf course property. This observation by Mac Hough, a golf course employee, fisherman, and fish biologist, already provides evidence for the positive impact of the project on fish habitat. Increasing flow, improving water quality, and removing the fish passage barrier will directly benefit steelhead that spawn and rear in Trout Creek.

After seven years of consideration, planning, and construction, the source of irrigation water at the AMGC is now wastewater effluent from the COE rather

than surface water from Trout Creek. This project would not have been possible without the support of several partners who contributed time, funding, and guidance. As the owner of the golf course property and wastewater treatment facility, the COE has been a constant and enthusiastic supporter of the project from concept to completion. The AMGC Board of Directors and staff not only approved the project proposal but also contributed staff time to implement all improvements. AMGC staff members' hard work allowed construction to occur on time, to budget, and beyond expectations. Through its Environment Fish and Wildlife Program, the Bonneville Power Administration contributed funds to purchase construction services and materials. The Oregon DEQ reviewed, advised, and approved the necessary wastewater management plan. In converting the irrigation source for AMGC from surface water from Trout Creek to reclaimed wastewater, this innovative project will improve habitat for endangered steelhead and Chinook salmon in Wallowa County.

Learning by Doing:

Students Explore Watershed Science with the GRMW

by Carolyn Erickson, Stella May Field Elementary

A few years ago, I contacted the Grande Ronde Model Watershed (GRMW) to inquire about additional resources for teaching science. I spoke to a GRMW employee, who happily responded and confidently assured me that the GRMW did indeed have educational resources to offer to my science curriculum! To my delight, Leigh Collins from the GRMW worked with me to offer fun and engaging science activities that supported the lessons and concepts I was teaching.

The GRMW provided a large stream trailer for students to study river systems and erosion patterns. This stream trailer allowed several students at a time to dig through plastic sand in order to form river channels, meanders, banks, and obstacles. Water was then pumped through these formations to show how the water flows and how river formations react to the water's movement. Students saw their river patterns in action and studied the ways in which erosion patterns formed. Each group enjoyed remaking their river systems several times, each time with hands-on and visual learning about river features.

Of course, the giant stream trailer was a big hit with students, but other activities provided by the GRMW also were popular in my classrooms. With the help of Leigh Collins, Jesse Steele, and Lacey Moore, I was able to offer an additional lesson about aquatic insects. Live insects were collected so that students could reach into a bucket and then place a bundle of plant debris on a tray that revealed many live aquatic insects for them to discover and classify. Seeing the larval stage of caddisflies, stoneflies, and other species under magnification definitely held the young learners' interest. Students learned about the roles these small animals play in the health of stream ecosystems.

Another lesson demonstrated



ABOVE: A sixth-grade student from Stella May Field identifying aquatic insects at the 4-H center in Summerville, Oregon, with the GRMW staff.

the effects of point and nonpoint source pollution in water systems. The GRMW provided models of landscapes with buildings, roads, and topography to show how runoff from both natural and human activity can enter our water supply. Students enjoyed this hands-on activity, which involved using spray bottles to simulate rain and see how the "pollutants" were transported. They also saw how vegetation affects relative amounts of runoff compared with paved areas.

Finally, everyone played a game of tag in which each player represented a species of aquatic insect. Their designated form of movement was determined by their roles in a stream ecosystem. This culminating game brought home the main objective demonstrated by the previous activities: the importance of healthy watersheds!

All of these activities occurred during a day of Elgin's Stella Mayfield Outdoor School that is held every spring for sixth-grade students. Along with the

amazing lessons provided by the GRMW, the outdoors provided the classroom space for us. Teaching science with fun and engaging yet authentic activities requires resources that not all classrooms can afford. Thanks to the wonderful help of the GRMW staff, these lessons are a reality for many students. The educational outreach provided by the

folks at the GRMW is truly an educational gift to students. These professionals who are willing to donate their time, materials, and expertise to our youth provide a valuable learning experience. After these lessons, some students mentioned wanting to follow in their footsteps and pursue the watershed restoration profession as adults. However, all of the students gained appreciation of watershed health, uses, and impacts through their participation in these activities.

As a teacher, having professionals from the GRMW as guest presenters in my life science curriculum has been very enjoyable and helpful in teaching about water ecosystems. Leigh, Lacey, Jesse, and everyone at the GRMW are polite and cooperative to work with, and they offer great new additions to Elgin's outdoor school program. I also have borrowed kit materials available for check-out, such as animal skull models, tracks, and plastic fish casts. Thank you, GRMW staff, for being a fun and valuable part of my students' learning!

Snorkeling

A Fish Biologist's Dream Job

by Jesse Steele, GRMW

If you live near one of northeast Oregon's beautiful streams or spend time camping and fishing along the rivers, then you may have seen a snorkeling crew at one time or another. Snorkeling is a fish biologist's dream job, and it is one of the best ways to better understand an organism by observing it in its natural environment. In case you have ever wondered why these folks spend so much time snorkeling, this article offers a quick overview of some of the reasons why we fish biologists have our heads under the water so often.

Summer Tagging

Each summer, the Oregon Department of Fish and Wildlife (ODFW) collects hundreds of juvenile Chinook salmon for tagging. One popular method of collecting the fish is "snerding," or snorkel herding. When snerding, two crew members set up a large net or seine downstream of one or two snorkelers. Once the net is in place, the snorkelers work together to herd a school of fish into the seine, which is quickly lifted when the snorkelers indicate the fish are in the net. Until you have tried

BELOW: ODFW crew members snerding on the Minam River.

RIGHT: ODFW crew members breaking through ice on Catherine Creek before a night of snorkeling. Photos provided by ODFW.



it, it is difficult to understand how much balance, agility, and speed is required to herd fish. Survival rates of this summer tag group to Lower Granite Dam are then calculated using information gathered from the tags.

Winter Tagging

Each winter, the ODFW spends time snorkeling at night to catch and tag juvenile spring Chinook salmon in Catherine Creek, the Upper Grande Ronde River, and the Lostine River. Snorkeling during this time of year often requires crews to break the ice away from the surface of pools before taking out the dive lights and searching for the juvenile Chinook salmon in the dark waters. During the winter months, juvenile Chinook salmon conceal during the daylight and emerge only at night. Fish are caught one by one using a small dip net and a dive light. The data collected while winter snorkeling are important in understanding the rates at which fish are surviving during the harsh winter months.



Habitat Restoration Project Monitoring

Snorkeling is a good way for fish habitat biologists to monitor a project site before and after construction. Before construction, biologists can suit up and take a look under water to assess what species of fish are present in a certain area, how many of each species are present, and during what time of the year they are using the site. After construction, the snorkelers record the same

data to find out whether the habitat project has increased the number of fish that use the site or increased the duration of time when fish are present. Fish habitat biologists often use snorkelers to help remove fish from a restoration site before construction begins. Known as fish salvaging, this effort ensures that restoration actions do not negatively affect fish.

CHaMP (Columbia Habitat Monitoring Program)

Crews from both the ODFW and the Columbia River Inter-Tribal Fish Commission (CRITFC) are currently gathering data about habitat conditions in the Grande Ronde basin. Part of their data collection efforts involves snorkeling at their sample sites to determine fish densities. The biologists working on these projects have developed protocols for collecting fish density numbers, and these protocols are being adopted by other agencies in the basin so that data collected by different agencies that conduct snorkeling surveys are consistent and easy to compare.

Snorkel surveys are conducted during summer flow conditions after fish habitat surveys have been completed. Fish abundance and size data are recorded for each site by the snorkelers. A single snorkeler or a team of two snorkelers swim upstream to identify and count fish species and size classes in both slow-water habitats (e.g., pools and runs) and fast-water, turbulent habitats (e.g., riffles, rapids, and cascades). Fish counts are reported by density. These protocols will ensure that no matter which agency is completing the snorkel survey, the data are collected in the same manner to ensure that fish densities are comparable across multiple agencies.

In conclusion, snorkeling is one of many essential tools that fish biologists use to study species of interest. Rain or shine, day or night; you never know when you might see a crew snorkeling. Don't hesitate to come ask what we are doing.

GRMW sends a special thank you to Ted Sedell and Scott Favrot with ODFW and Seth White with CRITFC for their contributions to this article.