RIPPLES IN THE GRANDE RONDE

SPRING 2015

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

A Meeting of the Minds

The 2015 River Restoration Northwest Symposium brings together engineers, biologists, regulators, and others to discuss the forefront of river restoration

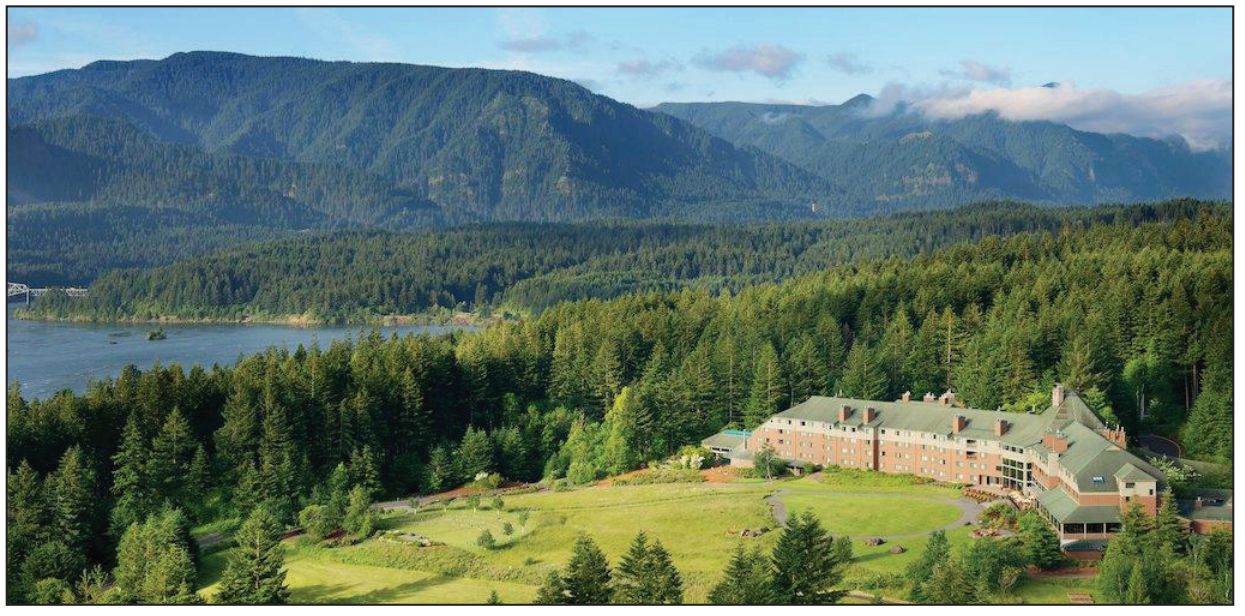
by Coby Mention, *GRMW Staff*

Initiated in 2001 by a group of river restoration professionals from Oregon, the River Restoration Northwest Symposium has been up and running for the past 14 years. Held annually at Skamania Lodge in Stevenson, Washington, this event is intended to provide a forum where river restoration professionals – whether they be engineers, excavation contractors, fisheries managers, hydrologists, or one of the many other types of disciplinary specialists involved in the field – can learn about the current state of the art in aquatic restoration practice and techniques.

Located on the Washington side of the Columbia River across from Cascade Locks, Skamania Lodge is an ideal place to host a conference. Lodging, meals, and all other needs are provided on-site, offering a comfortable, commute-free atmosphere in which participants can learn about new science, techniques, and applications as well as network with fellow restoration practitioners from around the world. "Around the world" is not an exaggeration, as presenters from Canada, the U.K., and many U.S. states were in attendance at this year's symposium.

The mission of River Restoration Northwest is to advance the science and standards of practice of river restoration through educational programs that emphasize an interdisciplinary approach to promote responsible practices, discuss and exchange ideas, assess projects, reflect on lessons learned, and provide technology transfer. The program aims to:

- *Promote responsible practices in the design of river restoration projects;*
- *Enhance discussion and exchange of ideas among river restoration professionals with different disciplinary backgrounds, including aquatic and fisheries biology, geomorphology, landscape architecture, hydrologic and hydraulic engineering, wetland science, and soil science;*
- *Provide a forum for project assessment and reflections on lessons learned;*
- *Create opportunities for professional development and technical information exchange;*
- *Support technology transfer from research to practice.*



Located on the Columbia River near Stevenson Washington, Skamania Lodge provides an ideal place to meet, discuss, and learn about river restoration practices. (Photo: Skamania Lodge Website)

The symposium is intended not only for public agency employees but also private industry professionals. Private consulting firms play an important part in stream restoration in the Northwest, and they are well represented at the symposium. One room in the conference center is dedicated to consultant booths representing engineers, contractors, bridge-makers, specialized equipment manufacturers, and even a filming company.

The symposium lasts for five days, with Day 1 reserved for short courses, Days 2, 3, and 4 reserved for presentations, and Day 5 offering

...Continued on Page 7, RRNW

Getting the Whole Picture

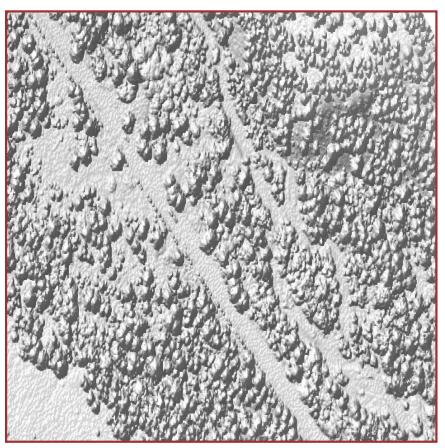
by Mason Bailie, *GRMW Staff*

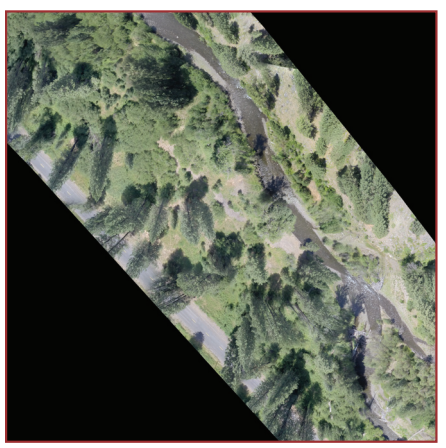
This article is the first in a three-part series in which we will get to show off the types of aerial products the Grande Ronde Model Watershed (GRMW) is creating. We create these products for our own use as well as for the benefit of our restoration partners. This article will cover how we create orthomosaics and digital elevation models (DEMs). The second segment, to be published in a later issue of *Ripples*, will cover how we use a Forward Looking Infrared (FLIR) camera to capture stream temperature data. The final part of this series will be about how we use ArcGIS Online to display all of these data also that we've captured and created.

The Lingo

What is an orthomosaic?

An orthomosaic is a collection of aerial images that have been geometrically corrected (also known as orthorectified) at a scale that is uniform. Orthomosaics can be used to measure true distances because they are an accurate representation of the Earth's surface. The GRMW typically uses orthomosaics in order to create maps and monitor any changes in a habitat project. These images also can be used by our partners in design and modeling software (such as CAD drawings).





Examples of the DEMs (Left) and Orthomosaics (Right) from Catherine Creek. (Photos: BOR, GRMW)

What is a DEM?

A DEM uses modeled or measured elevations to create a visual representation of the earth's surface. If you've ever seen a three-dimensional picture of a mountain, city, or some other piece of land, then you can bet that a DEM was used to generate that image. DEMs can be created using remote sensing (aerial and satellite imagery) or land surveying techniques. There is a wide spectrum of uses for DEMs, including climate impact studies, wildlife management, construction, meteorology, mining, disaster planning and management, and many more.

The Field Work

How do we capture the images to create these two products? Using our Unmanned Aerial System (UAS), the GRMW flies above the river and project area. The GRMW only operates over land where we have permission to fly. We also do not fly over land if there are any humans around who are not directly involved in the operation. Generally, we fly about 75 meters above the ground at a speed of eight meters per second for no longer than eight minutes of flight time. Using a GoPro camera attached to the front of the UAS, we take high-resolution pictures at a shutter speed of one picture per second. Our Ground Station Software is extremely useful because it can fly pre-planned paths, which are plotted in the office. This pre-planning adds to overall control of the vehicle and makes flights very easy to duplicate in monitoring efforts. We plan flights to cover as much of the stream as possible while keeping the UAS in sight. Another practice during our flights is to establish Ground Control Points (GCPs). These GCPs are small, designated "targets" for which we measure elevation and GPS information by hand to help calibrate the final products back in the office.

Processing

The GRMW uses software called Pix4D to process its imagery. We were given an educational license for Pix4D through our connection with Eastern Oregon University. Pix4D is a complete mapping and modeling software that can convert thousands of images into geo-referenced mosaics and three-dimensional models.

Pix4D will match the images and give us a detailed summary that will indicate the suitability of our images for orthomosaicing, including how many matches were detected between photos and some statistical analyses. Our software also provides a quick preview of what the orthomosaic and the DSM will look like; this initial processing generally takes a few hours.

Pix4D will then start the "Point Cloud Densification" process. This process can take a couple days depending on how many photos we are processing. The result is a densified point cloud, which is a set of

Picture, *continued on Page 5*

Ripples in the Grande Ronde is jointly funded by Bonneville Power Administration and the Oregon Watershed Enhancement Board.

Meet the Partner

Mitch Daniel

by Coby Menton, *GRMW Staff*

After moving to Wallowa County in late summer of 2014, Mitch Daniel has found himself very busy managing watershed restoration projects in both southeast Washington and Wallowa County. Based in Joseph, the Northeast Oregon and Southeast Washington Project Leader for the Nez Perce Tribe Watershed Division covers a large project area, including the Asotin, Alpowa, Pataha, Lower Grande Ronde, and Tucannon subbasins in Washington and the Lower Grande Ronde, Wallowa, and Imnaha subbasins in Oregon. Among many things, his job entails project development and oversight, funding acquisition, and agency coordination, which require equal time and attention in each state.

As a Project Leader, the most important element of Mitch's success is project implementation in collaboration with local stakeholders. Although each state has its own list of cooperators, the stakeholder groups represented are very similar and include private landowners, Departments of Fish and Wildlife, Soil and Water Conservation Districts, watershed councils, public landowners/land managers, and other non-profit watershed restoration special interest groups.

The main focus of Mitch's work is protection and restoration of habitat for Chinook salmon, steelhead, lamprey, and other resident aquatic organisms. Project priorities include aquatic organism passage, natural stream flows, appropriate sediment loads, floodplain connectivity, and properly vegetated riparian corridors, among others. Mitch's task is to implement the Nez Perce Tribe Watershed Division's vision to restore anadromous fish stocks in cooperation with stakeholders, private landowners, and public land managers so that both the fisheries and stakeholders benefit.

Mitch currently is wrapping up one restoration project and is in the design phase for another in Washington. In Wallowa County, he has several projects in the queue, including work required to implement two fish passage projects on the Lostine River, partnerships to develop a riparian and floodplain restoration project on the lower Wallowa River, and initiation of an off-channel habitat development project at the Tamkaliks Powwow grounds in Wallowa.

With his broad background in fisheries research, Mitch is very well-qualified to implement restoration objectives in Wallowa County and has been working in restoration project development since 2011. Born and raised in Fruitland, Idaho, Mitch graduated from Eastern Oregon University with a degree in biology. He advanced his education at Southern Oregon University, focusing on fisheries, natural resources, ecology, and environmental law. His career began in 1993 with work in temporary positions for the Idaho Department of Fish and Game. He was attracted to the profession because "they paid me to hike and camp in the back country and to swim in the rivers studying fish." From 1997 to 2006, Mitch worked for the Nez Perce Tribe in McCall, Idaho, as a Fisheries Technician and Biologist for the Johnson Creek supplementation project in the South Fork Salmon River Subbassin. He spent 2007 and 2008 in graduate school, followed by two years working for Quantitative Consultants, Inc., as their Remote Tagging Coordinator in the South Fork Salmon and Lemhi River Subbasins in Idaho. He returned to the Nez Perce Tribe in 2011 as a Restoration Specialist in the South Fork Salmon River and Big Creek Watersheds. In the summer of 2014, he accepted his current position in Joseph.

Mitch Daniel is pictured with his wife Jamie, and their sons Tennyson (left) and Emeric (right).

Outside of work, Mitch loves to spend time with his family in the outdoors, especially skiing, hiking and biking, and hunting and fishing when he gets the chance. He comes to Wallowa County with his wife, Jamie, and two young sons, Tennyson and Emeric. They would like to extend their gratitude for the kind and warm welcome the residents of Wallowa County have shown them during the past seven months. ■

More than Lincoln Logs

How Woody Debris Play an Important Role in Restoration

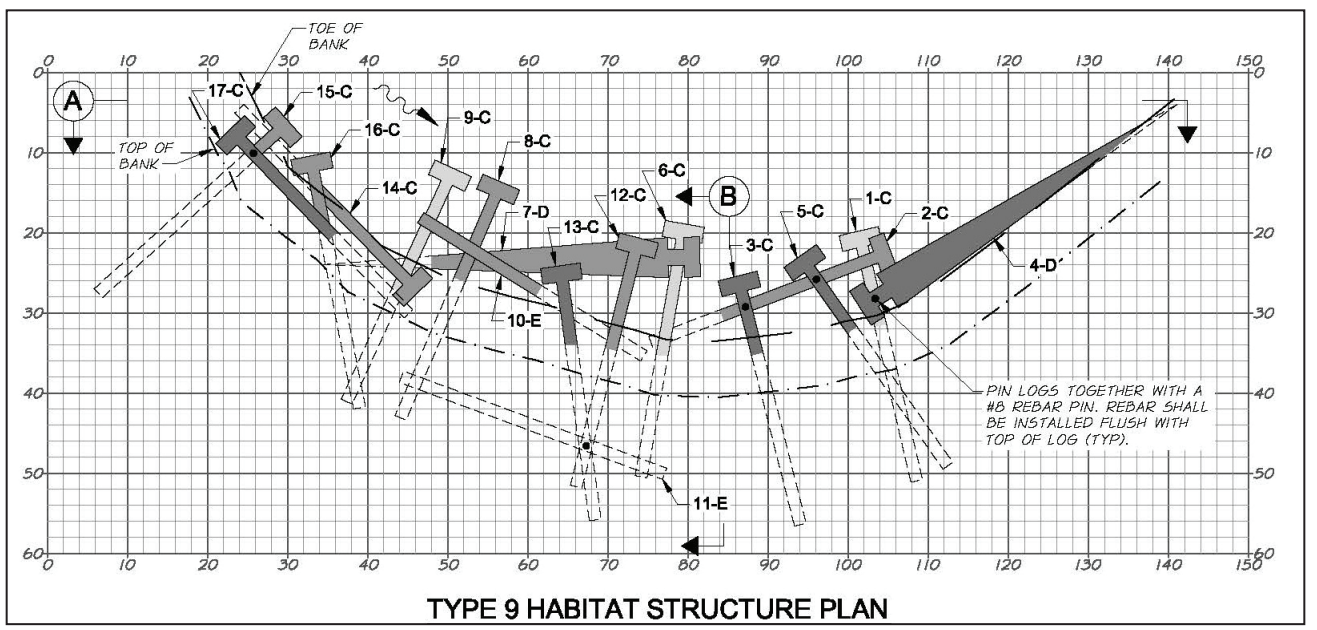
by Jesse Steele, *GRMW Staff*

If you're ever in need of some cheap entertainment, then spend some time browsing through newspaper archives online; it's mindboggling to see how things have changed during the past century. Recently, I pulled up an old DuPont flyer from 1935 that I had seen a couple of times advertising the use of dynamite for "streamlining streams." The advertisement boasts, "DYNAMITE may be used most effectively and economically in taking the kinks out of a crooked stream." The tagline reminds me of how priorities have shifted, how laws and regulations have changed, and how our understanding of a riverine ecosystem has improved. We once thought we should straighten, dredge, and remove vegetation from rivers in order to alleviate flood damage. Although these techniques were successful for a short period of time in reducing flooding, the overall effect on the river wasn't recognized at the time.

Large wood was actively removed from riparian areas less than a century ago because it slowed high spring flows from quickly rolling downstream. Trees and root wads caused hefty "jams" that flooded cities, homes, and crops. Large wood was to blame for inhibiting navigation and was even removed at times in the name of improving fish passage. Now, almost every habitat restoration project that the Grande Ronde Model Watershed (GRMW) funds involves adding large wood back into the river. So, why are we adding it back into the rivers and streams by the truck load? The answer lies in findings from research conducted in the past few decades. We have discovered that large wood plays an important role in the performance and ecology of a river.

Habitat

Adding large trees with root wads back into the rivers and streams is a significant component of most fish habitat restoration projects. These trees often are crisscrossed to form a large log jam that serves multiple purposes but most often works to maintain or create a pool. When placed in the river, a log jam can create turbulence in the water column that will actively dig out and maintain a pool. This streambed material that is scoured out from around the log jam often is deposited at the tail out (or downstream end) of the pool. The pool provides deep, slow-moving water for juvenile fish to rear in, and the large wood jam provides excellent cover to conceal these juvenile fish from predators. The fresh gravels that are scoured and then deposited at the tail out of the pool help to create suitable conditions for adult steelhead and Chinook salmon to spawn.



An example design drawing of an engineered log jam used in habitat restoration projects. A single restoration project can contain 14 different designs for these woody structures. (Photo: Anderson Perry and Associates)

Channel and bank stability

Not long ago, it was common practice to stabilize eroding river banks with large rocks, known as "rip rap." This antiquated practice is rapidly being replaced with the use of large wood to prevent erosion and protect unstable banks. There are several advantages to using large wood instead of rip rap, including promoting growth of plantings and moderating water temperatures. The space between logs is sufficient to plant new trees within the log jam so that the bank also is stabilized by the root network of the trees as they grow. Using rip rap not only smothers any existing vegetation but also does not allow any interstitial space for new plantings. When banks are armored with large rock, riparian vegetation rarely is able to become established. Depending on the species of large wood used in the log jam, the life expectancy of these structures can be more than 50 years, thus providing ample time for the new trees that are planted to become established and protect the streambank from further erosion. Rip rap not only blocks growth of riparian vegetation (an essential tool for shading the stream and cooling in-stream flow) but also perpetuates warm summer water temperatures through solar loading of the rock surface.

Aquatic ecology

Large wood that is submersed in water plays an important role in the river ecosystem. Wood collects organic material like branches, leaves, and even fish carcasses. These materials provide food for macro-invertebrates, which in turn are preyed upon by juvenile fish that are taking refuge amongst the wood. When studying the life cycle of salmon, it's safe to say that every freshwater life stage utilizes large wood. Without the large woody debris in rivers, juvenile fish are without good-quality pools to rear in, smolts are lacking places of refuge during peak flows, and returning adults don't have good-quality pools with cover to hold, stage, and spawn.

"When designing wood habitat structures along a main stem of a river, stability of the structure and safety are of great importance. For stability, methodologies such as pinning, tethering, ballast boulders, etc. are implemented. Factors such as structure location, egress potential, site distance, recreational use of the river, etc., are also important safety considerations."

Chas Hutchins, P.E.
Anderson Perry and Associates

Large wood is critical for proper stream function and a healthy river ecosystem. It is crucial in stabilizing banks and reducing erosion and is arguably the most critical component to improving fish habitat. Still, we must work it back into the riparian landscape without endangering the lives and livelihood of the people who inhabit, work, and play along the rivers. Anderson Perry and Associates has designed many of the habitat restoration projects that GRMW has funded. Figure 1 shows a typical drawing of how these structures are built and the safety measures used to ensure they will not become a hazard. The GRMW continues to recognize the importance in funding restoration of fish habitat while supporting those who live and work along our rivers. ■

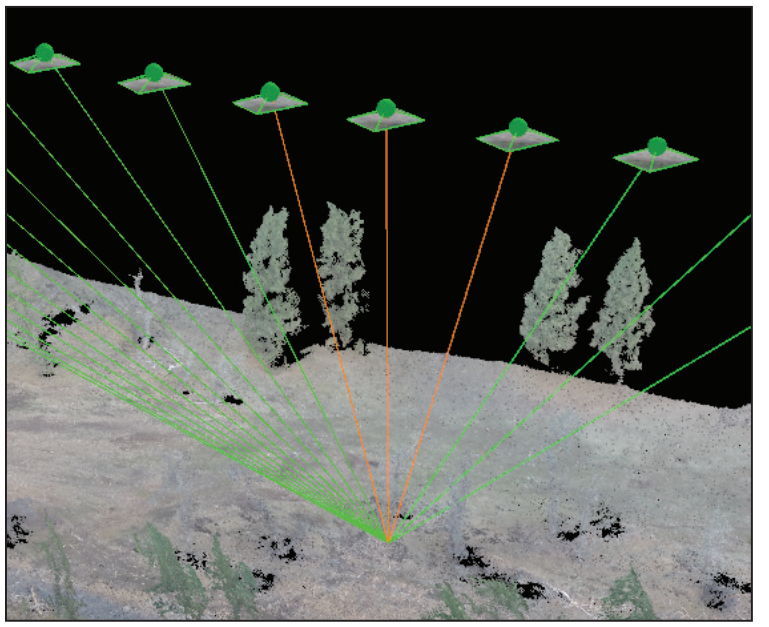
Whole Picture, *continued from Page 2*

data points with X, Y, and Z coordinates. They are used to represent the terrestrial surface of our project area. As you might have guessed, this product is what Pix4D is going to use to create our DEM. Aside from editing the work that the computer has already completed, we are now ready to start work on our digital elevation model.

The DEM and Orthomosaic construction are the longest of all of the processes. On larger projects, this construction computation process can take more than a week; after it is completed, we get a very good-looking representation of the project area. If we do our job correctly during the Point Cloud Densification process, then the DEM is almost finished at this point, meaning that it is ready to be sent off to our partners and used for tasks like project design. The Orthomosaic, on the other hand, generally needs quite a bit of editing to create a finished product. When the Orthomosaic is first processed, it is shown as a bunch of random polygonal cells displaying a re-projection of the photos captured by the drone. We can adjust each image's individual brightness and contrast, adjust their projection and split/merge them with other cells, or select a more suitable picture from our inventory. Although the process is time-consuming, the final, comprehensive view of the project area is worth it.

Final Product

Producing them takes a little bit of time and a lot of attention to detail, but the geospatial imagery of projects we are able to create with the help of Pix4D is useful for project managers, landowners, and funding entities to get a complete understanding of the project area. Additionally, the ability to run repeated flights of restoration projects during and after construction leads to tangible monitoring and reporting data. We look forward to updating you in future issues on the benefits of using FLIR imagery to record stream temperatures in streams in the Grande Ronde Basin. ■



They aren't UFOs! Those are photos captured by our UAS, being matched with "key points" on the ground by Pix4D software. (Image: GRMW)

Grande Ronde Model Watershed

Upcoming Board Meetings

The public is welcome to attend.

- Tuesday, April 28th
  5:00pm
  Elgin Community Center
  260 North 10th St.
  Elgin, OR 97827

- Tuesday, June 23rd
  5:00pm
  Wallowa Community Center
  204 East 2nd St.
  Wallowa, OR 97885

Meeting dates are subject to change.

Please call (541) 663-0570 to confirm.

Thank you!

Springing into Action

The Grande Ronde Model Watershed (GRMW) brings you the latest updates on restoration projects that the GRMW is administering with mitigation funding from Bonneville Power Administration (BPA) for the 2015 funding cycle.

by Lyle Kuchenbecker, *GRMW Staff*

Catherine Creek Stream and Habitat Restoration: CC44 (Phase III)

Funding: BPA ($2,052,924)

The Catherine Creek CC44 project is a multi-year, multi-phase project sponsored by the Union Soil and Water Conservation District involving six landowners that was designed to restore a very high-priority four-mile reach of Catherine Creek above Union. Catherine Creek provides spawning and rearing habitat for Endangered Species Act (ESA)-listed spring Chinook and summer steelhead as well as bull trout and redband trout. Restoration activities began in 2013 and will continue through 2016. Work completed or proposed includes the construction of 200 large wood structures, backwater alcoves, boulder complexes, side channels (7,026 feet), new channels (1,800 feet), an irrigation pipeline, livestock exclusion fencing, and riffle complexes. The project area will be planted and protected through conservation and landowner agreements. The expected benefits of the project are increased in-channel complexity and diversity, improved/restored floodplain connectivity, increased/reconnected side channels and alcove habitat, increased summer base flow, and decreased water temperatures during the summer.

Five Points Large Woody Debris and Planting

Funding: BPA ($226,072); USFS ($13,560)

The project sponsored by the U.S. Forest Service (USFS) will restore six miles of Five Points Creek, a tributary to the Grande Ronde River. This work is the first of three phases of the project. Five Points Creek is spawning and rearing habitat for ESA-listed Snake River summer steelhead and rearing habitat for ESA-listed spring Chinook. The project will involve construction of 65 large wood structures, removal of an old, unused water diversion structure, construction of a livestock riparian exclosure, closure of two miles of a user-created ATV trail along Five Points Creek, and planting deciduous seedlings and cuttings. The anticipated benefits are improved fish passage, increased in-channel complexity, and enhanced riparian and wetland diversity, vigor, and function.

Meadow Creek Upland Water (Phase III, A)

Funding: BPA ($26,155); USFS ($11,874)

This project sponsored by the USFS is the final phase of a multi-phase project on Meadow Creek, a tributary to the Grande Ronde River. Meadow Creek is spawning and rearing habitat for ESA-listed Snake River summer steelhead and rearing habitat for ESA-listed spring Chinook. This phase will complete the project by developing off-channel livestock water sources. Restoration work on previous phases included installation of wood structures on 3.25 miles of Meadow Creek, riparian livestock exclusion fencing, and riparian planting on three miles of Meadow Creek. The expected benefits are increased habitat complexity and cover, enhanced floodplain and riparian function, and improved riparian vegetation condition.

Rock Creek Restoration and Enhancement (Phase III)

Funding: BPA ($179,600); CTUIR ($233,515)

The project is the last phase of a multi-phase restoration project sponsored by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) encompassing 16 miles of fish habitat on Rock, Little Rock, Sheep, Graves, Little Graves, and Whiskey Creeks, which are tributaries to the Grande Ronde River. The streams are spawning and rearing habitat for ESA-listed Snake River summer steelhead and rearing habitat for ESA-listed spring chinook. Phase II and III restoration activities include installation of 214 large wood sites, placement of 24 habitat boulder clusters, installation of livestock riparian fencing of 127 acres, reactivation of historic meanders, channel reconstruction, reclamation of channelized reaches, road and dike removal, side channel development, riparian planting on 376 acres, and enrollment of more than 400 acres in conservation easements. The expected benefits are increased floodplain connectivity, reduced streambank erosion rates, and enhanced in-stream structural diversity, complexity, and geomorphic stability.

Wallowa River 6-Ranch Habitat Restoration (Phase II)

Funding: BPA ($300,000); Oregon Watershed Enhancement Board ($176,000); U.S. Fish and Wildlife Service ($10,000)

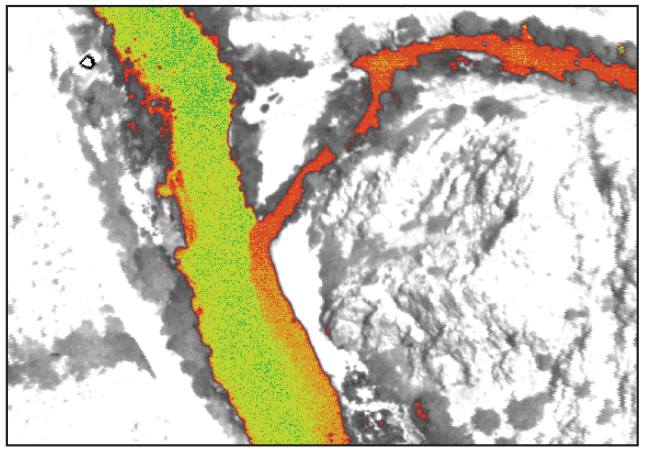
The project sponsored by the GRMW is located on a half-mile reach of the Wallowa River near Enterprise, Oregon. The project reach supports ESA-listed spring Chinook salmon, summer steelhead, and bull trout. Phase I of the project was completed in 2009 and included channel reconstruction (3,800 feet), rootwad installation, woody debris structure installation, cross vane and J-hook installation, and planting and seeding. The following restoration activities will be completed in 2015: channel reconstruction to increase sinuosity, construction of 12 woody debris structures and nine habitat structures, bioengineering on 1,100 feet of streambank, placement of large rocks for fish habitat, and construction of one large engineered logjam. The expected benefits are increased habitat quantity (increased channel sinuosity), greater habitat complexity, increased streambank stability, improved riparian condition and floodplain connectivity, and improved water quality (sediment, temperature).

Continued on Page 8, **GRMW Projects**

FLIR is *Here*

by Lacey Moore, *GRMW Staff*

As you may recall from our Summer 2013 issue of *Ripples*, the Grande Ronde Model Watershed (GRMW) was the recipient of a Nonpoint Source 319 Grant provided by the Department of Environmental Quality (DEQ) to fund the purchase of a mobile stream simulation trailer, which has been valuable in educational events throughout eastern Oregon and even Idaho. In 2014, the GRMW was awarded a 319 Grant for the purchase of a Forward Looking Infared (FLIR) camera to accompany project monitoring that was being conducted with our Unmanned Aerial System (UAS). FLIR detects radiation typically emitted from a heat source. The products from these cameras assist project implementers with monitoring the change in stream temperature before and after a project has occurred. Without the benefit of a remote vehicle and mounted FLIR camera, this type of monitoring could only be accomplished with a chartered helicopter, trained pilot, and larger infrared camera (all items that are outside of the non-profit budget). DEQ Nonpoint Source Grants support the planning and implementation of projects that address water quality problems in surface and groundwater resources resulting from nonpoint source pollution. DEQ accepts proposals from government agencies, tribal nations, and nonprofit organizations for projects that will lead to the restoration of beneficial uses in impacted water bodies. We are excited about the upcoming possibilities for our restoration partners and our team at GRMW to take advantage of this useful technology. We would like to thank Tonya Dombrowski at DEQ for being so helpful during this grant application process. ■



Above: An example from the Klamath River of processed temperature imagery. (Photo: Oregon State University) Right: The TAU2 19mm camera GRMW will use to capture temperature data.

RRNW, *continued from Page 1*

a field trip. Short courses offered this year addressed topics such as monitoring and design, hydraulics, aquatic macroinvertebrates, public speaking, and fluvial geomorphology. Days 2, 3, and 4 were full of presentations covering the vast variety of topics involved in stream restoration, including theory, practice, results, mistakes, and successes. The final day of the symposium offered a field trip to the now-removed Condit Dam that was one of the two largest dams ever removed in the United States at the time of its removal. The full five-day program can be viewed at the following website:

http://rrnwsymposium.org/program/index2015.php .

One of the most valuable aspects of the symposium is the opportunity to network with others who work in the stream restoration field. Ample time is available between each session to meet others, whether they are vendors, consultants, agency practitioners, regulatory personnel, or general contractors. This networking opportunity allows participants to informally learn from one other about what they are implementing in different regions, pitfalls, and different methods to achieve similar results. The many technical aspects of stream restoration are on display, but the most important aspect of stream restoration – collaborative partnerships – is fostered by the time provided to visit with colleagues.

The Grande Ronde Basin's professionals were a strong presence at this year's symposium. Representatives from the Union Soil and Water Conservation District, the Grande Ronde Model Watershed, the Confederated Tribes of the Umatilla Indian Reservation, and the Oregon Department of Fish and Wildlife as well as local consultants from Anderson Perry and Associates and Tetra Tech were in attendance. Anderson Perry and Associates is a sponsor of the event and had a display in the vendor room showcasing their river design work. At least one Union County contractor involved in stream restoration construction attended the event as well as others who have worked in the basin.

River Restoration Northwest provides a supportive venue for seasoned veterans as well as newcomers to the stream restoration community to learn from each other. It is a week full of opportunities to learn, observe conventional and new practices, and become aware of other restoration objectives specific to different regions. In the Grande Ronde Basin, we focus on Chinook salmon and steelhead restoration objectives; however, one presenter from southeast Oregon discussed the stream and landscape benefits of making artificial beaver dams, and a film was shown describing the preservation of a giant salamander called the hellbender that is native to Tennessee, all of which are unique facets of stream restoration in the United States.

The River Restoration Northwest Symposium is held every February at Skamania Lodge, and the event sold out this year. For more information, visit the following website. http://www.rrnw.org/Home. ■

GRMW Projects, *continued from Page 6*

GRMW Subbasin Gauging Station Operation 2014-2015

Funding: BPA ($55,000)

The GRMW assists the Oregon Water Resources Department with the operation of eight flow-gauging stations throughout the Grande Ronde Basin. Restoration partners including federal and state agencies, the Nez Perce Tribe, CTUIR, and The Freshwater Trust use the flow data to plan, implement, and monitor restoration projects. Flow data is especially important to the Oregon Department of Fish and Wildlife (ODFW) Early Life History project and the CHaMP monitoring program in the Grande Ronde Basin. The primary benefit is to maintain a continuous set of flow data for the Grande Ronde Basin.

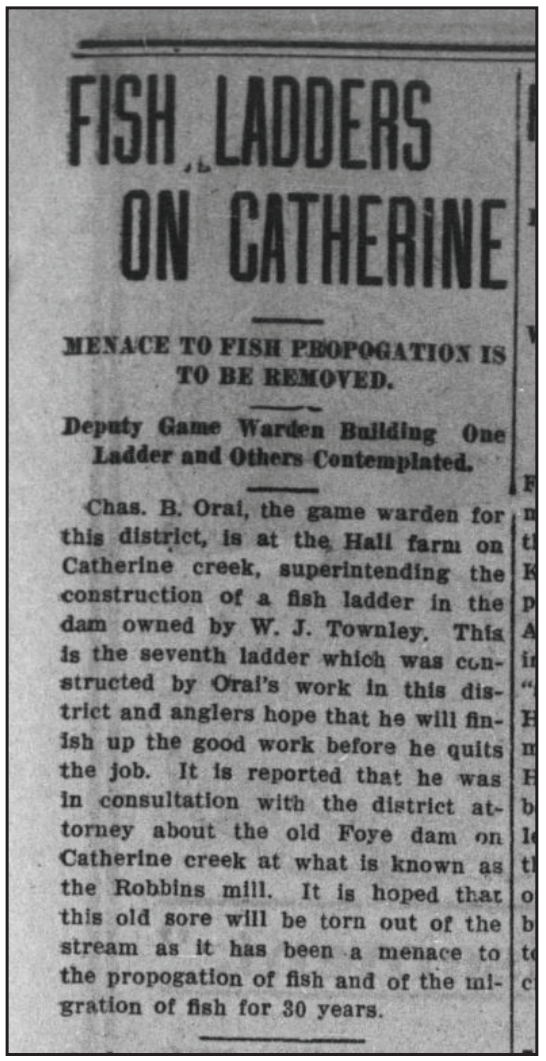
Fly Creek/Smith Riparian Fencing

Funding: BPA ($20,249); ODFW ($20,162)

The project is sponsored by the ODFW and will expand a previously constructed livestock riparian exclusion fence on the headwaters of Fly Creek, a tributary of the Grande Ronde River. Fly Creek is spawning and rearing habitat for ESA-listed Snake River summer steelhead and rearing habitat for spring Chinook in the lower reaches. A total of 1.5 stream miles and 30 acres will be protected from domestic livestock. The ODFW has agreed to a 25-year protective easement with the landowner. The expected benefits are improved density, condition, and species composition of riparian vegetation; stabilization of active erosion sites; improved habitat complexity and channel condition; enhanced riparian function and water storage; and protection of existing wetlands. ■

From the ARCHIVES

by Lacey Moore, *GRMW Staff*



FISH LADDERS ON CATHERINE

MENACE TO FISH PROPOGATION IS TO BE REMOVED.

Deputy Game Warden Building One Ladder and Others Contemplated.

Chas. B. Orai, the game warden for this district, is at the Hall farm on Catherine creek, superintending the construction of a fish ladder in the dam owned by W. J. Townley. This is the seventh ladder which was constructed by Orai's work in this district and anglers hope that he will finish up the good work before he quits the job. It is reported that he was in consultation with the district attorney about the old Foye dam on Catherine creek at what is known as the Robbins mill. It is hoped that this old sore will be torn out of the stream as it has been a menace to the propogation of fish and of the migration of fish for 30 years.

More than 100 years ago, the anthropogenic effects on native fish in our region were deemed newsworthy to Union County citizens. The fish ladder mentioned in the article, which was to be built on the dam owned by W.J. Townley, likely referred to the present-day Townley Dobbin irrigation diversion on Catherine Creek, located just downstream from the Union City Park. In 2009, the Grande Ronde Model Watershed, the Townley Dobbin Ditch Company, and the Bonneville Power Administration installed a state-of-the-art bypass fishway to ensure year-round passage for juvenile salmonids and other resident fish. It is difficult to say what became of the fish ladder mentioned in the 1911 article, as flooding and other events have changed many diversions over time. One thing is for sure: harmoniously protecting salmonids and agricultural water needs has been near and dear to the residents of this beautiful valley for more than a century. ■

The article pictured was from the November 23rd, 1911, issue of the *La Grande Evening Observer*. (Photo: University of Oregon Libraries.)