

Science Update



United States
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Forest
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Restoring Rivers, Sustaining Communities

Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land.

—Luna Leopold, hydrologist

Healthy Rivers Connect Humans and Ecosystems

James Nash says he is part trout. Growing up on a ranch in the Willowa Valley of north-east Oregon, he disappeared as often as he could to the banks of the Willowa River, which runs for more than two miles through his family's land. Once, while exploring the bottomland, he discovered some old ruts and grooves in the ground. "At first I didn't know what they were," he said. "But even as an 8-year-old, I could tell those channels would be better fishing." He had found an old natural channel of the Willowa River.

Much of the Willowa River in the valley, including the stretch on the 6 Ranch where Nash grew up,

had been moved, straightened, and channelized in the first half of the 1900s to accommodate Highway 82 and a railroad line. Fish-friendly pools and spawning gravels were lost. Nash's "trout sense" was right—fish did prefer the contours and complexity of the original river channel.

Nash is the fifth generation of his family to live on the ranch, which is operated by his mother, Liza Jane McAlister. She shuns the industrialized approach to agriculture. "As a caretaker of the land, we're always trying to make it healthier," she said. "We have a long-term connection to it, which drives us to conserve it, to get it back to how it was when our ancestors were



6 Ranch

"Our ranch has been in the family for five generations, counting my children," said Liza Jane McAlister. "We have a long-term connection to it, which drives us to conserve it."

- Willow and cottonwood are preferred forage for wild ungulates. In fish-habitat restoration projects, browsing pressure from deer and elk may be a limiting factor in preventing the establishment of native hardwoods.
- Artificial beaver dams hold promise as a stream-restoration technique in the arid West.
- Human population growth rates in the West far exceed the national average. Rural land conversion poses a threat to open spaces and biodiversity conservation, raising the stakes for keeping ranching a viable way to make a living.
- Many ranchers are showing a strong desire to integrate grazing and restoration. Overall, rangeland health has improved substantially over the past several decades. Multi-generational ranchers are often a rich resource of local ecological knowledge and a strong stewardship ethic.
- Collaborative approaches to restoration based on building relationships and mutually defined solutions have wrought significant successes.

here.” When Nash found evidence of the old river channel, the family wanted to return it to its natural meanders. “We put together a whole plan to restore the river,” he said. “But we ran into an impossible amount of bureaucracy and permits that were needed to do the work.”

Years would pass before a solution presented itself. In the meantime, Nash graduated from high school, joined the U.S. Marine Corps, and served as a tank officer in Afghanistan. Wounded twice, he received two Purple Hearts before returning to 6 Ranch in 2014 to carry on the family tradition. He now shares management of the ranch with his mother and sister. “There’s no place I’d rather live,” Nash said. “It’s where I want to be, but it’s also an obligation: to care for this land and this river and sustain what we have done here for generations.” 🌿



6 Ranch

James Nash offers guided fly-fishing on the Wallowa River, which runs through the cattle ranch he helps oversee with his family in northeast Oregon.

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Cynthia L. Miner, Communications and Applications Director
Frank Vanni, Publishing Director, fvanni@fs.fed.us
Rachel White, Writer and Managing Editor, rachelwhite@fs.fed.us
Jason Blake, Layout, jblake@fs.fed.us
Send change of address information to pnw_pnwpubs@fs.fed.us

Critical Resources in Trouble

Improving the condition of rivers and their riparian corridors reaps benefits far beyond the streambank, particularly in the dry American West. In terms of overall biodiversity and ecosystem function, they are the most important habitat on the landscape, providing a transport system for nutrients and stimulating recovery processes, because plants grow faster in the presence of water.

Many streams and rivers in the West have been altered to their detriment, often unintentionally. On dry landscapes, deeply cut streambanks known as gullies or arroyos have become as common a sight as tumbleweed, and wetland habitat throughout the West has been greatly diminished. In the past century, sagebrush flats have taken over where once marshy meadows were filled with wetland vegetation. Wandering shallow streams punctuated by beaver dams and ponds have been replaced by eroded channels that in some places have cut down 10, 20, or even 30 feet below their former floodplains.

Gordon Grant, a hydrologist at the Forest Service's Pacific Northwest Research Station (PNW), studies how the geologic landscape interacts with hydrology and how entire ecosystems are driven by water. "The causes of these incised channels have been hotly debated since the incision began over a century ago," said Grant. "Cattle and sheep grazing, changes in the climate, human activities to ditch and drain meadows

for agriculture, and widespread trapping and decimation of beaver populations have all been implicated, and the jury is still out as to what the dominant mechanisms were."

Whatever the cause, channel incision lowers the water table in the floodplain. As a result, less water infiltrates the soil. Instead of slowly spreading across marshy bottomland, surges from storms and snowmelt race through the narrow gullies, and more sediment muddies the stream as erosion lowers the bed and widens the banks. These changes have disconnected streams and rivers from their former floodplain and riparian ecosystems and their associated dynamic geological and ecological processes. The quality and stability of fish and wildlife habitat have suffered.

Across the Pacific Northwest, many government agencies, conservation organizations, and landowners have mobilized major restoration efforts to improve the health of streams and rivers, driven by the serious decline of the region's once robust runs of wild salmon, steelhead, and cutthroat. Many aquatic and riparian species, some of which have been listed as threatened or endangered under the federal Endangered Species Act, have been negatively affected by the altered conditions in and along the region's streams and rivers. Sustaining wild, naturally occurring populations of these fish depends on functioning watersheds and their aquatic ecosystems.



Gordon Grant

Deeply cut streambanks or gullies have become a common sight in the American West. This type of channel incision has negative effects on riparian ecosystems.

Ideas Need to Be Lived

Riparian restoration and ranching are not a zero-sum game. One undertaking's gains do not necessarily equal the other's losses. In fact, humans and their enterprises are an intimate component of the landscape and key to the sustainability of forest and rangeland ecosystems. Exploring these interrelationships between nature and culture is part of what Susan Charnley does for a living. She is a social scientist with the Pacific Northwest Research Station, where she studies the human dimensions of land management. Her research contributes insights that can be used to promote social-ecological resilience and reduce the gridlock that can arise over conflicting land management goals.

One of Charnley's goals is to help sustain working landscapes, particularly in rural communities in the West. Working landscapes are places where people make a living using renewable natural resources that come from the land—like grass for grazing sheep or cows. Ranching continues to be an important foundation of life in the rural West. Cattle production is Oregon's largest agricultural commodity, representing 15 percent of the state's entire agriculture sector. In 2014, Oregon cattle production was valued at over \$900 million, and 12 percent of all Oregon jobs are tied to ranching or farming.

Yet, for many reasons, making a living as a rancher amid the mix of public and private lands in the West is becoming increasingly difficult. "Markets are unpredictable and

younger generations don't always want to stay in ranching," said Charnley. "Even if they inherit the ranch, there are huge estate taxes. And in places with high amenities, the value for land is rising. It can be tempting to sell."

In 2013, 18 percent of people in Grant and Harney Counties were living in poverty; while the population in urban areas continues to soar, Grant County lost 3.6 percent of its population from 2010 to 2014. Rural land in the West is being developed at an average rate of 2.3 percent per year. The loss of open space to exurban and second-home development in areas such as central Oregon, the Bitterroot Valley in Montana, and along Colorado's Front Range has had notorious social and ecological implications.

Charnley recently co-edited a book that articulates the argument that working landscapes are critical to the ecological health and biodiversity of lands in the American West and to the economic health of rural communities. *Stitching the West Back Together* (Charnley et al. 2014) tells fascinating stories about efforts to conserve healthy working landscapes and discusses policy issues that are highly relevant for rural communities, civic groups, public land managers, conservation organizations, university professors and students, and people in the forestry and ranching businesses. Together, the authors chart a course that goes beyond a polarizing jobs-versus-the-environment debate to make the case that what is good for ranchers is good for the communities they live in.

Micha Maxson

For a host of social and economic reasons, making a living as a rancher is becoming increasingly difficult. It can be tempting to sell ranch land, opening up the possibility of losing this open space to development.

In addition, the river systems that make human livelihoods possible on private land are critical for conserving biodiversity. Private land holds 35 percent of bull trout critical habitat, for example. “Private ranchlands tend to have a lot of species,” said Charnley. “They tend to be at lower elevations, and to include more riparian land, which is richer in biodiversity. And ranching is an extensive land use. Keeping private-lands ranches in business helps maintain that extensive high-quality habitat. If ranchers are no longer interested or able to continue ranching, they end up selling their land.”

The importance of private land for conserving open space and wildlife habitat means that healthy streams must be a product of public and private collaboration. When ranchers adopt ecologically sustainable practices, ranchland can contribute to maintaining riparian health while serving as a buffer against development and permanent loss of open space. Emerging research on riparian restoration effectiveness can help all landowners figure out how to walk this middle path. 🌿

Q&A with Susan Charnley, co-editor of *Stitching the West Back Together*

How did the idea for this book come about?

We thought it would be useful to bring together people who work the land in all different capacities. Initially, we convened a workshop around these issues to have conversations with people. We heard about all the cool and creative things people are doing and we wanted to share those stories. We also wanted to see how science could make a contribution. That led to the idea of a book.

The book’s chapters are written by a diversity of authors, including foresters, conservationists, ranchers, and scientists. How did you decide who would contribute?

We started with the participants from the workshop. Then we looked for holes. We wanted geographic balance, but also a balance between different livelihoods (ranching, forestry). There was also a balance to make between the individual stories and the landscape scale, and between public land and private land issues.

What are some of the biggest challenges for maintaining working ranchland?

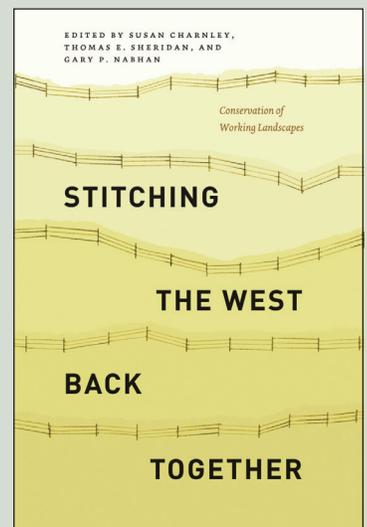
There has been a lot of conversion to agriculture already. There is uncertainty with public lands grazing. For example, allowed animal unit months (AUMs) on public lands have declined over time. Those leases are important economically. And cows have to be moved extensively and cover a lot of ground to get enough forage. If you don’t have access to public land for grazing, you have to pay to graze on private land. Social conflict is another source of uncertainty.

Overall, what is your sense of the current health of rangelands?

Federal agencies have improved their regulations to better support ecological conditions. And awareness of sustainable practices has grown on private lands. Ranchers learn from each other as they take on restoration activities. And it has become easier to get assistance, for example, from the Natural Resources Conservation Service, to conduct restoration projects. Also, science has contributed, and has led to experimentation with different forms and timing of grazing regimes.

From your experience in editing the book, are collaborative approaches working?

Before we even started writing the book, there were coalitions and networks here and there that were working hard to bring people together on these issues. One of the motivations of our original workshop, and the book, was to help connect some of these efforts across regions. There are some good examples in the book of groups that were not afraid to just keep trying new creative approaches until something finally worked. 🌿

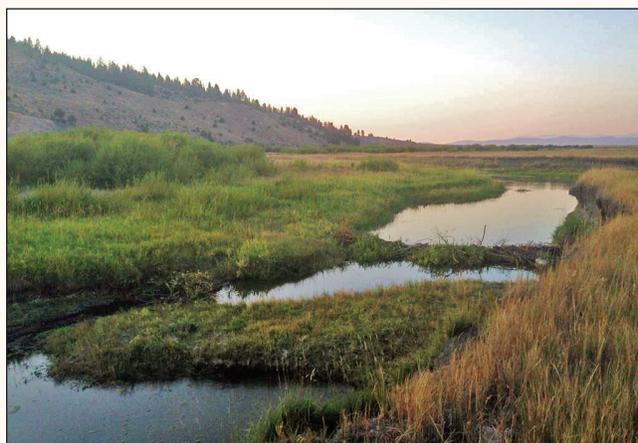


The Science of Riparian Restoration

Go Beavers!

Beavers—nature’s engineers—once shaped small-stream ecosystems in most of the Northern Hemisphere, creating sections of slow, deepwater and floodplain wetlands. Humans trapped beaver for their fur, leaving only small numbers remaining by the end of the 19th century.

With the loss of beavers came the loss of ecological benefits, including sediment storage and a diversity of water depths and velocities, all of which help to create preferred habitat for salmonids. Indirectly, beaver dam complexes also support riparian vegetation that contributes to shade, refugia, and a food source for fish and other wildlife. A study published by the National Oceanic and Atmospheric Administration a decade ago stated the urgent need to better understand the effects of depleting these millions of wood structures from small and medium-sized streams. “This is particularly important in semiarid climates, where the widespread removal of beaver dams may have exacerbated effects of other land use changes such as livestock grazing to accelerate incision and the subsequent lowering of groundwater levels and ephemeralization of streams,” study authors reported.



Caroline Nash

Beaver dams on the main stem of the Silvies River. Beavers help create salmon habitat by building dams, which trap sediment and add structural complexity to streams.

In an inspired attempt to bring back some of these ecological benefits, a restoration technique that mimicks beaver dams has caught on among landowners and conservation groups. Artificial beaver dams, or ABDs, involve reshaping the eroded stream channel with a series of earth, rock, or wood plugs. Water rises up behind them, resulting in a

series of ponds that fill up the incised gully. As hydrologist Gordon Grant explained, “These ABDs have proven effective in raising water tables and reestablishing riparian and meadow vegetation, but there is little research on their long-term effectiveness.”

Grant is beginning to fill in that information void. Through a colleague, he learned of an ABD restoration project on a large private ranch in the Silvies River Valley in eastern Oregon, and was invited to come and take a look. “The rancher is interested in changing what amounts to a systemic problem: channel incision. He was taking us to places like that on his land with deep gullies, which are utterly unproductive from a rancher’s point of view. He’s convinced that the loss of beaver dams caused this channel incision, which then results in wet meadows turning into sage flats,” said Grant. “Then he drove us around to show us his restoration projects and we were amazed. We had never seen a river transformed like that.”



Aisha Harley

Caroline Nash, Oregon State University Ph.D. student, at the Silvies River study site.

Grant explained that, about 10 years ago, the rancher started putting in low-head rock dams. “Hundreds of them, every 50 feet, with about 6 inches of water going over each dam,” Grant said. “They pond up the channels, bringing the water up to the level of the sagebrush, which allows grass to grow again.”

The ranch has a new restoration site, where work began in 2015 and is continuing in 2016. With the blessing of the rancher, Grant and Oregon State University (OSU) Ph.D. student Caroline Nash (no relation to James) have designed and begun conducting a long-term study that will quantify the physical and hydrologic changes resulting from this restoration technique. They work alongside other researchers from OSU, the University of Wyoming, and the U.S. Geological Survey to measure streamflow, groundwater levels, sediment, and other important stream responses. They will also use models to assess the restored stream’s sensitivity to future climate changes.

For the rancher, the ultimate goal is to encourage beavers to move back, build their own dams, and maintain them. First the beavers will need the wet meadow habitat that grows the food they live on: willows, cottonwood, and other

riparian shrubs and trees. For the scientists involved, the goal is to better understand how to sustain healthy stream systems in a dry landscape, and how they function in both the present and future climate.

“The landscape has been transformed,” said Grant. “And it continues to be transformed. Our role is to try to make sense of it.”

The Meadow Creek Study

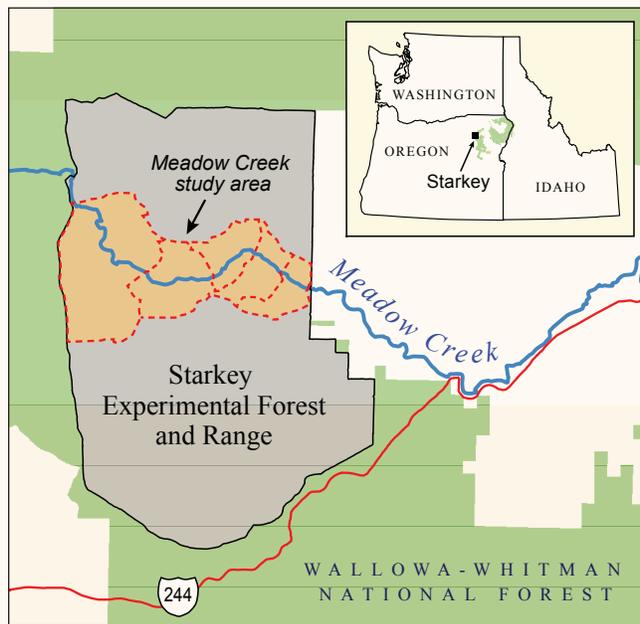
To test the effectiveness of a new antibiotic, a microbiologist might conduct a series of experiments in a closely controlled laboratory trial. Studying natural landscapes like forests and rangelands does not lend itself to such an easily manipulated setting. But the U.S. Forest Service does have an elegant stratagem for addressing this conundrum: its network of 80 experimental forests and ranges (EFRs). These sites provide managed landscapes that serve as natural testing grounds for exploring vexing forest and range management issues, such as invasive species, wildfire, and climate change.

In particular, the creation of the Starkey EFR in 1940 proved a momentous step for the emerging science of range management. The only experimental area that includes



Rhonda Mazza

Meadow Creek at the Starkey Experimental Forest and Range in northeast Oregon, the site of a one-of-a-kind study of the effects of grazing on riparian vegetation recovery for salmon habitat.



Bridgett Naylor and Keith Routman

Meadow Creek study area. Dashed lines show fenced areas used to manipulate various levels and types of ungulate grazing.

until the first grazing study began at Starkey in 1954, cattle grazed on public lands all season long, and proper stocking rates were only guessed at. Ten years later, based on study results, most public allotments had some form of rotational or deferred-rotation grazing.

One study at a time, Starkey catalyzed advances in range management throughout western forested rangelands. Meanwhile, beginning in the mid-1980s, other PNW research was revolutionizing fish habitat restoration practices. Scientists had begun to understand how fish populations were being affected by dramatic changes to the physical structure of rivers—such as opening channels and removing slash and other debris—that had occurred since Euro-American settlement. PNW scientists began challenging traditional thinking and proposing the novel concept of leaving or putting dead wood in streams to increase channel complexity and improve fish habitat.

Now, placement of large woody debris in streams has become a standard practice. Yet questions remain. So far, no research had investigated the effects of cows, elk, and deer on fish and fish habitat. In 2012, having heard a clamor for guidance on the interactions of grazing and fish habitat restoration from land managers, conservation organizations,

both forest and rangeland, Starkey has long been a source of definitive information on managing elk, mule deer, and cattle in relation to other public land uses. For example,



Mary Rowland

Research from the Pacific Northwest Research Station introduced the restoration concept of putting large dead wood into streams to improve fish habitat. This technique is one of many being used to restore Meadow Creek.

and other interested parties, an interdisciplinary team that included Forest Service wildlife biologists Mike Wisdom and Mary Rowland set a new study in motion on Starkey's Meadow Creek, the first ever to evaluate the impact of riparian vegetation recovery on endangered salmon and steelhead populations under varying levels of cattle, elk, and mule deer grazing.

"We wanted to know: can we really do this?" Rowland said. "Can we sustainably graze livestock in riparian systems with salmon and steelhead and not see fish habitat degradation? The project has two goals: a conservation goal of restoring riparian function and fish habitat, and a research goal of evaluating the effects of grazing."

The default approach to restoring stream habitat has generally been to exclude cows in areas with new tree and shrub plantings, yet some of the most desirable and appropriate native riparian vegetation—like willows and cottonwood—are highly preferred forage for deer and elk. "So we are not just looking at cattle, but also at the effects of deer and elk

herbivory as well as a spectrum of other riparian responses, including stream temperature, small mammals, and native bees," said Rowland.



Mary Rowland

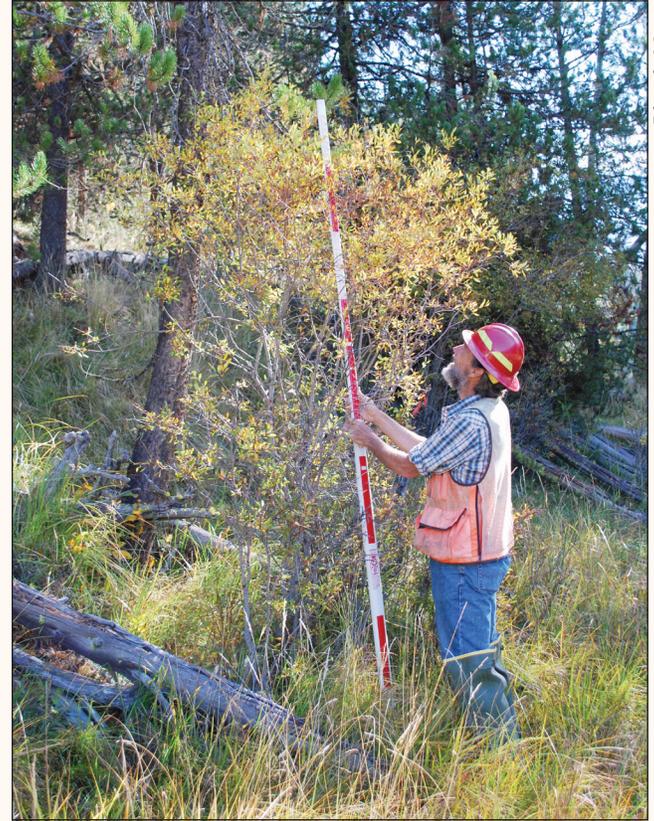
Sandy DeBano netting native pollinators at Meadow Creek. The Meadow Creek project is set up to evaluate the impacts of stream restoration and grazing on a diverse spectrum of riparian responses, including the role of native bees.



Tony Higgett

Elk cow in a river.

Rhonda Mazza



Rhonda Mazza

(Left) Restoration seedling in the Meadow Creek study. (Right) A field crew member measures vegetation heights at Meadow Creek. Streamside vegetation has a big effect on water temperature.

Meadow Creek is the largest stream running through Starkey, and provides important summer habitat for juvenile steelhead and Chinook salmon. Historical logging and past grazing had simplified the stream channel, making it less hospitable to fish. In partnership with more than 20 collaborators, the Meadow Creek restoration project has begun improving stream conditions by putting more fish cover in the stream, increasing habitat complexity, and making more deep pools. In 2012, field crews began work along a 7-mile stretch, removing two long-abandoned culverts and placing woody debris that included 60-foot trees with giant root wads along the banks and into the stream, as well as 75 large boulders provided by the Oregon Department of Transportation.

In conjunction with the in-stream work, crews seeded the disturbed areas with native forbs and grasses. Over the course of spring 2013 and the following spring, they planted more than 40,000 native hardwood and conifer tree and shrub seedlings to jumpstart riparian vegetation recovery along the 7-mile segment. New pasture fences were built, as well as nine small 1-hectare exclosures that will be used to control and compare different levels of domestic versus wild ungulate grazing.

Starting in 2017, about 60 cow-calf pairs will be introduced under a five-pasture, deferred-rotation grazing system.

The study is in a preliminary phase, but promises to provide previously unavailable information on the establishment, survival, and growth of native riparian vegetation plantings under browsing by deer, elk, and cattle. Initial results show that current levels of deer and elk browsing are having a substantial dampening effect on the growth of restoration plantings, which in turn affects fish habitat.

Another component of the study will be addressing climate change and how it might affect stream temperature, an increasingly pressing issue. This work builds on pioneering stream temperature modeling by PNW research ecologist Steve Wondzell in the Middle Fork John Day River. As with many ambitious and pioneering research projects, the Meadow Creek study raises new questions while answering older ones. But the project is one of a kind, and with its huge number of interested partners and collaborators, and ideal natural laboratory setting, it is unusually well positioned to address the complex questions that include both riparian and terrestrial systems. 🌿

Partnerships Calm Troubled Waters

Zones of Agreement: Deal-Breakers and Desires

Southwest of the Wallowa Valley, eastern Oregon's Malheur National Forest lies in the heart of what has long been logging and livestock country. When the timber industry began ebbing in the 1990s, conflicting ideas about public land management at times created tension with forest management goals. By the mid-2000s, beset by court battles, management of the Malheur's 1.7 million acres had come to a near standstill.

As a consequence of the management stalemate and inability to treat stands of trees growing increasingly dense from past fire-exclusion practices, the forest landscape was succumbing to wildfire, drought, and insect outbreaks. Locking horns wasn't working, and forest health was suffering. A Grant County commissioner decided to start a conversation among opposing factions, and invited an environmental attorney to meet with residents to find a path toward overcoming disagreement. Out of these meetings, the Blue Mountain Forest Partners (BMFP) collaborative, was officially formed in 2006.

Trent Seager caught the attention of the BMFP while doing field work on the Malheur National Forest for his Ph.D. on aspen and moisture release. "They asked me to come talk to them about my research and then kept inviting me back," he said. "For about a year off and on I would join them. They said their conversations had been enriched

by having a scientist there, so they hired me on contract as a science advisor."

The collaborative has grown to include loggers, environmentalists, ranchers, landowners, timber industry representatives, elected government officials, and federal land managers, all of whom value or depend upon the forest resources of the Malheur. They work hard to find middle ground on forest management issues, and when they do, they articulate that shared vision in a written "Zone of Agreement" (ZOA) pertaining to particular topic.

Recently the collaborative completed a ZOA on riparian restoration. "Riparian management has been more contentious than other issues, and every forest management project seems to involve riparian areas, so we needed this ZOA," said Seager. The process begins when collaborative members go out together on a field trip. They keep track of all the agreements or disagreements that arise about management tactics. "We compiled all those key points and then ran them by everyone and began merging them into themes," said Seager. "Later, during an all-day workshop, we went through each of the contentious points and found a statement that could be stated in a positive way. Then a committee of us worked on those and ran that back by the group with multiple chances for comment."



Vernita Ediger

Blue Mountain Forest Partnership members and Forest Service partners discuss aspen stands and their connectivity to riparian systems. Trent Seager is in the green vest.

The group considers the resulting ZOA a living document, subject to change based on continued collaborative discussion. It provides the national forest staff with a starting point for management decisions, with the hard work of reconciling dissonant views already done. “The ZOA shows that we have agreed,” explained Seager. “If the national forest adheres to these guidelines, there will be no objections or litigation from any of the partners in the collaborative.”

Examples from the riparian ZOA include these statements, crafted by the BMFP:

- Where riparian areas have degraded or impacted conditions from livestock (cattle, sheep, horses) and wild ungulates, the Forest Service should consider fencing or other deterrents in their aquatic restoration treatments.
- BMFP supports the use of in-stream “beaver support structures” that encourage native species to assist in riparian restoration. Monitoring of the efficacy of these structures should occur.

Seager’s role is to be a neutral resource and a scientific sounding board for the group, without advocating for any stance. “I am not out there on the field trips walking around like Google Scholar™,” he said. He helps the members see ideas they may not have considered, and frames the dialog in a constructive light. For example, if a discussion starts

diverging between the importance of livestock versus a focus on streams, Seager might encourage the group to look for where science can show the overlap, and see if that helps find a middle ground for stakeholders.

“BMFP leaders had to say, again and again, we don’t allow position statements such as, ‘We will never support logging.’ You can restate that to say what you desire. Then it is up to the group to problem solve. For the riparian restoration, the hardest issue was whether to allow commercial thinning,” said Seager. “Everyone discusses what they would like to see. In the end, when ranchers, loggers, environmental lawyers, and county officials all agree on something, that’s a shared value. We understand each other’s desires and deal-breakers. Knowing that has allowed us to build bridges—to build trust.”

The positive effects of this partnership between a national forest and a local collaborative go beyond creating a shared vision. The BMFP has been instrumental in the successful navigation of the requirements of the National Environmental Policy Act for large-scale projects on the Malheur National Forest, which has paved the way for implementing restoration work on the forest. This has brought direct economic benefits to the local economy by creating living-wage jobs.



Vernita Ediger

Members of the Blue Mountain Forest Partners collaborative and U.S. Forest Service partners take a field trip to discuss riparian restoration. Collaborative partnerships like this have facilitated restoration and brought economic benefits to their communities.

There Must Be a Better Way

In the late 1980s, people in the Grande Ronde Valley in northeast Oregon watched closely what was happening west of the Cascades. An endangered species was forcing divergent interests to compromise and create a new vision for forest management. Looking to avoid the acrimony that accompanied the “spotted owl wars,” the commissioners for Union and Wallowa Counties and both the Nez Perce Tribe and Confederated Tribes of the Umatilla Indian Reservation collaborated to establish the Grande Ronde Model Watershed (GRMW), one of the oldest watershed councils in Oregon.

The scenic Grande Ronde River rushes for 180 miles between the Blue Mountains and the Wallowa Mountains, flowing through the agricultural Grande Ronde Valley into big canyon country before entering the Snake River. In dedicating itself to improving habitat for salmon and steelhead in the Grande Ronde River and Imnaha River subbasins, the GRMW had its hands full from its inception. Much of the anadromous fish habitat in the area was altered. Water quality was compromised by high levels of sediment and by high water temperatures. The number of spring Chinook salmon spawning in the Grande Ronde subbasin had plummeted from 12,200 in the 1950s to 400 in 1989. Only four fish spawned in the Upper Grande Ronde River in 1999. These low levels prompted listing of three native fish species as threatened under the Endangered Species Act: bull trout, summer steelhead, and spring Chinook salmon.

Jeff Oveson is the executive director of the Grande Ronde Model Watershed. A large part of his role is to build trust in a rural community. “We are not an advocacy group,” he said. “Our mission is to represent a broad community: landowners, resource managers, local industry, the Umatilla and Nez Perce Tribes, and conservation groups. We don’t have regulatory authority. And that’s probably a good thing.” The GRMW is not there to enforce policy, but to support restoration efforts. To do that, the group brings together diverse interests who may not otherwise be inclined to see eye to eye.

The strong opinions that Oveson encounters reflect the passion people feel for the land and how it should or should not be used. “Sometimes I have to duck my head down,” he said. This makes GRMW’s track record all the more remarkable. In its 22-year history, the group has coaxed forth amazing examples of the adaptability of local residents to cooperate with each other and make restoration projects work at the ground level, complying with and often exceeding environmental regulatory standards such as the Endangered Species Act, water quality regulations, and local permit requirements. Much of the work they do is based on the legacy of research from the Pacific Northwest Research Station recognizing that riparian disturbances are integral to habitat management, and which set the standard on fish-habitat enhancement practices.

“It’s great to have so many partners willing to work on restoring habitat on both private and public land,” said Oveson. The work GRMW does is possible because of the



Roger Peterson

Grande Ronde River, Washington

huge financial commitment of state lottery funds through the Oregon Watershed Enhancement Board and the federally mandated investment of ratepayer monies through the Bonneville Power Administration. “Without these partners, very little of this would be achievable in the short run,” he added.

To date, GRMW has funded or implemented more than 400 restoration projects, with many more completed by their partners using other funding sources. One of these projects involved finally restoring the Willowa River to its natural channel on the 6 Ranch.

“People Come Here Because It’s Beautiful”

When Liza Jane McAlister’s great-grandfather settled the land that would become the 6 Ranch, he wrote in his journal about catching trout from the river and frying it in bear grease. “I still have those daily journals of my great-grandparents,” she said. “And I think that impacts what I do—having their voice. I think there are ways to keep improving, improving, improving, forever. We want to look for balance and health.”

Even the breed of cattle she raises reflects that ethic. About 25 years ago, she acquired a few Corriente cows, hoping that they would be able to graze on some of the steepest ground on her property. Corrientes are a Mexican breed



Adele Nash

Liza Jane McAlister at 6 Ranch in northeast Oregon near Enterprise. She and her family have been actively restoring sections of the Willowa River with the help of the Grande Ronde Model Watershed.



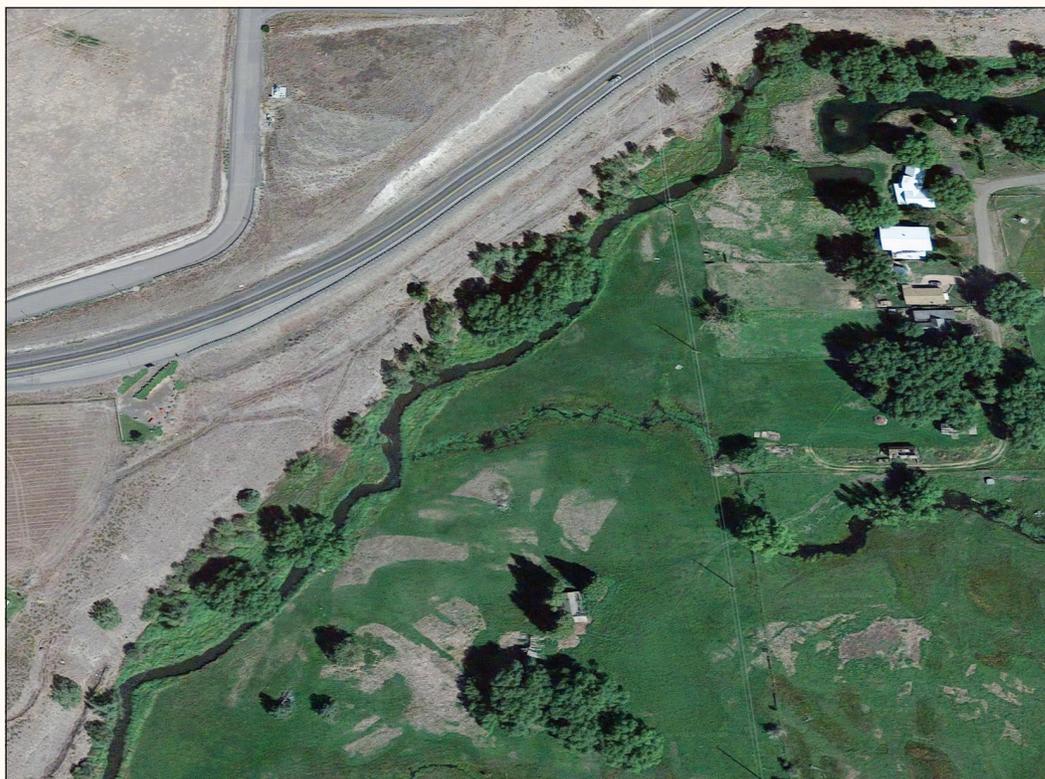
Ellen Levy Finch

6 Ranch raises Corriente cattle, a Mexican breed adapted to drier habitats. They are less prone than other cattle breeds to loiter in riparian areas.

adapted to canyons and harsh climates. “Seeing the difference between them and the regular beef cows was revealing,” she recalled. The new cows scrambled up the highest rims and foraged plant species spurned by ordinary beef cows. They didn’t hang out in the coolness of the shade in riparian areas or lie in the river. “The Corrientes really align more with nature, and that really fits my values.”

Knowing that the stretch of the Willowa River on her land had become somewhat sterile and devoid of any fish habitat didn’t sit well with McAlister and her family. The instream water had been disconnected from the floodplain and was lacking any substantial riparian vegetation. Restoring the river to a more natural state became a possibility when they partnered with the GRMW. Jeff Oveson’s group took care of the details and logistics that had proven too daunting for the family to navigate on its own—acquiring the permits, convening meetings, drawing up contracts, and overseeing the engineering specifications necessary to reintroduce the sweeping meanders of a wild river and provide woody debris and habitat structures to create fish habitat. “They made it easy for us,” said McAlister of the watershed council.

The project began in 2006 and involved excavating about 1,800 feet of new river channel, filling about 1,300 feet of existing channel, and excavating 400 feet of side channel. “They completed the excavation first before they moved the river,” said James Nash. “They did it in the winter. I thought it looked terrible. Trees that were part of my childhood got torn out and there were all these gouges and muddy holes and tracks from excavators.”



Google Earth™

Wallowa River near Enterprise, Oregon

Other work included constructing woody debris and wood habitat structures, and tree planting. As PNW stream-restoration research has shown, long-term management of fish habitat includes management of the whole riparian zone, to provide both present and future sources of large debris. “And the plan was ‘hands-off,’” said McAlister. “In other words, do the big equipment work and then leave it alone to recover to 10 years, no management.” That meant no cows on the river for 10 years. “That’s a lot to ask a rancher, to give up pasture land,” said Nash.

The speed of recovery was startling. The muddy mess Nash described quickly transformed as the river reclaimed its natural curve. “It bounced back so quickly,” said Nash. “Within 2 weeks we had chinook salmon spawning in there, which I had never seen in my life.”

The family embarked on a second project this year, right at the place where the first project left off. “We had learned a lot in the meantime and I insisted on a different approach,” said McAlister. “I discovered I could ask for what we thought was the best way to manage. The first

hands-off project became a reed canarygrass jungle, which then became a haven for deer. They mowed down all the tree plantings. For the second one, we said let’s do it differently and compare the two. I said from the beginning I wanted to graze it. That held up the project for a while because it is a big investment and this was an experiment. The paradigm is an attachment to ‘no grazing.’ But in the end we won. I wrote a management plan: we will let the plantings get established for 2 years with no grazing, while also using weed whackers to control the reed canarygrass. Then the cows can come back.”

Not everyone in the Grande Ronde Valley has the same commitment to river health. “I do hear from neighbors: why would you do this for fish?” said McAlister. But she recognizes that the health of her land is a productive gift to the rest of society. “It’s all connected,” she said. “The land is healthier, and healthier land means healthier cows. And I believe what you do on your land effects every place. What we offer to the world is open space. People come here because it’s beautiful.” 🌿

Streams, Wildflowers, Elk, and 100 Years of Homesteading

Perched above Hells Canyon in Oregon's northeast corner, the rolling hills of the Zumwalt prairie provide habitat for thousands of species of mammals, birds, reptiles, and insects. With the recent return of gray wolves to the area, the only native animal species missing is the grizzly bear.

The uplands of the Zumwalt prairie are carpeted with a colorful assortment of nearly 500 plant species, most of which are native to the area. Even through the hot and very dry summers, grassland birds nest in fields bright with blooming penstemon, Blue Mountain buckwheat, Oregon checkerbloom, western meadow aster, and sagebrush mariposa lily. The Zumwalt is the largest existing remnant of Pacific Northwest native bunchgrass prairie. Historically, this grassland type covered close to 20 million acres, but over 90 percent of it has been plowed into cropland or otherwise converted.

The uniqueness of this ecosystem and the richness of its wildlife prompted The Nature Conservancy (TNC) in the early and mid-2000s to purchase 33,000 acres and create the Zumwalt Prairie Preserve. For most of the 20th century, the landscape making up the Zumwalt, 95 percent of which is privately owned, has been grazed by cows. Keeping with that traditional land use, TNC leases space on the preserve for rotating seasonal grazing. They have found that moderate, low-intensity grazing is compatible with grassland birds and other wildlife, as well as plant biodiversity. TNC occasionally collaborates with PNW researchers at Starkey Experimental Forest and Range on rangeland issues, including a current project on invasive grasses.

"We want to maintain a working landscape because it's better than subdivisions and wind energy development," said Jeff Fields, who manages the Zumwalt Prairie Preserve for TNC. He says there is no one-size-fits-all approach to sustainable grazing. "Each piece of land is unique and on a different trajectory of change," he said. "The cattle we have prefer riparian areas. Our tactics focus on that."

Zumwalt Prairie Preserve lies at the headwaters of several stream systems, and Fields carefully manages grazing

in these riparian areas. "On some streams, their inherited condition was so bad we just keep stock out completely," he said. "On the west side along the Pine Creek corridor, we use four-strand barbed wire and electric fence. We just exclude cattle. A neighbor has excluded elk on Pine Creek as well."

The Nature Conservancy uses a variety of tactics to manage grazing while meeting standards for acceptable amounts of use in the riparian areas. "Grazing intensity. Duration. Season of year. These are all things you can control and



A fritillary butterfly at Zumwalt Prairie Preserve.



Sagebrush mariposa lily (Calochortus macrocarpus). Native wildflowers abound on Zumwalt Prairie Preserve in northeast Oregon.



Elk herd at Zumwalt Prairie Preserve. Elk have been far more abundant at Zumwalt than they have been historically, thus they have a greater impact on riparian vegetation.

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change,” said Fields. “In the spring, cows are usually not that interested in the sedges and rushes on the streams, so they don’t wallow there. But then in the fall, the sedges and rushes become more palatable to them so it’s harder to graze them there and sustain habitat recovery.” Grazing plans in key riparian pastures emphasize short-duration grazing, limited to April through early June, when livestock prefer grass over shrubs and other riparian plants.

Another stream on the preserve, Camp Creek, provides habitat for spawning summer steelhead, prompting TNC to take extensive restoration actions. An assessment of Camp Creek on the preserve in 2002 found that failing stock pond dams in the upper reaches of the stream were causing erosion and degradation of the stream channel. In 2010, TNC embarked on a restoration project, removing 11 earthen dams, re-contouring the stream channel, and planting 10,000 native shrubs and trees, including Saskatoon serviceberry, water birch, quaking aspen, chokecherry, and willow, in fenced-off exclosures that prohibited entry by deer, elk, and livestock. Four years later, the average overall survivorship of shrubs and aspen planted along Camp Creek was 44 percent.

Removing dams on Camp Creek allowed the stream to regain a more natural flow. But nearly 200 more dams remain on the preserve, built in the 1950s by ranchers to pond water for livestock. Fields said they present an unanswered question for TNC. “We haven’t figured out yet how you would approach removing all the dams and stock ponds on a working landscape. The location and source of water directly controls where the elk and cows go. There is intensive use close to that water, and having these stock ponds means that we can control those zones of impact.”

“If we take out the stock ponds, what is the alternative watering system? They really are crucial to being able to keep these lands available to livestock,” he said. “And we want to maintain a working landscape.”

Cows are not the only grazers on Zumwalt prairie. Elk numbers have swelled in the past two decades on the north

Zumwalt prairie across all ownerships. There are eight times more elk now than in the 1950s, with more than 3,000 head at any given time, even winter. This situation means that the information soon to come out of the Meadow Creek study will be closely followed by TNC managers. “There is mutual interest in this topic of effects of ungulate herbivory because the elk at the Zumwalt are far more abundant than in years past, owing to a variety of reasons, and are having huge impacts on riparian and other shrubs and woody plants,” said Mary Rowland, Forest Service wildlife biologist.

Concerned about browsing pressure, TNC and other landowners have taken actions to try to control the elk herd, such as opening the preserve to elk hunting and trying to move the herd away from heavily used areas. “For a couple of years, we did try hazing the elk, mostly on foot or with four-wheelers to try to move them off private land onto national forest land,” said Fields. “We aren’t doing this anymore. It was never that effective. The elk would just kind of make a big circle around and come back to the place they wanted to be.”

Elk have a notable impact on shrubs on the Zumwalt. Across all the grazed pastures on the preserve, TNC’s monitoring shows that the vast majority of browsing that suppresses shrub development comes from elk and deer. “We do see a high level of elk use on shrubs,” said Fields. “Less on grasses and sedges. Elk have a different kind of impact than cows. Even with big herds, elk don’t hang out in the riparian areas. They like to get higher up where they can see what’s coming.”

With so many interactions to manage between stream health, cows, elk, water use, and maintaining plant biodiversity, there is no simple grazing prescription that has been responsible for the continued productivity of the grassland prairie at Zumwalt. Therefore, TNC continually adapts grazing tools and tactics based on knowledge gained through monitoring and research.

“We’re never entirely satisfied with what we’ve got,” said Fields. ❧



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Success Will Be Nontraditional

For Liza Jane McAlister and her grown children, respect for tradition is as much a part of her livelihood as conservation. “The things we do are old-fashioned. We keep those old skills alive. We don’t use ATVs or four-wheelers.”

Cultural ties to tradition in the arid West are inextricably linked to the continuation of ranching as a way of life. But respect for tradition does not have to mean adhering to practices that no longer work. McAlister and her family may continue to engage in team roping on horseback, but they are also open to new management approaches and building partnerships to further their commitment to running an ecologically sustainable livestock operation.

In the 1980s, PNW research created a stir by proposing a new way of thinking about stream restoration that includes entire stream systems and the importance of woody debris. Once again, willingness to embrace new ideas if they serve a broader goal will be a critical element for success in restoring riparian ecosystems. Along with trying new approaches, emerging research, such as the Meadow Creek study and

Grant’s research on artificial beaver dams, will also be helpful in guiding our understanding of what sustainability looks like and what is feasible.



Adele Nash

“There’s no place I’d rather live,” says Nash of his home at 6 Ranch in northeast Oregon. He and his family value tradition and sustainable ranching practices.



Rhonda Mazza

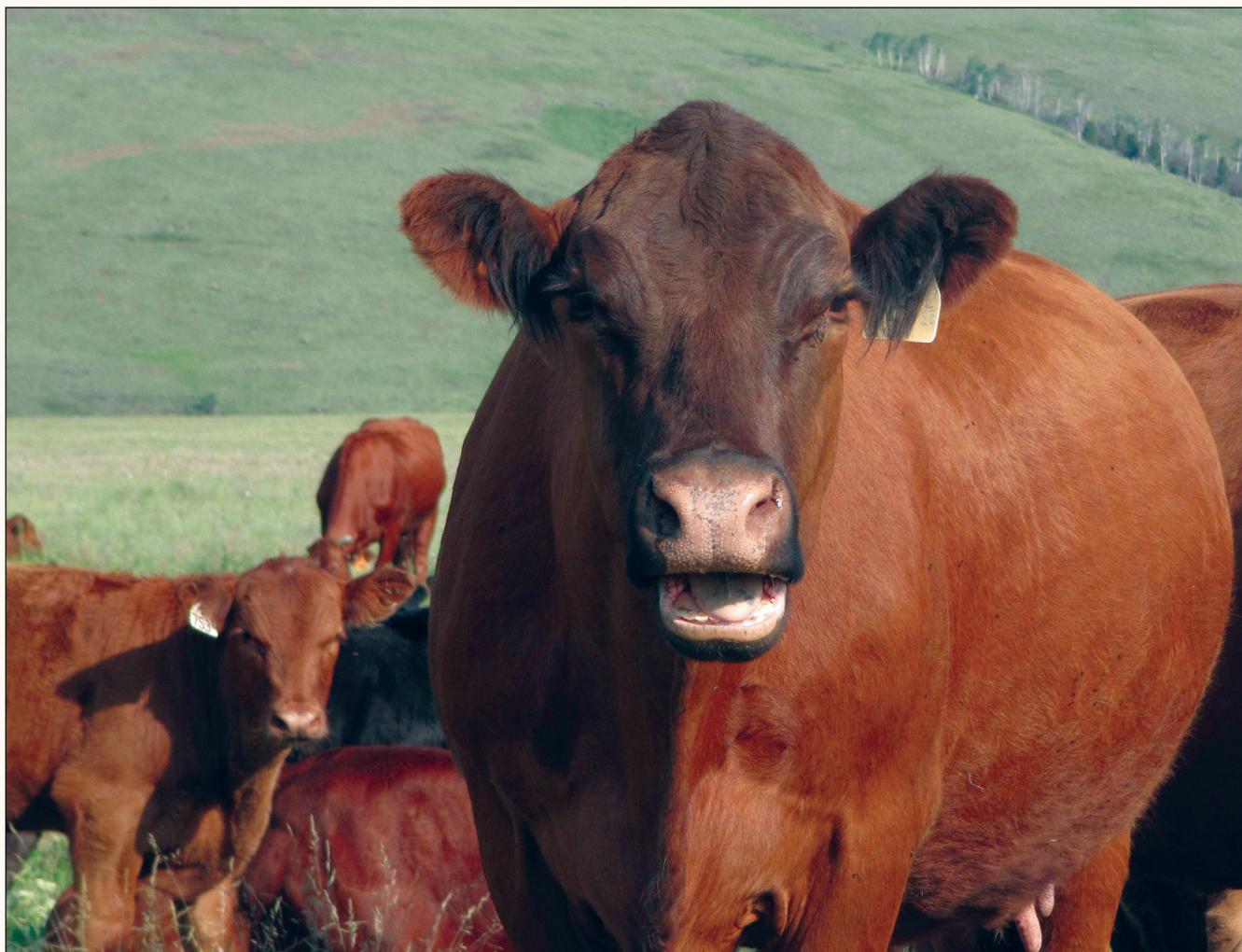
A beaver splash dam at Meadow Creek. Successful restoration of stream habitats will likely take various forms, and involve creativity and collaboration.

“There are still huge questions surrounding management of public lands in regard to grazing,” said Jeff Oveson of the Grande Ronde Model Watershed. “The work being done on Starkey is fascinating. They are actually looking at how do we deal with damage. This is critical. My biggest hope to get out of the Meadow Creek study: we’ll know how to manage domestic ungulates so we can successfully restore streams.”

Gordon Grant echoes the need to try new ideas. “To make progress, you need to be an experimentalist. And it’s hard to do that when everyone has staked out different camps,” he said. “In terms of commitment to restoration, ranchers are all over the place, but I am astonished at the upper end of that spectrum. They are very savvy and they are trying to do it right. I have been transformed a bit by this work.”

The complexity of riparian ecosystems is matched by the complexity of human communities and politics. The technical challenges of creek and habitat restoration sometimes pale in comparison to the difficulties in forging agreements among the strong and differing interests of the parties involved. That’s why willingness to partner is also critical. The West is a patchwork of private, tribal, and public lands. The most effective way for restoration efforts to gain traction is to work across jurisdictional boundaries. The Grande Ronde Model Watershed, which uses the motto “Rivers Uniting Neighbors,” has proven that locally based efforts can be used to enhance coordination and implementation of existing local, state, and federal programs to restore a regional watershed area.

“I’m a foolish optimist,” said Oveson. “I think we all have to remain foolishly optimistic.” 🌱



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There is no one-size-fits all approach to sustainable grazing. PNW research is exploring how different types of grazing affect riparian restoration for fish habitat.

Science Update

U.S. Department of Agriculture
Pacific Northwest Research Station
1220 SW Third Avenue, Suite 1400
P.O. Box 3890
Portland, OR 97208-3890

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The complexity of riparian ecosystems is matched by the complexities of human communities that rely on rivers for clean water, livelihoods, and recreation. Stream restoration in dry western landscapes provides benefits far beyond the streambank. But achieving effective restoration will likely include experimentation, cooperation among different landowners, and a strong basis in science. The Pacific Northwest Research Station has long been a source of influential research on stream restoration, and continues that legacy with current studies that touch on novel techniques, social implications of keeping working landscapes viable, and unusually diverse multidisciplinary approaches.

For More Information

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Contacts

- Mike Wisdom**, research wildlife biologist, U.S. Forest Service,
Pacific Northwest Research Station, mwisdom@fs.fed.us
- Gordon Grant**, research hydrologist, U.S. Forest Service,
Pacific Northwest Research Station, ggrant@fs.fed.us

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