



# RIPPLES

in the

# GRANDE RONDE

SPRING 2003

RIVERS UNITING NEIGHBORS

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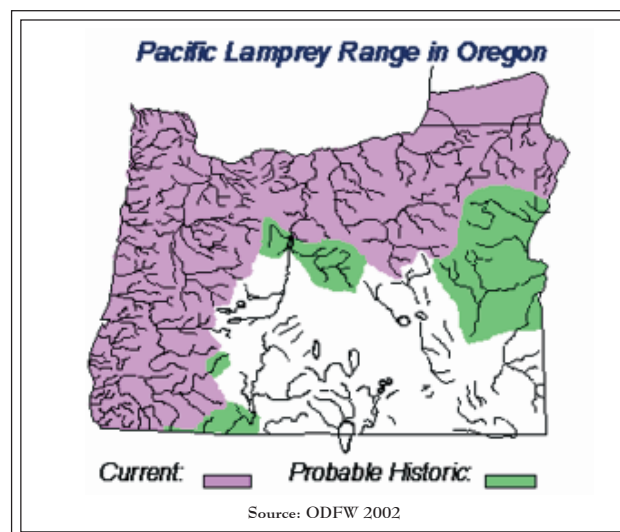
## Investigating an Overlooked Fish: the Pacific Lamprey

By Kristin Knight, GRMWP

Migrating Pacific salmon and steelhead have gained much attention in recent years, as we recognize their amazing migratory path as well as their threatened status in northwest ecosystems. Yet another migratory fish in our waters is also struggling to survive: the Pacific lamprey (*Lampetra tridentata*). Although the long, slippery lamprey may lack the majestic grace of the salmon, this often overlooked fish is an ecologically and culturally vital species that we cannot afford to ignore.

### What is a Lamprey?

The Pacific lamprey is one of eight to twelve (some species are elusive and it is still unknown if they live in Oregon) species of lampreys that occupy waters in Oregon and other parts of the western coastline. Lampreys as a whole can be either solely freshwater residents or anadromous, fish that hatch and grow in streams, migrate to the ocean, and return to freshwater to reproduce. Several misconceptions exist about the lamprey: many people believe the lamprey to be an eel, when it is actually a fish that evolved in prehistoric times. One of the first vertebrates to develop, the lamprey has no true bones, paired fins or a jaw. Another myth is that all lampreys are pest animals. While this is true in the Great Lakes region, where the invasive sea lamprey has become a persistent nuisance, the lampreys in our area have evolved in local ecosystems and are part of the natural food web.



### How do Pacific Lampreys Live?

The Pacific lamprey occupies waters from Baja California to the Bering Sea in Alaska and Asia. In Oregon, they dwell in coastal streams as well as in inland waters, including the Columbia and Lower Snake Basins. Each lamprey starts out as a tiny egg buried in gravel in upper stream reaches. After several weeks of incubation, the larvae hatch and travel shortly until they find a suitable silty area. There the larvae burrow and remain for an amazing four to six years, moving only occasionally downstream. Blind and mouthless, the larvae survive by filtering out microscopic plants and animals with their mucus. Then, by cues still uncovered by scientists, the larvae metamorphose in two months time into an adult, forming defined fins and a rasp-like mouth, and begin their journey to the ocean.

Once the fish reach the open seas, they grow up to two feet and spend two to three years surviving as parasites on marine mammals and a variety of fish such as hake, walleye, salmon and steelhead. The lamprey may feed on its host's blood to survive, but typically the two exist in relative equilibrium. Lampreys may even act as a buffer to salmon populations. The young adult lampreys traveling out to the ocean are an alternative food source for preying gulls and large fish who might instead feed on smolts (young salmon migrating to the ocean); lampreys heading upstream are also preyed on by marine mammals, offsetting even more salmon losses.

After its time in the ocean, the Pacific lamprey begins to travel upstream to spawn. Scientists have yet to determine if lamprey have an intrinsic homing sense like salmon do. One suggestion has been that lampreys might follow the scent of larvae. Beginning the trip typically in the fall, the fish spend the winter in streams, and begin to spawn in spring. There, a male and female work together, removing rocks and creating a nest filled with 98,000-238,400 eggs that are then covered in sand and gravel. After completing their work, lampreys die within 3 - 36 days, providing a food source for other animals such as sturgeon and returning vital nutrients to the stream system as they decompose.

### Cultural Importance

Just as the lamprey has coevolved with salmon, marine mammals and other animals, it also evolved with both coastal and inland Native American populations, becoming an important food source and a cultural



*A local Umatilla tribal member shows a Pacific lamprey harvest.*

icon for tribes. The lamprey, like many other animals, holds a position of respect in the spiritual world of Native Americans. In addition, lampreys were used as both a medicinal and food source. Local Columbia River plateau tribes fished for lamprey at free-flowing falls or rapids, typically at night when the fish are most active. After netting, jigging (catching fish with

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# Wallowa Co. Community Planning Process Moves Forward

By Nils Christoffersen, Wallowa Resources & Meg Mitchell, USFS

Seeking alternatives to “gridlock”, “analysis paralysis” and “charter forests” for the management of public lands, Wallowa County initiated an innovative collaborative watershed planning and management process in January 2001. Upper Joseph Creek Watershed was selected as the first area to develop and test this approach. The watershed assessment with management recommendations is nearing completion. A draft report will be available for peer review and public comment in April. The report will be revised and finalized in May. The Wallowa County Natural Resource Advisory Committee and Wallowa Resources are facilitating the effort.

Placed-based collaboration prior to the USFS analysis and decision-making processes required under the National Environmental Policy Act (NEPA) should reduce the conflict over public land management. Wallowa County’s Community Planning Process is designed to generate agreement about the most important places for restoration and land stewardship, and the most appropriate management actions for the next 5 to 7 years. In addition, the USFS and Wallowa County are exploring opportunities in implementation and monitoring that involves citizens in the management of their public lands by using a variety of contracting methods and agreements.

Over 70 citizens and personnel from various agencies and the Nez Perce Tribe have offered their ideas and expertise for the watershed assessment. The community sponsored process started out by establishing Stewardship Principles and forming four sub-groups to assess the condition of range, forest, recreation & roads and aquatic systems across the entire watershed. These four groups completed their preliminary assessments this winter. On March 11<sup>th</sup> and 12<sup>th</sup>, the various groups met to discuss, combine and integrate their recommendations. The recommendations focus on improving the health of terrestrial and aquatic systems. Possible activities to improve the watershed included:

- Reductions in open roads,
- Road maintenance and replacement of culverts for fish passage,
- Increasing hardwoods in riparian corridors,
- Promotion of late and old growth structure in forests,
- Understory thinning for forest health, wildlife habitat and fuel reduction,
- Prescribed burning,
- Protection of wildlife travelways and key areas,
- Noxious weed prevention and treatment, and
- Several types of range and grassland improvements.

These activities were specifically located within the watershed by the groups.

A strong theme of the effort is to blend the needs of the landscape and watershed health with the needs and health of the community. Already, there have been some benefits to the local economy from data

collection efforts and assessments. After the assessment is finalized, the ideas and recommendations for the National Forest lands will be studied by the Forest Service on a more site specific basis through the NEPA and public involvement process. Specific work in the watershed can then be done as early as this summer. Some of the additional information that will be needed and work on the ground can be contracted out, multiplying the involvement and benefits.

Those persons interested in a draft of the assessment should contact Erin Melville at Wallowa Resources (541-426-8053).

## Editor’s Note

Welcome to the fifth issue of the *Ripples* newsletter published by the Grande Ronde Model Watershed Program. We at *Ripples* strive to highlight local restoration efforts, volunteer opportunities, and educational tips and activities in Wallowa and Union Counties. We want to bring you an informative and engaging newsletter. Feel free to contact us if you have any questions, concerns or suggestions.

– Kristin Knight, *Ripples* Editor

Send your Letters to the Editor to:  
Grande Ronde Model Watershed Program  
10901 Island Avenue  
La Grande, OR 97850  
Phone: (541) 962 – 6590  
Fax: (541) 962 – 6593  
[ripple@eou.edu](mailto:ripple@eou.edu)

E-mail us if you would like to be included on our electronic mailing list!

Electronic versions of this and all past newsletters are available at: <http://www.fs.fed.us/pnw/modelwatershed>

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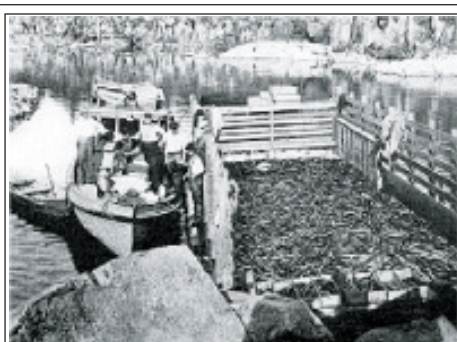
a long pole and hook), or catching the lampreys by hand, the fatty and nutritious fish were dried or roasted for food. The oil from lampreys was also used as a healing substance or as hair grease. Similar to other animals, lampreys played not one but many roles in the lives of Native Americans. The loss of the lamprey also means the loss of yet another fundamental cultural aspect of tribal life.

### Dangers to Current Populations

Beginning in the early 1990s, tribal scientists and the Oregon Department of Fish and Wildlife began to notice a decline in lamprey populations. The Pacific lamprey and other lamprey species face many of the same problems as northwest salmon and steelhead. Lampreys are weak swimmers to begin with and as they head upstream to spawn, the fish are impeded by dams and other obstructions. Without paired fins, the lamprey cannot jump and must use its sucker mouth to cling to the sides of the fish ladder while regaining energy to swim further upstream. Other obstacles, such as culverts with a substantial lip, can also hinder their upstream travel. Artificial surfaces often lack a rough, rocky surface for the lampreys to grasp, making it even more difficult to continue upstream. And young adult lamprey traveling out to the ocean often are stopped by fish

screens or go directly through turbines; scientists have yet to determine what the exact mortality rates are from this fate. In addition to instream barriers, the sedentary larvae move down into low reach streams,

where most agriculture and urban development has also taken place, affecting water quality. Larvae, as filter-feeders, take in whatever the stream sends their way; this makes them potentially sensitive to pollutants in the water.



*A historic harvest of Pacific lamprey on the Columbia River*

The Columbia and Snake River Basins’ lamprey populations are believed to be in severe decline. Fish counts at dams give some of the only historic data we have on lamprey. In 1969, approximately 8,000 Pacific

lampreys were counted at Lower Monumental Dam on the Snake River; in past years, fewer than 200 lampreys have passed through this same dam. Within the Grande Ronde Basin, lampreys have been spotted occasionally throughout the years. Yet in recent



*An adult Pacific lamprey*

studies, only a few larvae have been found in the lowest reaches of the Grande Ronde River, suggesting that fewer lampreys are returning to the area.

The Pacific lamprey was recognized by the State of Oregon as a sensitive species in 1993 and was given further protected status in 1996. In January 2003, eleven conservation organizations submitted a petition to the US Fish and Wildlife Service for federal Endangered Species Act protection for the Pacific lamprey and three other native lamprey species. Although current restoration efforts to increase salmon and steelhead populations most likely benefit lampreys as well, more research needs to be dedicated exclusively to lamprey in order to develop detailed and specific recovery plans. Data on lamprey populations are sporadic and often only incidental to salmon studies, ignoring the nuances of lamprey, such as their nocturnal nature.

For more information on the lamprey, see some of the following links. The Confederated Tribes of the Umatilla Reservation has been performing much of the needed research on this topic; see articles such as “The Ecological and Cultural Importance of a Species at Risk of Extinction, Pacific Lamprey” in the July 2002 issue of *Fisheries* journal:

<http://www.fisheries.org/fisheries/F0207/fish0207.shtml>.

Or check out the Oregon Department of Fish and Wildlife’s report on the many species of lamprey in Oregon and current management challenges: <http://www.dfw.state.or.us/ODFWhtml/InfoCntrFish/lamprey.pdf>



# Habitat Restoration Continues in the Grande Ronde Basin

*By Lyle Kuchenbecker, GRMWP*

The Grande Ronde Model Watershed Program (GRMWP) and its partners have been working with private landowners to implement habitat restoration projects in the Grande Ronde Basin for nearly 11 years. The GRMWP was designated by the Northwest Power Planning Council (NPPC) in 1992 to be a “model” for community-based restoration and coordinated resource management. The goal of the GRMWP is to work with landowners, voluntarily, to accomplish habitat improvement while helping them meet their resource management objectives. Through the voluntary efforts, the program hopes to minimize or avoid future regulatory actions by state or federal regulatory agencies. The GRMWP receives Bonneville Power Administration (BPA) Fish and Wildlife mitigation funds to accomplish restoration work. Private landowners and a variety of agencies have completed well over 350 projects in the Grande Ronde Basin using BPA funds obtained through the GRMWP.

### *Project Criteria*

Eligibility for BPA funding is quite simple and all landowners are welcome to apply. A project must benefit fish and wildlife, or their habitat, in some manner. BPA funds the highest priority projects that address problems associated with salmon and steelhead habitat. Other funding sources have different criteria. The most direct fish benefits are often achieved through projects in stream or riparian areas (the zone immediately adjacent to a water body dominated by wetland plants). However, upland conditions often affect stream habitat and water quality (sediment sources) so projects in the uplands may also qualify for BPA funds. Projects that facilitate fish passage at in-channel barriers, improve riparian or upland vegetative conditions, enhance stream flow and reduce sediment input to streams can be very beneficial to fish and their habitat.

### *Fish Passage*

Uninhibited access throughout a stream system for adult and juvenile steelhead and salmon is very important in the stream environment. Adults need free access to upstream spawning areas. Juvenile fish often require the ability to move throughout the stream to access cooler headwater habitats during warm water periods. Inadequate or improperly installed culverts with steep gradients or excessive drop (>6") at their outlets can impede both adult and juvenile movement. Irrigation diversions can also block passage, especially during lower flow periods.

### *Riparian Vegetation*

The condition of riparian zones, primarily the riparian vegetation,

may be the single most important variable affecting water quality and fish habitat. Riparian vegetation improvement can provide some of the most direct benefits to fish and water quality by providing stream shade, improving streambank stability and creating a future source of large wood for the stream channel. Projects that increase vegetation density or improve plant species composition can be beneficial. Examples of projects that indirectly improve riparian vegetation and water quality are livestock fencing, off-stream livestock water development, streamside road removal or improvement, and riparian planting.

### *Stream Flow*

Low summer stream flows can be a serious limiting factor to the health of the aquatic environment. Abnormally low stream flow translates to higher stream temperatures simply because less water volume warms faster. Low stream flows are often the result of low late summer flow combined with irrigation water withdrawals.

Late season stream flow can be increased, over time, by a variety of projects aimed at improving the health of riparian and upland vegetation. The objective is to store more of the available water, from snow melt and spring rains, in the soil profile. Restoring riparian vegetation and improving overall riparian health promotes increased water storage in the zone adjacent to the stream for release to the stream later in the summer. Increased streamside vegetation also reduces evaporation loss. Improving upland vegetative cover and plant species composition also promotes increased water storage, only on a much larger area away from the stream.

Implementing projects that improve irrigation efficiency can also result in higher late season stream flows, in addition to improving crop production. Irrigation ditch lining and conversion from flood to sprinkle irrigation are examples of projects that reduce water use and can improve stream flow.

### *Sediment*

Excessive or continuous sediment input to streams is a problem particularly for fish spawning. It often is also a problem for fish migration (steelhead and salmon) and rearing. Eroding streambanks, draw bottom roads, and excessive erosion from agricultural, forest or rangelands can be sources of elevated sediment input to streams. Projects that stabilize

streambanks, relocate or improve streamside roads, or reduce soil erosion levels from either riparian areas or uplands are primary ways to reduce sediment input to streams.

### *How do Landowners Begin a Restoration Project*

The first step toward habitat improvement is to verify that there is a problem. Riparian areas lacking vegetation, actively eroding streambanks, silt covered streambeds, muddy discharges into streams, visible soil erosion, sparse upland vegetation and improperly installed culverts are “red flag” conditions that may require improvement.

The next step is to identify the cause of the problem and how it could be improved. Often there are several alternatives to remedy the condition. Project managers should consider feasibility, cost and the likelihood of success at a site. Obviously a vital consideration is how the proposed remedies fit in with the landowner’s management objectives and use of the land.

The third step is to prepare a proposal to acquire funds. These can be submitted to the GRMWP or another funding entity to acquire cost share to do the project. In addition to BPA funds through the GRMWP, there are other agencies that provide funding for habitat work. These include the Oregon Watershed Enhancement Board (OWEB), Natural Resource Conservation Service (NRCS), Oregon Department of Agriculture (ODA), and Oregon Department of Fish and Wildlife (ODFW).

Project eligibility criteria, as well as the application format and process, vary with the funding entity or program. BPA funds are geared more toward fish and wildlife habitat. OWEB funds are more general and are geared toward overall watershed health. ODA funds emphasize assistance for agricultural operations. The NRCS has several programs specific to different resource areas. BPA and OWEB funds require cost share by the landowner. In-kind landowner labor can be included as cost share. Funding from one source can often be leveraged to acquire funds from another source. Each one of these organizations is ready and willing to provide technical help with each of these steps.

The GRMWP has one funding cycle per year. In 2003 proposals will be due in July for work to be done in 2004. There will be approximately \$550,000 available through BPA for the Grande Ronde Basin. OWEB has three funding cycles each year for habitat projects with due dates of February 1, June 1 and October 1. OWEB has approximately \$4 million, statewide, for each of the funding cycles. The process is competitive throughout the state so there is no set amount for each river basin. The NRCS and other agency programs may have continuous signup periods or due dates depending on the program.

### *Contacts for Private Landowners*

These agencies and individuals are the initial contacts for landowners requesting assistance or information regarding habitat restoration projects or participation in resource management programs.

Entity	Contact Person	Phone
GRMWP	Lyle Kuchenbecker	541-962-6590
Union Soil & Water Conservation District	Sarah Hendrickson	541-963-0724
Wallowa Soil & Water Conservation District	Cynthia Warnock	541-426-4520
Natural Resources Conservation Service	Mike Burton (La Grande)	541-963-4231
	Tom Smith (Enterprise)	541-426-4520
Wallowa Resources (Wallowa County)	Nils Christoffersen	541-426-8053
Oregon Department of Agriculture	Ken Diebel	541-963-4610
Oregon Department of Forestry	Rick Wagner	541-963-3168
Oregon Department of Fish and Wildlife	Vance McGowan	541-963-2138
Oregon Watershed Enhancement Board	Karen Leiendecker	541-963-9076



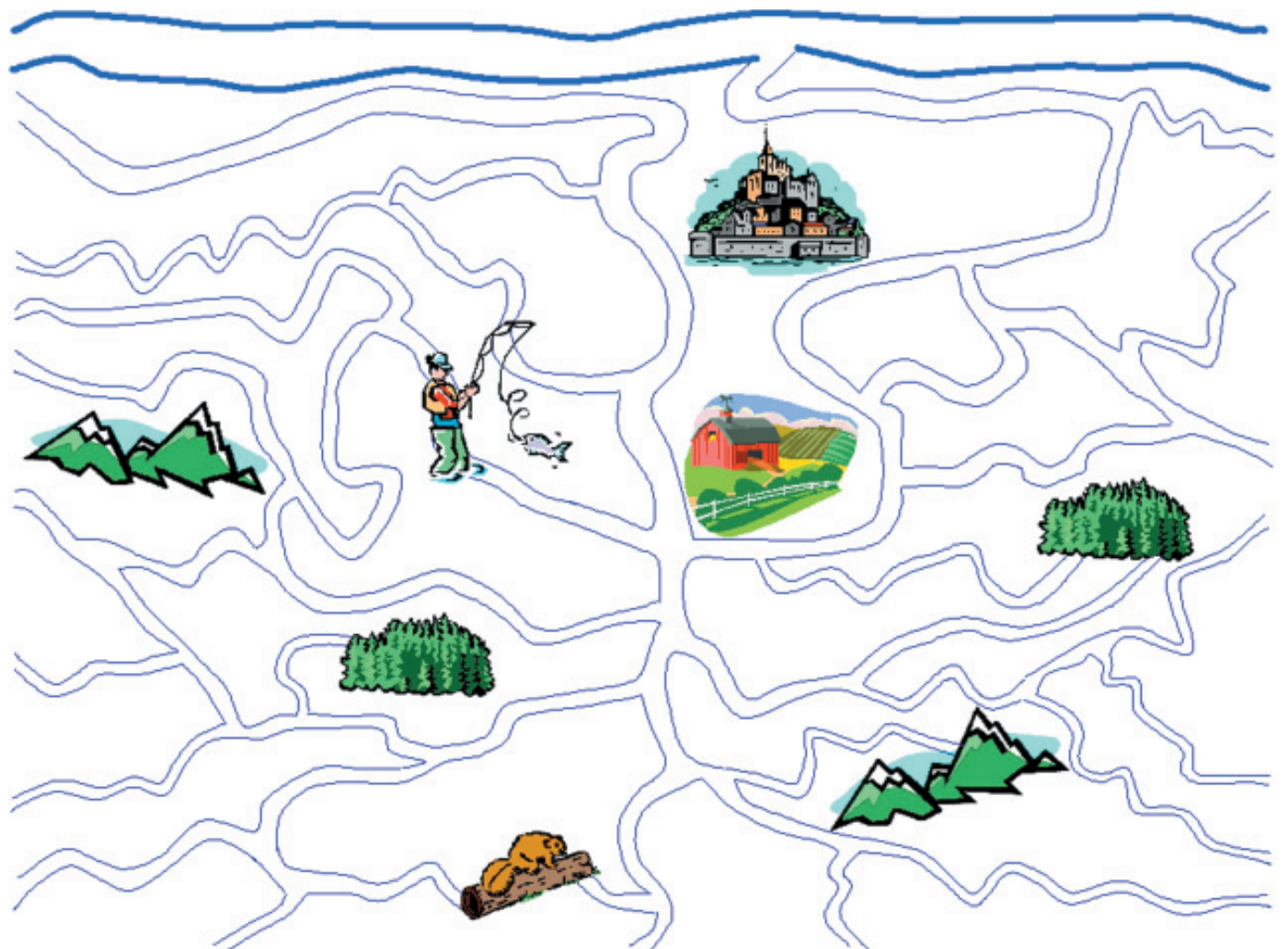


Charcoal artwork by Lauren Beck, a local 13-year old from Imbler.

CAN YOU MAKE YOURWAY THROUGH THE WATERSHED? START AT THE MOUNTAINSTREAM AND TRY TO REACH THE RIVER, JUST AS A MIGRATING FISH WOULD.

START

ALREADY FINISHED? TRY STARTING FROM ANOTHER STREAM!





# Oregon Department of Forestry Works to Reduce Fire Risk on Private Lands

*By Jamie Chandler, ODF*

After the severe 2000 fire season in Montana and Idaho, and the subsequent loss of homes and property, the federal government enacted the National Fire Plan. Through this plan financial and technical assistance is available to homeowners and landowners located in designated “Communities at Risk.” In Union County, the Oregon Department of Forestry (ODF) is currently working with landowners in the Mt. Emily, Cove, Morgan Lake, Ruckle Road, and Pumpkin Ridge areas to create defensible space around individual homes as well as working with landowners to treat entire parcels, promoting the “Community Fuel Break” idea.

The reasons that individuals should do fuels reduction work on their property are numerous. Many people incorrectly assume that just because a fire is approaching their home, that a fire engine will be parked in their driveway ready to save the home from the fire. This is incorrect. In these instances, firefighters will likely select homes they can most safely and effectively protect. Even with adequate resources,

some wildfires may be so intense that there may be little that firefighters can do to prevent a house or other structure from burning. The key is to reduce the intensity of the fire as it nears the home. This is accomplished by reducing the amounts of flammable vegetation surrounding the home. Consequently, the most important person in protecting a home from wildfire is not the firefighter, but the homeowner.

The fall of 2001 was the beginning of the National Fire Plan work in Union County. Since then, nearly 90 homes have been assessed. Nearly two thirds of those homes have completed or are currently working on reducing the fuels buildup around them. In addition, nearly 1,000 additional acres have been assessed by ODF.

One of the many projects that the National Fire Plan funded was a fuels reduction project at the Blue Mountain 4-H Center on End Road near Summerville. The main objective of the project was to create a defensible space area around the buildings at the center. These included the main lodge, as well as the 10 cabins. There were many partners for this project. Boise, Union County Emergency Services, Oregon Youth Authority, The Blue Mountain 4-H Center Board of Directors, and ODF all worked together to make this project a success.



*Another site on private land below Mt. Emily where preventative thinning was completed.*



*Before and after pictures of a site below Mt. Emily recently thinned by ODF.*



This year, the United States Forest Service (USFS) is making plans to begin fuels reduction on their lands that border the private lands on Mt. Emily in a cooperative effort between the Forest Service and the ODF. A series of public meetings were held in February to give the public a chance to learn about the project and also to make comments. More meetings are scheduled for the future, as the Forest Service nears the final decision on the project. Two National Forests are involved in this effort. The Wallowa-Whitman National Forest, La Grande Ranger District, as well as the Umatilla National Forest, Walla Walla Ranger District, have lands in the proposed project area.

The Vale District of the Bureau of Land Management (BLM) has a plan for fuels reduction work near the Cove area in a cooperative effort with ODF. This project is still in the National Environmental Policy Act compliance stage. The proposed project area is on BLM lands southeast of Cove

So far, the focus for La Grande ODF has been the Mt. Emily area. This year the Mt. Emily area has expanded to include the Ruckle Road area, as well as the Pumpkin Ridge area. The interest in these areas was substantial, and

many landowners are already conducting fuels reduction on their properties in these areas.

Plans for the upcoming spring include a community meeting hosted by the ODF, BLM, and USFS for the forest/urban interface landowners in the Cove area. This meeting will focus on ways to make forest homes and property more survivable in the event of wildfire, as well as the cost-share assistance programs that are offered. More information on this event will be available soon.

The first step in obtaining assistance from the Oregon Department of Forestry is to call (541) 963-3168 and make an appointment to have your home and/or property assessed for fire danger. Elements of the program to create defensible space include:

- 1) Technical expertise to advise you of necessary work that significantly increases the chance of structure survival, should a catastrophic wildfire occur.
- 2) Financial cost-share incentives to assist you in accomplishing the necessary work.

If you have any questions concerning National Fire Plan or fuels reduction work, please call Jamie Chandler at the Oregon Department of Forestry.



# Wallowa Resources Offers New *Nature & Heritage Explorations* Program

By Anette Christoffersen, Wallowa Resources

Wallowa Resources, in collaboration with the USFS, the Nature Conservancy, Grande Ronde Model Watershed and others have created a Heritage Program in Wallowa County. The program seeks to build public appreciation for and understanding of the area's cultural and natural history. The program also responds to requests from outfitters and guides for assistance to extend their seasons and diversify their products. Two local outfitters, Cooley River Expeditions and Millar Pack Station, initiated these 2003 trips. It is Wallowa Resources intention to expand the program and work with any interested Wallowa County outfitters and guides for the 2004 season.

Results of extensive market research have shown that cultural tourism is a fast growing segment in Oregon and the rest of the nation. As Bruce Beckham, Former National Tourism Association president says "Baby boomers want to come home from vacation with more than a tan. They're more into life seeing than into sightseeing. That's where the cultural and heritage tourism fits in. For the first time, you don't really have to be a major destination. You just have to have a unique history that you've preserved, and be willing to share a participatory experience with people."



*A recent rafting outing.*

The program is promoting trips where local outfitters will take the participants river rafting, horseback riding and hiking while experiencing the existing nature and heritage of this unique area. They will learn about birds on the Nature Conservancy's Zumwalt Prairie, plants and wildlife in the Eagle Cap Wilderness, history of the Nez Perce Indians and study botany and watershed dynamics. In addition to native plants and wildflowers, participants may see bald eagles, deer, elk, bighorn sheep and bear. They get to spend the evenings in a traditional western camp, with discussions around the campfire livened up by cowboy poetry and music.

During the summer of 2003, these three unique trips are being offered:

## **Raptors above the Zumwalt Prairie**

Last year, biologists on the Nature Conservancy's Zumwalt Prairie Preserve located 23 raptor nests. For Ferruginous, Swainson's, and Red-Tailed hawks, there is no more densely utilized breeding area in the nation. To build on their ongoing survey of these raptors, the Nature Conservancy enlists help on a weekend during the feeding or fledgling periods of the breeding season. Camping and riding horseback across the preserve the participants will help the Conservancy begin to track annual recruitment of the hawks and receive an excellent overview of the geology, botany and terrestrial wildlife - to say nothing of the overview into the dramatic canyons of the Imnaha and Snake rivers.

*Dates: Friday May 30-Sunday June 1, 2003 and Friday June 6-Sunday June 8, 2003*

## **Wildflowers on the Grande Ronde River**

Climbing aboard the raft in the tiny town of Minam, participants will leisurely float the river and get an introduction to river skills and

local plant life. Joining the group, Botanist Jerry Hustafa and hydrologist Coby Menton will facilitate identification of wildflowers and noxious weeds as well as a discussion of watershed dynamics. This will stimulate an exploration of the natural resource management issues facing Oregon's canyon country. The participants will get their hands dirty in river restoration, - pulling weeds and performing basic beach cleanup to help move the river's vegetation back into balance. The group will pull out of the river at Wildcat and settle in to vans for the drive back to Minam, with a broader understanding of the local

environment.

*Dates: Thursday June 12-Sunday June 15, 2003*

## **Wilderness Cabin Restoration**

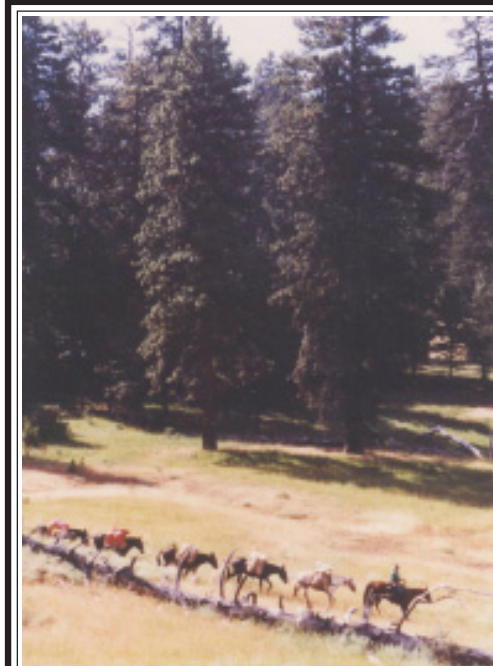
A relic of an era when bands of sheep grazed in the remote Wallowa's and the Forest Service posted a ranger and often his family on this windy ridge. The Standley Guard Station cabin is suffering a variety of structural ills. Within the boundaries of the Eagle Cap Wilderness, no motorized tools are allowed. Logs will be skidded to the site with a draft team, walls will be jacked, and chinking and roofing will be prepared using historic methods. Enjoy a comfortable base camp near the cabin to lend a hand to this process

while exploring the nearby fire ecology, geology and human use history.

The participants will meet their outfitters at Bear Wallow trailhead to pack onto mules and prepare for a gentle four-mile ride into the cabin. Work along with the contractors, Kurt and John Skovlin, who lived and worked at the cabin in the 1940's, learning historic restoration techniques. The participants will have the opportunity to ride down to the Minam River where

Red's Horse Ranch and the Minam Lodge evidence a history of recreation. But before paying fly fisherman or hunters arrived here, the Nez Perce and later horse thieves, loggers, and shepherds favored this warm valley.

*Dates: Wednesday Sept. 8-Sunday Sept. 12, 2003*



*Horseback riders traveling through Wallowa County countryside.*

Wallowa Resources is working on developing additional trips for the 2003 and 2004 season and invites everyone to check out their web site at [www.wallowaresources.org](http://www.wallowaresources.org) (go to the page for Nature & Heritage Explorations) or call Brinda Stanley at Wallowa Resources, (541) 426.8053 for more information or to reserve a trip.

## STREAM TEMP. CONTINUED FROM PAGE 8

stream temperature standard, set using current scientific research, is employed to protect beneficial uses and therefore aquatic species sensitive to temperature. A 64°F stream temperature standard criterion was established to protect general salmon and trout use during the warm summer months, applying where those uses occur and/or are designated beneficial uses for the stream segment. At 64°F, temperatures are less than optimal but not yet at levels where growth ceases or direct mortality occurs. While this criterion does not eliminate any risk to fish whatsoever, it keeps the risk to an acceptable minimal level. This has led to a number of initiatives to reduce abnormally high stream temperatures. The next article in this series will discuss those efforts and policies.

A majority of the information in this article can be found on the Oregon Department of Environmental Quality (DEQ) website at [www.deq.state.or.us](http://www.deq.state.or.us). In particular a paper written by Matthew Boyd and Debra Sturdevant of Oregon DEQ titled "The Scientific Basis for Oregon's Stream Temperature Standard: Common questions and Straight Answers" provided much of the scientific information in this article. The references in this article represent a variety of disciplines and geographic regions, including northeast Oregon. The paper can be downloaded at [www.deq.state.or.us/wq/standards/WQStdTemp.htm](http://www.deq.state.or.us/wq/standards/WQStdTemp.htm). Clicking on the water quality link on the DEQ homepage will lead to a wealth of water quality information for the State of Oregon.



# Urban Update: Introducing Native Plants into Your Yard

As spring moves into the Grande Ronde Basin, many people think of preparing their yard for the upcoming growing season. This is the perfect opportunity to rethink some of the plants that we grow: why not try using more native plants? Shrubs, plants and trees that are indigenous to our region provide many benefits, both to you and our surrounding ecosystem, and are just as stunning as nonnative species.

Native plants have evolved to coexist with the climate and surrounding wildlife. Many are tolerant of drought-like conditions and require less water, fertilizer, pesticide and general maintenance, because they have adapted to our semi-arid climate. Birds, butterflies and other creatures are more in tune with the seasonal readiness of native plants, and will utilize your yard more as habitat. Native plants also pose no threat to the surroundings, unlike nonnative weeds that can spread and overtake vital habitat. By using native plants, we can save ourselves time and money as well as reduce both the amounts of water we use and the chemicals we put into our soil and waterways.

Incorporating native plants in a yard can happen gradually or drastically, depending on how much time and money the owner has to commit. If you prefer to start with small changes, focus on one section of your

yard. For example, nonnative ivy could be replaced with Creeping Oregon Grape as a ground cover. Native plants are most effective when placed together, providing both a noticeable habitat and foodsource for wildlife. Reducing the amount of lawn is one option. Turf grass requires major fertilization and water to keep it a desirable green. A corner of native plants is an alternative to lawn as well as a refreshing addition to your backyard.

If you are ready to commit to a complete overhaul of your yard, develop a plan by detailing your yard to scale and experimenting with new changes on paper. Effective planning will make all the difference. While in the planning process, ask around at local nurseries to see what natives are available. Native plants can require more research and work in the beginning, but once they are established, they ultimately are more self-sustaining.

Several resources offer starting points for native plant beginners. The Oregon Department of Fish and Wildlife (ODFW) publishes a guide to using natives called *Naturescaping: a Place for Wildlife*. Contact them (541/963-2138) for more information. Washington State University Cooperative Extension also offers a booklet called *Landscaping with Native Plants in the Inland Northwest* (go to <http://www.caheinfo.wsu.edu> to order). Check local bookstores for other publications. There are now many books focusing on native plants in the Pacific Northwest. Although some might not be specific to the Eastern Oregon climate, most at least include a section on drier climates.



*The native camas plant was once essential for tribal populations in the region.*

The Native Plant Society of Oregon (<http://www.npsso.org>) provides advice as well as fieldtrips throughout the state. There is also the William Cusack chapter here in northeast Oregon (541/775-2909). And don't forget to check with your local Oregon State Extension Master Gardner for any tips they have for converting your yard to a more native state.

## Teacher Tips and Liquid Links

As we become more aware of water quality issues and watershed health, there are also more and more educational resources that are becoming available for teachers and students. From hands-on field work to classroom lessons plans, these sites allow teachers to explore water education from every angle.

The following sites all offer general information on stream ecology and resources for teachers and students: <http://www.streamnet.org/pub-ed.html> and <http://www.streamkeeper.org/opportun/links.htm> This link, <http://www.yearofcleanwater.org>, celebrates the 30<sup>th</sup> anniversary of the Clean Water Act and has online pamphlets on water education for distribution. It also has links to other sites of interest.

This site (<http://www.usbr.gov/watershare/education.html>), hosted by the US Department of the Interior's Bureau of Reclamation, offers tips on water conservation and lesson plan ideas for teachers. The group America Rivers provides this webpage (<http://www.americanrivers.org/kids/>) with

information on the water cycle within rivers and activities to accompany this information.

Wetlands are another aspect of water education. Simple observations of wetlands throughout the seasons show changing wildlife and vegetation. Try such sites as <http://edtech.kennesaw.edu/web/wetlands.html>. This website has many links, from the basics of wetlands to curriculum ideas. The EPA also has an excellent site for wetlands education; go to <http://www.epa.gov/owow/wetlands/education>

If you are looking for a more active way to become involved in waterways, consider one of the programs that allow you to adopt a certain body of water. The Adopt-a-River program is run by the Oregon nonprofit group SOLV, which strives to maintain the livability of Oregon (<http://www.solv.org/volAdoptARiver.shtml>). Another program, Adopt-a-Watershed, allows a school or another community group to care for a section of their local watershed (<http://www.adopt-a-watershed.org>). The site also has many educational resources and links.

Or, if you have any useful and informational sites on water quality or natural resource education in general, make sure to pass them on to the *Ripples* staff for future publication.

### *Did you know???*

The Grande Ronde Model Watershed Program has three water quality models available for use:

- **Non-point Source Pollution/ Watershed Model**
- **Wetlands Model**
- **Hazardous Materials Model**

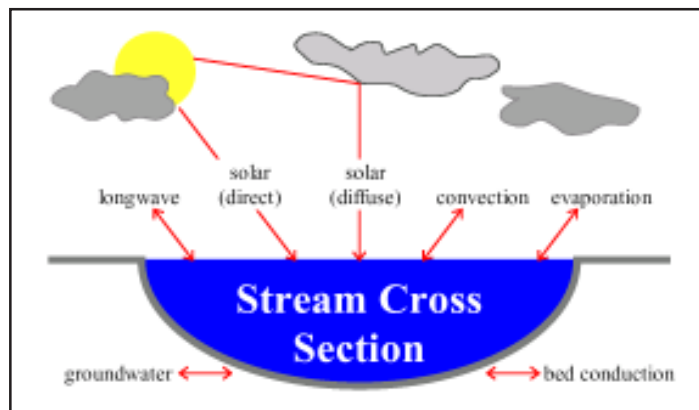
There are also riparian and ground-water elements to use on these models. Large and interactive, they are perfect for classroom demonstrations. The GRMWP would be happy to come to your classroom to present on water quality and pollution. Or check out a model to incorporate into your own classroom lesson plans.

Contact the GRMWP for more information at 541/962-6590 or [kknight@eou.edu](mailto:kknight@eou.edu)

# A Closer Look at Factors Affecting Stream Temperature

By Coby Menton, GRMWP

Stream temperature is a very important water quality parameter that influences resident and anadromous fish, as well as many other aquatic organisms essential to stream health. Many streams in the Grande Ronde Basin have documented elevated summer temperatures. Much of this is the result of land management activities, past and present. Forest and agricultural practices, mining, roads and urban development have all affected water quality in the Grande Ronde Basin to varying degrees. This article will explain the science behind water temperature and heat transfer and discuss the environmental variables affecting stream temperature.



## Temperature Science and Heat Transfer

There are six processes that allow heat energy exchange between a stream and its environment:

1. Solar energy (sunlight)
2. Longwave radiation (emission of stored heat energy)
3. Evaporation (cooling process)
4. Convection (Interaction between air and water temperature differences)
5. Bed conduction (soil/substrate temperature)
6. Groundwater interaction (springs)

When there is an addition of heat energy to the stream, the temperature will increase. The converse is also true. Simple relationship: add heat, the temperature rises; subtract heat, the temperature drops.

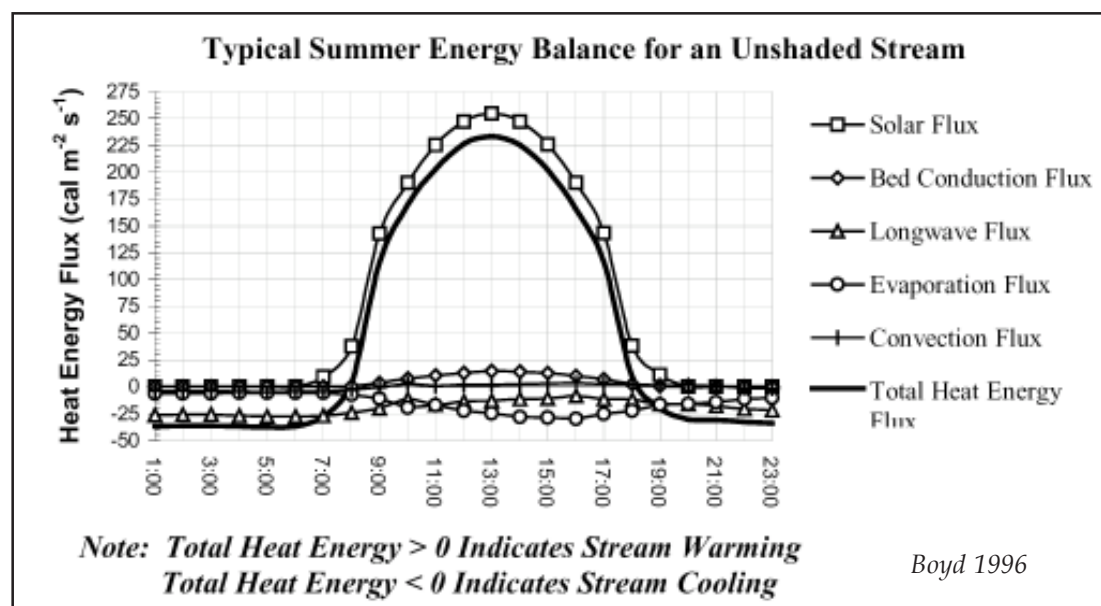
All of these processes with the exception of solar radiation can both impart and remove heat energy from the stream as illustrated in the above caption. Solar radiation is a one-way street that can only add heat energy to a stream. The following chart illustrates the heat

exchange process for a small, unshaded stream on a typical summer day.

The total heat energy change denoted by the solid black line in the chart shows how heat energy is gained and lost throughout a typical summer day for an unshaded stream. In this example from midnight to around 8:00 am the stream is releasing heat energy to its surrounding environment. From 8:00 am to 5:00 pm the stream is receiving heat energy from the surrounding environment with the most heat energy entering the stream around 1:00 pm. After 5:00 pm the stream resumes its release of heat energy. This chart describes what we observe and intuitively believe; streams heat during the day and cool at night. The exact timing of heat exchange in this example should not be taken as true for all streams but descriptive for small unshaded streams in general.

As described above, solar radiation can only input heat energy into the stream. Notice that the solar flux curve never drops into negative numbers on the heat energy flux scale. All of the other heat energy influence curves shown in the chart occupy the negative heat energy flux during the whole day or part of the day. The evaporation and longwave fluxes completely occupy the negative numbers and, in this example, act to cool the stream where convection and bed conduction act to both heat and cool the stream. In this article the term “flux” is used to describe the condition of continuously changing heat energy loads.

A final note to make about this chart is the amount of heat energy imparted to the stream due to the solar flux compared to the other influences. At 1:00 PM in the afternoon the solar flux adds more than 250 thermal units to the stream where the bed conduction flux adds about 15 thermal units, and convection adds less than 5 units. On the negative side of the thermal unit scale, evaporation takes out about 25 thermal units and the longwave flux takes out about 15 units. Add all of these positives and negatives together and the total heat energy flux (solid black line) curve is developed. Clearly, as illustrated by this example, the solar flux is the dominant contributor to stream warming.



## Environmental Variables

### Riparian Vegetation

Shade does not cool streams rather it reduces the amount of solar radiation that comes in contact with the stream surface. Because solar radiation is the most significant contributor to stream warming, shade producing riparian vegetation is very important to a stream's heat energy balance. When discussing shade along streams, vegetation height and width or density must be included in the discussion. For the height of the vegetation to be most effective it needs to be tall enough to block the sun when it is at its highest point. In Oregon, the highest the sun gets is roughly 70° overhead. The stream receives shade when the solar altitude (70°) is less than the vegetation shade angle (height of vegetation). Riparian vegetation width or density is the other consideration when judging the shade component. Increasing the chance of collision between incoming sunrays and riparian vegetation enhances shade. Wide riparian vegetation corridors and a dense riparian canopy will intercept more solar radiation and increase the quantity of shade offered to the stream.

### Channel Characteristics

Riparian vegetation provides structural integrity to river channels that maintains bank stability. Bank stability is important as unstable banks often lead to channels that are wide and shallow and have high width to depth ratios. Lower width to depth ratio is important because the narrower and deeper a channel is the less surface area there is exposed to solar radiation. A wide stream requires taller vegetation to provide adequate shading. Due to increased surface area and decreased shade duration, wide streams experience greater heat energy loads from radiant energy when compared to streams that have a smaller width.

### Flow

Stream flow magnitude is a very significant stream parameter leading to stream temperature change. As the flow rate decreases, the volume of water involved in the heat energy balance is reduced. However, the energy processes inherent to the stream environment remain relatively unchanged. The result is that during heating periods the stream water tends to accumulate more energy per unit volume. As flow volumes

increase daily temperature changes will decrease as seen when comparing low volume streams to high volume streams. Smaller volume streams have a greater fluctuation between their high and low temps during the summer months.

## Conclusion

Stream temperature is one of the most important factors affecting the aquatic environment. The

Boyd 1996

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