

Constant monitoring keeps check on water quality

Water quality on the Warm Springs Reservation is "excellent" and the Warm Springs Water and Soil Resources Department is working to keep it that way.

Collection of water resource data is important in maintaining the high quality of the water resource by providing background information for management decisions.

Thirty-five monitoring stations provide data on stream characteristics. Taken at various times of the year, the data enables the Water Department to keep tabs on the condition of streams.

Water quality testing has resulted in improvements on some reservation streams. For example, erosion control structures installed at Log Springs helped to reduce sediment load and improve water quality at the Warm Springs National Fish Hatchery. Gabions on Quartz Creek decreased sediment and increased vegetation.

Evaluation of streams are made from tests conducted at monitoring sites once a month.

Turbidity

Turbidity measures the particles of sediment in the water. By passing a light through the water, the opaqueness can be calculated.

pH

The acidity or alkalinity of the water is found by measuring the hydrogen-ion concentration and activity. The scale ranges from zero to 14. Reservation streams generally measure between 6.5 and 8.5.

Warm Springs watermaster Deepak Sehgal notes that the streams maintain a good pH level with one

exception. In the fall, the Deschutes River shows a high pH level resulting from runoff. Runoff from irrigated land carries with it high concentrations of fertilizers. Although the river eventually carries the deposited chemicals downstream, lakes are more severely affected. Algae increases and oxygen content decreases as is evidenced in Lake Billy Chinook.

Dissolved Oxygen

The amount of oxygen in the water can influence aquatic life. Tests indicate that streams "are basically in excellent quality" in regards to dissolved oxygen, says Sehgal. However, Reservation lakes have not been thoroughly monitored in the past. The Water and Soil Resources Department is developing a method for analyzing lakes.

Conductivity

The amount of electricity passing through water shows the amount of dissolved solids in water. Water does not conduct electricity unless there are particles in it. The conductivity test doesn't indicate what type of solids are contained in the water but it does indicate whether the amount is high or low.

Temperature

Temperature spot checks are made when other tests are executed. Thermographs which record temperatures continuously and which are located at some sites help provide temperature figures.

Temperature problems are occurring in some Reservation streams. These streams show temperatures that range too high in the summer and too low in the winter. These

extremes can take a toll on aquatic life. Fish, for example, have adapted to temperatures not exceeding 65 degrees Fahrenheit. Temperatures exceeding this can cause stress.

Sehgal mentions that good stream canopy cover over streams can produce beneficial effects on the temperature of streams.

Sediment analysis

Sediment analysis is done only after a major runoff has occurred. Water samples are taken and then analyzed in the Natural Resources offices. The amount of transported silt is measured.

In 1982, the Streamside Management Plan was instituted and has partially protected Reservation streams. Class I and Class II streams, requiring stream buffers of 100 feet and 60 feet respectively, have been shielded from human activity. Class III with only a 30-foot buffer strip have not received such protection. These streams, too, are important as they feed Class I and II streams. Sehgal hopes to establish more stringent protection on these smaller streams.

The Watershed Management Plan which takes into account cumulative effects of human activity in watersheds is also helping to protect water quality. The plan was developed after resource managers analyzed Beaver Creek Watershed to find that one activity may not be injurious to a watershed but as the number of activities increase, the effects rapidly increase. "We want to maintain a level of activity that nature can keep up with," says Sehgal. If activity is exceeded,

efforts to mitigate must take place, such as seeding, eliminating roads or stream enhancement.

Outside the forest, water quality is protected with constant monitoring and action steps if needed. The Kah-Nee-Ta lagoon system was recently overhauled after fecal coliform counts were found to be excessive in the Warm Springs River. A chlorination system and new plumbing alleviated the problem of untreated sewage entering the river. Monitoring continues in areas where human activity is high.

Spills from chemicals which might endanger aquatic life receive immediate response. Clean-up activities are required immediately and the Water and Soil Resources Department monitors the area until it is declared free of harmful chemicals which could enter the river system.

The Warm Springs Water and Soil Resources Department is the Reservation's "Waterwatch," and it is an important component in planning for the future. Department personnel are involved in development of the Integrated Resource Management Plan for the Reservation. The Department has a representative on the Environmental Code team and on the Water Negotiation team. It is involved in weather monitoring besides water quality monitoring and works closely with other resource offices to maintain the high quality of water which is essential to the future of the Reservation.



The quality of water on the Warm Springs Reservation is rated high.



Water technician Richard Craig samples water at Shitike Creek to determine its condition and to provide continuing data on this important resource.

Hundreds of species use Riparian zones

Floodplains are an important part of the riparian zone. All of the floodplain vegetation that shades or directly contributes material to a stream is considered part of the riparian zone. In fact, the frequency of flooding and the groundwater supply are the major factors that control the growth of floodplain trees. Stream channels rely on natural flooding patterns. Floodplains and backwaters act as small reservoirs to hold surplus runoff until peak floods are past. Floodplains also spread the impact of a flood over a larger area, while the vegetation helps collect debris. The composition of many communities depends on the water pattern (fast- or slow-moving), and flooding is critical in the exchange of nutrients and energy between the stream and the riparian area. Both wet and dry phases are necessary in this zone to complete the stream's nutrient cycle and food chain.

Because riparian ecosystems provide the essentials of habitat—food, water, and cover—they are crucial for a variety of wildlife. In general, the area within two hundred yards of a stream is most heavily used by wildlife. In western Oregon, of 414 known species of wildlife, 359 use riparian ecosystems extensively, and 29 species are tied exclusively to this area. While riparian zones cover less than one percent of the land in

eastern Oregon, 280 of 379 species use this zone extensively.

Riparian zones provide migration routes and corridors between habitats for many animals. The riparian zone provides cover, food and water during these movements. The woody plant communities in the riparian zone provide cover, roosting, nesting and feeding areas for birds, shelter and food for mammals, and increased humidity and shade (thermal cover) for all animals.

Birds are the most common and conspicuous forms of wildlife in the riparian ecosystem and it is an important breeding habitat for them. In some riparian research areas from 150 to 550 breeding pairs have been found per 100 acres. Bird density is just one indicator of the productivity of a riparian zone.

Mammals typical of the riparian zone include all sizes from small to large. Mammals, especially rodents, are parts of various food chains. Others, such as the beaver, may modify riparian communities.

Another indicator of riparian environmental quality are the amphibians and reptiles. Nearly all amphibians depend on aquatic habitats for reproduction and overwintering sites. Certain turtles, snakes and lizards also prefer riparian ecosystems.

Fish are also indicators of the

health and integrity of the watershed and riparian ecosystem. Large woody materials, like fallen trees and limbs, create pools and protective cover—necessary components of fish habitat. The debris also increases the diversity of invertebrates. These are a basic part of the food chain on which salmon and trout depend.

For humans, since the land along the streambanks and floodplains is often fairly flat, riparian areas are attractive locations for roads. Streams and their banks are also readily available sources of rock and gravel for building roads. Roadbuilding increases sedimentation which adversely affects aquatic life, especially fish. Runoff from roads may carry oil, antifreeze and other contaminants into the stream. The construction of a roadway also destroys valuable wildlife habitat. Traffic, a hazard in itself, may disturb or displace many wildlife species. Road construction probably has a greater and more long lasting impact on riparian zones than any other human activity.

Generally, areas near streams are highly productive forage sites. Cattle and other livestock use riparian areas heavily. As they concentrate near water, the soil is compacted and water percolation is reduced. As the vegetation is eaten or trampled, erosion in-

creases, the streambanks slough away and water quality is reduced.

Mining in and near streams has severe impacts on riparian ecosystems. Mining often increases sedimentation and disrupts spawning areas by moving large amounts of gravel, rock and soil. In addition, mining may introduce poisonous heavy metals into streams.

Logging may disrupt the riparian zone. Until recently, clearcuts commonly went to the stream's edge. In addition to removing the trees which shade the stream, the understory and groundcover were heavily damaged. These trees would also have been a future source of structure in the stream. This created erosion, and all of the problems caused by heavy sedimentation. Direct destruction of spawning grounds can occur by dragging logs through streams, building roads along the banks, and transporting logs down small rivers. Now strips of vegetation, called buffer zones, are left along streams. These provide shade, and logs which fall in the stream, reduce water velocity and prevent washouts. All of these practices affect water flow, bank erosion, siltation and temperature extremes.

Since areas along streams are cool, green, shady and beautiful, they are especially attractive for recreation.

Holistic Resource Management takes future into consideration

(Editor's Note: The following information is provided by Ross Racine of Tribal Range and Ag and Dave Smith, BIA range conservationist.)

Holistic Resource Management

What is Holistic Resource Management (HRM)? A practical method for managing land, human and financial resources to produce results that respond to environmental, social and economical, cultural and other important values.

How does it differ from other management approaches?

We can manage in wholes, the minimum whole includes the land, human and financial resources involved in any situation.

It is goal driven. We start by defining the quality of life sought by the people involved, in our case it is tribal members. Then, we envision what our landscape needs are to look like far into the future so our people and communities, wildlife, water, timber and agriculture will be healthy and productive. This differs significantly from the vaguely defined goals behind most management decisions throughout the United States.

Instead of acting to increase production, solve a problem, eradicate or preserve a species, we ask, "What quality of life can we expect? What can this place produce in order to support it? And what will this landscape have to become to sustain this production and quality of life indefinitely?"

A landscape goal example may include such statements as: "Clear cool running streams, that support fish life, which are bordered by a healthy riparian ecosystem. Wildlife are supported by balanced areas of high quality forage and protec-

tive thermal cover. Grazing occurs in a manner to sustain and enhance perennial plant communities without causing detriment to riparian areas, wildlife areas, cultural plant production or reforestation."

Our hope is that more and more tribal members will become involved in the goal setting process, so that our future management decisions and actions are truly moving in the direction that our people desire.

After you have set goals how do you begin?

We begin by assessing current reality. We have to know where we are with the land and the people before we plan how to get where we want to go.

We assess the current state of the land, not by gathering and comparing detailed measurements and statistics, but by observing what's happening on or near the soil surface. By learning how to read the land we can tell if our rainfall is penetrating the soil and becoming productive or being lost to evaporation runoff.

Reading the land requires us to use all of our power-of-observation skills (i.e. sight, touch, smell, etc.) This requires us to get out of our pick-up trucks, get down off the horse, onto our hands and knees to look into the land, not just at the land. Reading the land requires us to be "resource detectives". That is, to look at what is happening on the land, (the soil surface, existing plant and seedling growth, insect activities in the soil, etc.) and piece together the clues to determine the health of our land.

Through our observations we can tell if the earth's nutrients are cycling through plants and animals, or if they are trapped in old undecayed plant material. We can

tell how effectively we are utilizing the sun's energy by the amount and type of plants that grow on our land.

As more people on the reservation become involved in this process of goal setting and holistic management, we will need to become more skilled at working together. We need to ask ourselves how well we are communicating, and how trusting we are of one another. We need to ensure that our efforts are team efforts, and we need to encourage the creativity inherent in each team member.

So a team of people set comprehensive goals, you assess the current situation on the land and on the human interactions, what's next?

Once we've completed our assessment, we consider the actions we need to take in order to achieve our goals. Our assessment of where we are as a team may show us that we have a great deal of work to do in building communication and trust levels. That is why initially, our goals are only temporary. The people involved need to have enough knowledge of holistic management, plus sufficient trust in each other before they can freely express their desires or contribute their ideas. Developing trust and increasing knowledge becomes a continuous process.

Our assessment of the land will probably show that none of the processes mentioned are at optimum. Before we take any action toward our goals we test each action according to specific criteria: Is it justifiable in terms of its impact on the whole? Is it economically and environmentally sound? Is it ethical?

Those actions that pass the testing are then implemented according to a master plan devised by the

resource users. We develop a step-by-step procedure for creating this plan, which is revised annually.

In managing our tribal resources holistically, we will develop a specific planning procedure that will govern the day-to-day management of the land, crops, livestock, timber, water, fish and wildlife, cultural plants and other products mentioned in our goal. This "biological" planning helps us maximize production and profit while working toward the landscape description we've envisioned in our goal.

Recent articles within a major Oregon newspaper have depicted how poor public lands have become in Oregon and the west because of livestock grazing. Advocates for removing livestock from public lands say that only by total livestock exclusion can the land heal itself and be biologically sound. Yet, we know that through the use of Holistic Resource Management practices, the landscape description advocated by these individuals can be achieved with livestock.

Once you have created a holistic plan, how do you know you are moving toward your goal?

We monitor to stay on track. Because no plan devised by humans is perfect, and because natural events—rain or drought—or cultural events—market shifts—aren't always predictable, we're always prepared to modify our plans. Ideally, we want to make those modifications before events overtake us. So, before any plan is implemented, we determine what information will give us the earliest warning that we might be diverging from our goal.

To prevent livestock overgrazing, streamside damage, and the destruction of cultural sites and wildlife habitat, we would plan

livestock moves according to how fast or slow we've estimated the plants would grow.

To keep our biological planning on track, we will monitor the daily growth rate of plants. We've also developed a specific monitoring procedure that quickly tells us what is happening on the soil surface. Any changes adverse to plan will always show up there first. When performed annually, this monitoring gives us all the information we need to ensure that we are progressing toward our landscape goal.

Our master plan is monitored monthly (more often in emergencies). We look for consumption or costs of input (fuel, fee, labor, etc.) that run adverse to plan, then determine why and immediately do something about it.

As people become more familiar with Holistic Resource Management, and as our communication becomes more open and honest, we can begin to set more permanent goals.

How would our community here at Warm Springs benefit from Holistic Resource Management?

Our community's health and welfare ultimately depends on the health and welfare of our natural resources. If we truly want to achieve a high level of self sufficiency, we must learn how to manage our natural resources for long-term health and productivity. We must also learn to work more closely together so that actions taken by either land managers or our leaders support and contribute to fulfilling the needs and values of our people.

Holistic Resource Management is a very basic concept. Fundamentally it teaches us that every individual on this reservation is an important part of the whole of our reservation. It teaches us that we

must have a clear vision of what we want to create for our families, our community, our economy and our environment.

It teaches us how to be keen observers of our land and people. And finally, it teaches us how plan toward that future we have agreed is important to us. We have only a limited amount of land, water, timber and wildlife.

The decisions we make about the management of those resources will affect us long into the future. If we are concerned about that future, we need to express those concerns, and become involved in creating the goals and plans for tomorrow.

How do you plan to introduce people to Holistic Resource Management on the reservation?

We have been working with the Center for Holistic Resource Management to design a continuing education program for the reservation. Examples of the skills the participants will work on are: communication, team building, goal setting, decision making and financial and biological planning and monitoring. The classes will last one-and-a-half days and will meet once a month for about eleven months. We will spend time both indoors and out in the field.

Who can attend?

Anyone interested in the future of our reservation is encouraged to attend. People do not need to have a background in natural resource management. We also hope that students will consider attending.

Where can people get more information?

Please contact the Range and Ag office at 553-2421. Also note there is no individual cost, only time commitment.