Upper Owyhee Watershed Assessment

X. Riparian

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Contents

The Oregon governor's strategic initiative for ensuring sustainable water resources for Oregon's future, Headwaters 2 Ocean, considers all water resources from the hilltops to the Pacific Ocean. The completion of the assessment of the upper Owyhee subbasin is consistent with the governor's initiative. The upper Owyhee subbasin contains the headwaters of the Owyhee River and two of its principal tributaries, the South Fork Owyhee River and the Little Owyhee River.

X. Riparian

A. What is a riparian zone?

A riparian zone is an area that supports vegetation requiring more moisture than the adjacent uplands. In arid and semiarid regions, riparian areas exist in the narrow strip of land along the borders of creeks, rivers, or other bodies of water where surface water influences the surrounding vegetation.[7,18,27,39]

Riparian ecosystems exist between the uplands where there is seldom standing water and the stream, river, or lake where free flowing or standing water is common. They may also exist on intermittent streams where plants have access to the water table. Riparian zones have widely varied hydrology, soil, and vegetation types. There are different interactions between the topography, soil, geology, elevation, hydrology, vegetative cover, evapotranspiration, animal use, and alterations by people. Consequently riparian zones vary considerably and may be difficult to delineate.[7,18,32,38,39]

Because of the proximity of riparian zones to water, the plant species are considerably different from those of the drier surrounding areas. Riparian zones are generally more productive in terms of plant biomass and are a critical source of diversity

in rangelands. They create well-defined habitat zones but make up a minor proportion of the overall area in arid-land watersheds. Riparian plant communities are disproportionately important in the upper Owyhee subbasin, but there is "probably less known about them"[7] than other plant communities. Riparian zones represent an extremely significant component of the overall landscape.[7,18,27,32,33] "Wetlands and riparian zones generally cover only a small percentage of the landscape in arid regions, but in the Owyhee Uplands ecoregion the percentage is even smaller than that of the Great Basin. Again, the reason for this is the lack of large playa lakes or internal basins . . . that are often comprised almost solely of alkaline wetlands."[26]

Photo 10.1. A riparian section of vegetation along an intermittent stream coming out of the Independence Mountains.

B. Why are riparian areas important?

The vegetation in riparian areas affects the hydrology of the ecosystem. During high stream flows, water can be stored in the adjacent soil and in ponds, lessening the destructive effects of downstream flooding. The stored water can be a source of groundwater recharge, helping maintain stream flows later into the season.[18,38] Where willows grow along the stream banks, passing water fills the soil profile to the sides of the stream. The water is released slowly back into the stream, helping stabilize the flow in the channel.

Stream banks with well developed riparian vegetation are less prone to erosion. The roots of riparian vegetation stabilize the soil. Water slowed by riparian vegetation has less power to erode the stream bank. Also, slower water will carry less sediment and sediments from floodwaters may be deposited in riparian vegetation.[18]

Riparian vegetation filters water both before and after it reaches a stream, removing sediments and nutrients, providing clean water and building up the soil.[18,32]

Abundant forage, water, and wildlife habitat attract a greater amount of use of riparian zones by wildlife than proportional for their small land area. In addition to providing habitat for fish and wildlife, riparian areas in the upper Owyhee subbasin provide scenic beauty. They are disproportionately important for many other uses. They provide opportunities for hunters, fishermen, and birdwatchers. Recreationists concentrate their use in and along such areas. Riparian zones tend to have relatively gentle topography which makes them attractive locations for roads or housing. Frequently, stream margins are highly productive forage sites. Cattle concentrate in

Photo 10.2. The green of the riparian area along Tent Creek contrasts with the grey-green vegetation of the hillside

riparian areas not only to drink, but because of the shade, relatively gentle topography and vegetation that remains green after upland forage dries.[18,32,33,39,40]

1. Importance to wildlife

The riparian zone is the most important wildlife habitat type in managed rangelands and is used more than any other type of habitat. Of course aquatic species such as fish and amphibians use the water in these zones, but many other semi-aquatic animals, such as waterfowl and muskrats, are found only in riparian zones. Riparian areas are critical to the life cycles of many other wildlife species.[18,33]

Stream side vegetation is also extremely important in the food chain. The organic detritus from the vegetation is a food source for aquatic organisms. The vegetation is an important habitat for terrestrial insects that form part of the diet of many bird and fish species.[18]

In the upper Owyhee subbasin most non-bird wildlife species are directly dependent on riparian zones or use these areas more than other habitats. Wildlife habitat consists of food, cover, and water. Riparian areas offer water. Many riparian zones also provide an unusually large part of forage for big game as well as livestock.[32,33]

Because riparian zones are a transitional zone, there are often several changes in vegetation between the wetland and the land with no subsurface water. This provides a number of different microhabitats so that there is a large diversity of breeding and forage sites. Some of these microhabitats tend to be more humid with more shade. Some wildlife species including deer and elk are attracted by the microclimate produced by the vegetation.[18,33,38]

Every riparian zone has different site attributes, but riparian zones are important to wildlife for many reasons.

Photo 10.3. Changing types of vegetation in a riparian zone along a small creek in the upper Owyhee subbasin.

C. Vegetation

Riparian plant communities are complex and highly variable in structure, number of species, species composition, productivity, and size. Plant species adapted to the upland may be unable to grow near river channels because they can't tolerate continuously wet soil and similarly species adapted to the river environment usually will not tolerate drier, less frequently flooded sites. Many riparian species must survive complete inundation some years or soil that may dry out completely other years, and sometimes both within the same year. [7,13,32,39]

Stream conditions vary considerably over the course of a year and from year to year. Vegetation in riparian zones is even more variable than streams. There is not only a greater availability of water to plants, but frequently there are deeper soils. This leads to a great diversity of plant species. Riparian communities include many combinations of grasses, forbs, shrubs, and even trees. The density of the vegetation varies considerably.[7,9,13,32,33]

Riparian and wetland natural communities in the Owyhee Uplands are generally assumed to be similar to those present in the Great Basin except that there are few large, high elevation aspen groves and the extent of alkaline wetland habitats is limited.[26]

Photo 10.4. Coyote willows reflected in Hurry Back Creek in the upper Owyhee subbasin.

Willows are the common woody riparian species in the upper Owyhee subbasin. The coyote willow is an upright, deciduous shrub which is generally about 12 feet tall and about 15 feet wide. It grows along creek bottoms, both on the shoreline and sometimes in the water. Coyote willow forms dense thickets of pure, even-aged shrubs. Short-lived, they are threatened by both fire and drought. They can not survive long if the water table becomes too low.[6,5]

Sedges and rushes are common herbaceous riparian species.

These species are well adapted to riparian areas. Numerous growing points and stems allow water to flow over and through a plant. A high density of roots or underground stems (rhizomes) which form a dense mat protect the stream bank from erosion and contribute to steam bank stability during high water.[3,32,38]

The dramatic contrasts between the plant communities of the riparian zone and the general surrounding upland range vegetation adds to the visual appeal.

D. Proper functioning

A properly functioning riparian area will have adequate vegetation to filter sediment, to stabilize the stream bank, to protect the stream bank from erosion, to store and release water, and to recharge the aquifer. A properly functioning riparian area along a perennial stream would result in some of the following characteristics: late summer stream flows, high forage production, good water quality, and vegetation and roots that protect and stabilize the banks. It could provide shade, cooler water, good fish habitat, and a high diversity of wildlife habitats.[2,15,27] In order to determine whether a riparian area is functioning properly, it is necessary to examine site-specific characteristics. The potential vegetation for that spot is based on the interaction of geology, soil, and the physical processes and attributes of the stream.[4,25]

E. Historical use

Some of the earliest use of riparian areas in the upper Owyhee subbasin by Euro-Americans was for wintering cattle. Since the cattle remained close to the existing water supplies, they would completely consume the nearby forage, mainly winterfat, and Indian ricegrass. In the dry upper Owyhee basin, the wetter riparian areas were the first areas farmed, mostly for hay. In 1901 north of Winnemucca, David Griffiths listed alkali bullrush, cattail tine, and spike rush which grow in freshwater marshes and seasonal lakes as important hay species. The floodplains adjacent to creeks were the first areas used to plant hay and other domestic plants.[10,41]

Photo 10.5. The Wiley Ranch on the Owyhee River. Counterclockwise from upper left: the site looking towards the river, the old farm house, the Owyhee River, abundant riparian vegetation.

To provide enough water and irrigable land to grow hay to feed their herd through the winter, ranchers acquired tracts of private property. During the summer the herds drank from streams and springs on the public lands where they were grazing, but established water rights were crucial for the success of a ranch.[31,11] Since the riparian areas were the most productive lands, they were used for farming and ranching. Irrigated lands are usually located within the historic floodplains of stream and river corridors which expanded the riparian areas.[11] Meadows were enlarged on private land by diverting water by gravity flow along the lateral edges of the floodplains and using surface

irrigation.[41] Today it is difficult to distinguish natural wetlands and pastures from the areas that have been continually expanded through human intervention.

In the Nevada section of the upper Owyhee subbasin, the agricultural lands have been irrigated from the streams running out of the Independence and Bull Run mountains. The channelization and spread of irrigation water has largely transformed the native riparian areas in the few agricultural areas (see Agriculture section of this assessment).

In the upper Owyhee subbasin in Idaho, only 4% of the area is riparian. The historical acquisition of waterways and associated riparian areas in this section of the subbasin is evidenced by 18% of the stream miles being on private land although only 6.5% of the land is privately held. Some of the old wet meadow riparian areas have been converted to irrigated pasture or hay fields.[12,11] "All privately owned stream segments assessed during the 2003 [Idaho TMDL] Riparian Assessment . . . still have active riparian livestock grazing."[12]

F. Fragility

Since riparian zones occupy relatively small areas, they should be considered vulnerable to severe alteration. The distinctive vegetative community is important to the ecology of the whole region. There are many activities that can impact riparian areas.[2,33,39]

Indiscriminate recreational use can seriously disturb or destroy habitat in riparian zones. In riparian zones, recreational use per unit area is many times that for other vegetative communities. Campgrounds in riparian zones increase the opportunity for viewing wildlife but decrease the effectiveness of the riparian zone as wildlife habitat due to the "disturbance by humans, trampling, soil erosion, compaction, and loss of vegetation."[2,33]

The increased presence of vehicles and people on existing roads along riparian zones affects how wildlife use the area. New road construction in riparian zones would alter the size of the zone and of the vegetative community. It may impact water quality and alter the microclimate, destroying wildlife habitat. Road maintenance can disturb riparian areas.[2,33]

The U.S. Forest Service has identified the major factors affecting riparian areas in the Owyhee River basin as livestock grazing, floods, and dams.[39] There are some areas of the upper Owyhee subbasin where livestock grazing continues to affect riparian areas. Continuous or intensive grazing of riparian zones may alter vegetation with a reduction in plant productivity, a change in the plant community, or the encroachment of dry land vegetation. The change may result in a lack of adequate vegetation for bank protection and sediment filtering. The resulting erosion may lower the streambed and change the adjacent water table. Cattle in an eroded streambed may create further bank erosion with "hoof shear".[2,7,33,38]

Management actions such as fire suppression may also alter riparian areas.[38]

G. Riparian areas in the upper Owyhee subbasin

Photo 10.6 Hoof shear beginning to affect a stream bank.

Since riparian areas only exist where there is some connection to the water table, these will primarily be along perennial streams (see Figure 5.13 in the hydrology component of this assessment). Some intermittent streams may also have riparian areas. However, the majority of the non-perennial stream reaches in the upper Owyhee subbasin have not been evaluated as to whether they are ephemeral or intermittent.

Sagebrush dies when flooded. Sagebrush does not tolerate saturated soil, and if the soil stays saturated for two weeks, the sagebrush dies. Spreading water across sagebrush land for two weeks is a well known method of sagebrush control, since the root systems die from lack of aeration.[24] Stream channels that have well developed sagebrush growing directly in the bottom of the wash are not connected to the water table and are ephemeral and will not support riparian vegetation. However, sagebrush seedlings can germinate and begin growing where they can't survive subsequent flooding.

1. Landsat imagery

Using Landsat data, maps have been developed showing the probable plant associations in the upper Owyhee subbasin. Sensors aboard the Landsat satellites measure both visible and infrared wavelengths coming from small sections of the earth. The resolution of the pictures generated from these measurements is about 30 meters (98 feet) by 30 meters.[34] Details smaller than 30m by 30m will not be apparent. The Gap Analysis Program is designed to map vegetation using the Landsat spectral bands. The upper Owyhee subbasin lies within two of the completed projects: the Northwest Regional Gap project and the Southwest Regional Gap Analysis projects completed in 2004 and 2007. In the rangeland section of this assessment on Figure 7.1, plant associations mapped by the Northwest Regional Gap project and the Southwest Regional Gap project, it is possible to locate the course of many of the perennial streams and rivers in the upper Owyhee subbasin by the light green coloration indicating *intermountain basins semi-desert grassland* plant associations (Figure 7.2). "These grasslands occur in lowland and upland areas and may occupy swales, playas, mesa tops, plateau parks, alluvial flats, and plains, but sites are typically xeric [dry]."[22] A similar, but slightly more olive, green denotes mesic [with a well-balanced supply of moisture] meadows in the mountainous area.

The blue-green adjacent to the drier *intermountain basins semi-desert grassland* plant associations is the *Great Basin foothill and lower montane riparian woodland and shrubland* plant association which also exists along streams in the mountains*. The plant association designated by a slightly darker blue green is called *Columbia Basin riparian woodland and shrubland*. Other riparian and wetland plant associations in the upper Owyhee subbasin are less widely spread. Streams draining into the basin from South Mountain and a number of the intermittent streams draining into the Little Owyhee River from the east side of Capitol Peak have *Rocky Mountain lower-montane riparian woodland and shrubland, Rocky Mountain subalpine-montane riparian shrubland* or *Rocky Mountain subalpine-montane riparian woodland* plant associations along their banks, indicated by the turquoise areas.[19,22,35,36,20] Descriptions of these riparian plant associations are found in Appendix J.

There are also plant associations of wetlands or seasonal wetlands identified by Landsat analysis in the subbasin. These include *Columbia Plateau silver sagebrush seasonally flooded shrub-steppe*, *North American arid west emergent marsh*, *Rocky Mountain subalpine-montane mesic meadow*, *Rocky Mountain subalpine mesic meadow*, and *Rocky Mountain alpine-montane wet meadow* (Appendix J).[19,22,35,36,20]

2. 45 Ranch

The Gap analysis project provides a broad description of the probable vegetation of an area. A more detailed classification system has been adopted by the Environmental Protection Agency and the US Geological Survey (USGS) and focuses on existing vegetation actually growing at a site. The lowest level in this classification system, the National Vegetation Classification System, is delineated by the association of two or more species and called a community.[37,Rangeland component]

The only extensive survey of riparian plant communities in the upper Owyhee subbasin was conducted by the Nature Conservancy on the 45 Ranch and the associated BLM allotment. The Nature Conservancy's survey showed riparian communities existed along the floodplains of the South Fork Owyhee River and the Little Owyhee River, in the spring systems of the canyons, and in intermittent lakes and creeks. In addition to the riparian communities in and along the perennial and intermittent streams, the terrace communities were also assessed. Although the reports of the inventory and assessment are specific to a particular location, to a certain extent the results summarized below can serve as an indication of the types of riparian vegetation which might be found in other areas of the plateau lands of the upper Owyhee subbasin. The South Fork Owyhee River may be considered representative of deeply incised perennial streams, the Little Owyhee River of intermittent streams, and the intermittent lakes and pools of similar pools throughout the plateau region.

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* Although montane means inhabiting mountain areas, the area specifically referred to as *montane* “is the highland area located below the subalpine zone. Montane regions generally have cooler temperatures and often have higher rainfall than the adjacent lowland regions, and are frequently home to distinct communities of plants and animals.”[16]

The assessment identified 275 riparian species (Appendix E) and 21 riparian and wetland plant communities (Table 10.1).[17] Plant communities are named by the dominant specie found within them and a forward slash (/) separates this from a specie in a different tree, shrub, or plant group.[21]

Table 10.1. Riparian and terrace plant communities identified on the 45 allotment.[17]

Common name	Scientific name	Principal location
Woodlands		
Western juniper/California oatgrass	*Juniperus occidentalis/Danthonia californica*	Intermittent creek
Tall Shrub		
Sandbar willow*/Barren	*Salix exigua/*Barren	South Fork
Sandbar willow*/Mesic graminoid	*Salix exigua/*Mesic graminoid	South Fork
Low Shrub		
Silver sagebrush/Dry graminoid	*Artemisia cana/*Dry graminoid	Little Owyhee, intermittent creek
Silver sagebrush/Mat muhly	*Artemisia cana/Muhlenbergia richardsonis*	Intermittent lake
Owyhee sagebrush shrubland comm.	*Artemisia papposa* shrubland comm.	Intermittent creek
Graminoid		
Nebraska sedge	*Carex nebrascensis*	Intermittent creek
California oatgrass	*Danthonia californica*	Intermittent creek
Creeping spike-rush - vernal pool	*Eleocharis palustris* (vernal pool)	Intermittent lake
Creeping spike-rush - palustrine	*Eleocharis palustris* (palustrine)	Little Owyhee
Wandering spike-rush	*Eleocharis rostellata*	South Fork, intermittent creek
Baltic rush	*Juncus balticus*	Little Owyhee, intermittent creek
Common reed	*Phragmites australis*	South Fork, intermittent lake
Threesquare bulrush	*Scirpus americanus*	South Fork
Sharp bulrush	*Scirpus pungens*	South Fork
Forb		
Prairie sage	*Artemisia ludoviciana*	Little Owyhee, intermittent lake
Cut-leaved water-parsnip	*Berula erecta*	Intermittent creek
Davis peppergrass vernal pool	*Lepidium davisii* vernal pool community	Intermittent lake
Transition zone communities		
Smooth scouring rush	*Equisetum laevigatum*	
Smooth brome	*Bromus inermis*	
Non-riparian river terrace communities		
Basin big sagebrush/basin wildrye	*Artemisia tridentata* ssp. *tridentata/Elymus cinereus*	South Fork terrace
Greasewood/Sandberg bluegrass	*Sarcobatus vermiculatus/Poa secunda*	South Fork terrace
Basin big sagebrush/needle-and -thread grass	*Artemisia tridentata* ssp. *tridentata*/*Stipa comata*	South Fork terrace
Wyoming big sagebrush/Thurber's needlegrass	*Artemisia tridentata* ssp. *wyomingensis/Stipa thurberiana*	South Fork terrace

* Sandbar willow is also commonly called Coyote willow

a. South Fork Owyhee River

The plant communities occurring in the floodplain of the South Fork Owyhee River were not diverse and were very different from those on the adjacent stream terraces. The principal communities were identified: Sharp bulrush (*Scirpus pungens*) which tolerates prolonged flooding but has poor palatability for big game and livestock; Common reed (*Phragmites australis*), a tall perennial stand which floods annually; and Sandbar or Coyote willow (*Salix exigua*) communities containing the only woody species with significant cover in the floodplain.[17]

Photo 10.7. The Owyhee River on the 45 Ranch.

The assessment concludes that the "riparian vegetation of the South Fork floodway [sic] is represented by communities in high ecological condition. The sharp bulrush community, especially, armors most of the river banks along the South Fork. The maintenance and condition of these communities is more affected by the larger fluvial (river) processes of the watershed than by local livestock grazing."[17] "Most of the South Fork's flow originates in the mountains of Nevada, where snow accumulates in the winter. This snow accumulation zone constitutes a small percentage of the South Fork basin, however, with most of it being arid lowlands of the plains. There is virtually no snowpack on the plains and streams tend to be intermittent and ephemeral, largely flowing during winter and spring and in summer only during storms. This makes for a very flashy hydrologic regime where the river rises rapidly and dramatically in response to spring snow melt patterns and episodic storm events, quickly returning to near base flow."[17]

Between the floodplain communities and the terrace communities there is a narrow transition zone on the river banks with species which may withstand at least some flooding. The Smooth scouring rush (*Equisetum laevigatum*) and Smooth brome (*Bromus inermis*) appear to stabilize steep banks during floods. [17]

Considered by the assessment to be important and unique, the "river terrace communities never flood and are marginally riparian, but their distribution is restricted to valley bottoms along the South Fork and Little Owyhee rivers because of alluvial substrates and higher water table than surrounding uplands."[17] "On the 45 Allotment nearly all terraces support the basin big sagebrush/basin wildrye plant community."[17]

The Basin big sagebrush/basin wildrye (*Artemisia tridentata* ssp. *tridentata/Elymus cinereus*) plant community, with few exceptions, occupies all of the terraces along the South Fork Owyhee River. Greasewood/Sandberg bluegrass *(Sarcobatus vermiculatus/Poa secunda*) community was observed on a few terraces. On slightly higher terrace surfaces there were upland communities of Basin big sagebrush/needle-and-thread grass (*Artemisia tridentata* ssp. *tridentata*/*Stipa comata*) and Wyoming big sagebrush/Thurber's needlegrass (*Artemisia tridentata* ssp. wyomingensis/*Stipa thurberiana*).[17]

The assessment concluded that 57 percent of the terraces were in good to excellent condition. The "concentration of high quality examples of the basin big sagebrush/basin wildrye community is the greatest of anywhere in Idaho."[17]

b. Little Owyhee River

The Little Owyhee River is intermittent, probably flowing only during spring runoff and summer storm events. The large size of the drainage area into the Little Owyhee River is unusual for an intermittent stream. There are some perennially wet habitats in the floodplain although the surface flow is intermittent. There are open-water pools in the channel with aquatic species growing in them. The floodplain riparian communities are quite varied. [17]

The last flood event my have scoured the floodplain surface and deposited a new layer of sand, gravel or cobble. The gravel and cobble deposits are mostly devoid of plants. However, new sand deposits may contain a suite of annual plants if the deposits remain moist. "Where the water table is at or near the surface, the channel can be dominated by lush graminoid wetland communities"[17] (Table 10.1). Sharp bulrush and willow species are less common than on the South Fork Owyhee River. The willow occur in the channel or along its edge. The high cobble bars in the middle of the channel are covered by prairie sage and a high diversity of associated species. Silver sagebrush can dominate small bars on the edge of the dry channel. At high flows, this silver sage/dry graminoid community is clearly under water, probably for only short periods of time.[17]

The terrace plant communities were similar to those along the South Fork with basin big sagebrush/basin wildrye community types and greasewood. However, the perennial understory species were uniformly replaced by exotic annuals “as a legacy of past livestock grazing.”[17] "The big terraces along the lower Little Owyhee are easily accessible and have been grazed hard since settlement."[17]

c. Canyon spring systems

Although numerous, all of the canyon spring systems are small. Most of them are isolated sources of perennial water. The associated riparian habitats of the springs contain very different riparian plant communities.[17]

d. Intermittent lakes and creeks

On the upper Owyhee subbasin plateau there are both intermittent creeks and internally drained basins that have an intermittent lake or small pool at the lowest point. Across the subbasin these intermittent creeks, natural lakes and pools are widespread.

Vegetation in these habitats is different than that in the surrounding uplands. Although they have water in them only part of the year and sometimes not every year, they are influenced by high water tables or standing or flowing water. "Little is known about the succession, disturbance, and management of these communities."[17]

i. Intermittent pools

The intermittent wetland basins, locally called playas, are defined by Keeley and Zedler as vernal pools. They "define vernal pools as precipitation-filled seasonal wetlands inundated during periods when temperature is sufficient for plant growth, followed by a brief waterlogged-terrestrial stage and culminating in extreme desiccating soil conditions of extended duration."[14] In the 45 allotment the basin areas vary in size from a few acres to several hundred acres. The principal plant communities of the intermittent lakes and pools of the allotment are silver sagebrush/matmuhly (*Artemisia cana/Muhlenbergia richardsonis*), creeping spike-rush - vernal pool (*Eleocharis palustris*), and Davis peppergrass vernal pool (*Lepidium davisii*). In small pools Davis peppergrass is often the only plant.[17]

ii. Intermittent creeks

Although the Little Owyhee River is intermittent and shares some of the same communities as intermittent creeks, its size makes it a special case. Within the 45 allotment there were five community types on the intermittent creeks. Prairie sage (*Artemisia ludoviciana*) communities were common in intermittent drainages and along the Little Owyhee. Silver sagebrush/dry graminoid community was also found along the Little Owyhee. California oatgrass communities are common in the Owyhee uplands. However, both the Western juniper/California oatgrass *(Juniperus occidentalis/Danthonia californicus*) and Owyhee sagebrush (*Artemisia papposa*) communities were uncommon in the 45 allotment.[17]

e. Weeds

Although 17 percent of the riparian flora consisted of non-native species, only four of the 48 non-native plants were deemed to be of concern by the author of the 45 Ranch assessment. White-top was widespread, usually in the transition zone between the wetter floodplain and the drier terrace, frequently on the upper edge of river banks. Canada thistle and Scotch thistle were growing in small patches of the terraces. There were five mature tamarisk (*Tamarix* sp.) plants mapped along the South Fork Owyhee River floodplain.[17]

Although there were no new plants of tamarisk (salt-cedar) observed, the authors of this upper Owyhee watershed assessment consider this to be a major potential threat to riparian areas. Tamarisk is known to replace native vegetation, use prolific amounts of water and dry out riparian areas. It has a habit of mining salts from the soil profile and exuding them on the surrounding soil, rendering those areas unable to support plant species that cannot tolerate saline conditions. Salt cedar is at or near the top of the list of noxious invasive weeds for all agencies. There is a high probability that established salt cedar will limit the ground flow of water to an extent that it may affect fish and wildlife. Tamarisk has very prolific seed production and can out compete native riparian trees and shrubs. [1,27,23]

H. Invasive species.

Tamarisk (or salt cedar) is a major potential invasive species of riparian areas in the upper Owyhee subbasin (Figure 7.3). A single tamarisk plant can use up to 200 gallons per day of water in the summer time. Tamarisk has very prolific seed production, grows very rapidly, and sends roots down deep. It provides very poor stream bank stabilization and erosion control.[23,30,28]

Tamarisk could be controlled today, but it is poised to replace native riparian vegetation. There is a high probability that expanded salt cedar could limit the flow of ground water which will obviously affect water for wildlife and push some species toward extinctions.[23,28] Insects which rely on vegetation which has been replaced by tamarisk will disappear and species which feed off the insects will lose a food source. Larger wildlife which frequent the wetter spots of intermittent streams to obtain water may be pushed out of the habitat due to lack of water availability.

Other invasive species in the upper Owyhee subbasin which adversely affect riparian areas include perennial pepperweed, white top, poison hemlock, houndstongue, and purple loosestrife (see invasive species discussion in the rangeland component of this assessment).

I. Upper Owyhee Agricultural TMDL

The 2003 *Upper Owyhee Watershed TMDL Implementation Plan for Agriculture* assesses riparian zones in the Idaho section of the upper Owyhee subbasin. The authors, the Idaho Soil Conservation Commission (ISCC) and the Idaho Association of Soil Conservation Districts (IASCD), determined that many best management practices (BMPs) "have already been established by producers within the watershed. The BMPs included watering facilities developed away from streams (watering troughs and tanks), spring development, heavy use area protection, fencing, and prescribed grazing (shorter duration grazing and moving livestock to prevent overgrazing). With proper installation and maintenance these BMPs can improve water quality and help restore stream function. Most of the riparian areas that were evaluated during the 2003 Upper Owyhee Riparian Assessment displayed an upward trend. This indicates that existing BMPs have already provided water quality improvements on the stream segments with TMDL targets within privately owned parcels."[12]

"According to some ranchers in the area, there has already been a change in grazing duration. This has greatly improved stream channel condition and riparian health along several stream reaches. The primary reason to reduce duration and adjust timing is to increase and protect riparian vegetation. Allowing new vegetation growth each year will create multiple age classes, which increases both the quantity and quality of stabilizers along the stream bank and ensures long-term bank stability."[12]

All of the areas assessed by the ISCC and IASCD were riparian areas on privately owned stream reaches (Figure 10.1). The assessment determined that there were several privately owned parcels with riparian areas that needed site-specific changes, primarily in grazing management. The authors felt that these improvements could be made without "the use of structural components such as fencing; however,

additional pasture fencing and water developments in these areas would certainly make it easier to control livestock distribution and grazing intensity."[12]

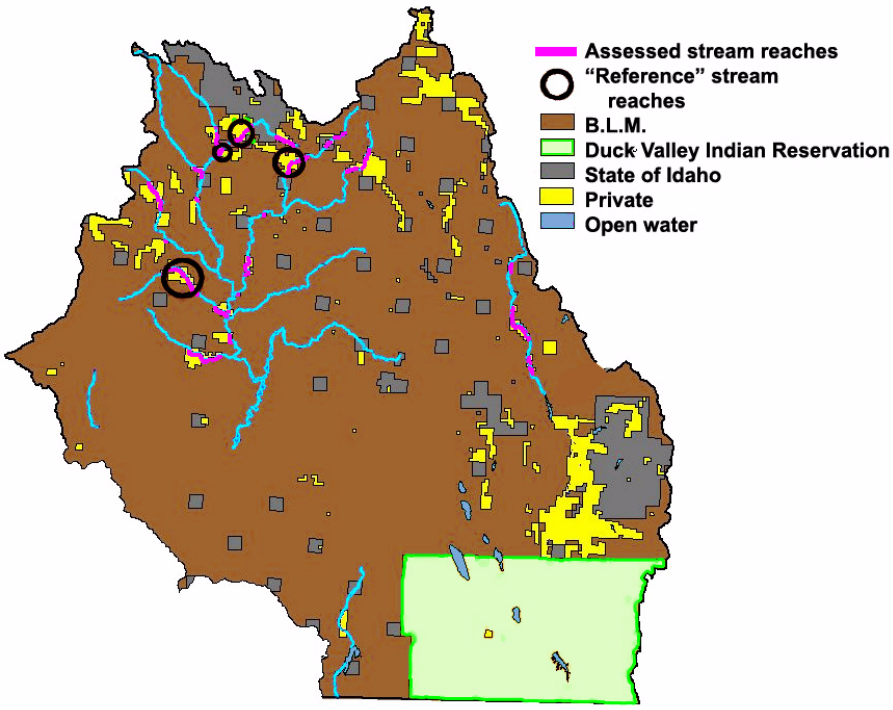

Figure 10.1. Riparian areas of stream reaches assessed in the Idaho section of the upper Owyhee subbasin.[12]

The base materials of the stream channels next to the majority of the riparian areas surveyed by the ISCC and IASCD consisted mostly of gravel, sand, and silt. These channels had an average slope (gradient) of 0.7% with the largest gradient being 2.1%. The channels are important to the development of riparian vegetation since the "upland areas above streams have minimal impact on riparian function and stream conditions. The upland area begins at the outside edge of the riparian area along a stream and continues upward to the subwatershed boundary. There was little evidence of excessive erosion or deposition within stream channels from upland areas within each of the evaluated subwatersheds. The primary sources of erosion and deposition are within the stream channel and riparian areas themselves."[12]

The ISCC and IASCD assessment rated the "outward floodplain development" as adequate on 73% of the stream reaches assessed. However, the "inward floodplain development" into the stream channel was rated as adequate in only 15% of the assessed stream segments. A trapezoidal stream channel was considered to indicate adequate inward floodplain development while a dish shaped channel indicated needed improvements in inward floodplain development.[12]

The assessment found that certain stream reaches of Camas Creek, Castle Creek, Deep Creek and Pole Creek represented "potential riparian stability, vegetation health, and diversity within the stream." These streams were deemed to be "reference" streams for the subbasin with good to excellent riparian conditions (Figure 10.1). All of these stream reaches are near the headwaters of the respective creeks. Considering the diversity of geological, hydrological and physical aspects of riparian zones, these stream reaches may not be representative of what can be achieved elsewhere in the subbasin, especially downstream where streams may be highly confined or subject to great natural fluctuations in high and low flows.

J. Discussion

The management of riparian areas is a vital environmental and economic issue. Although riparian zones in the upper Owyhee watershed are extremely limited, there are many different groups who feel the areas should be managed in different fashions and this poses the potential for conflicts. Riparian resources are utilized by livestock, wildlife, fish, vegetation, invertebrate animals, river rafters, hunters, fishermen, hikers, campers, boaters, birdwatchers, homesteaders and others. As a result, riparian zones are critical zones for multiple-use planning.

Some riparian areas are obviously not subject to management such as those in deep canyons inaccessible except by boat.

All ecosystems are dynamic and change over time. Riparian systems are probably more dynamic than the surrounding uplands.[32] Planning for riparian zones needs to consider their dynamic nature and attempt to maintain them as fully functioning ecosystems.[18] These ecosystems will vary from what they were during other climatic periods, from what they were before the Spanish introduced horses to the new world, and from what they were at the turn of the 19th century or the turn of the 20th century. There is no going back to some "pristine condition." Invasive species have affected riparian zones. Recreational use of riparian areas in the upper Owyhee subbasin is increasing as the urban population in the western United States grows.

Photo 10.8. Riparian areas along an inaccessible stretch of the Owyhee River.

It is extremely important to consider all uses of riparian zones. No one use is inherently detrimental or beneficial.

Cattle grazing is sometimes cited as a primary negative factor in riparian areas. Although many riparian areas in the United States were mismanaged and degraded by improper livestock grazing, modern livestock grazing practices are substantially different from those of early in the last century. The negative effects of grazing can be minimized or eliminated with proper management.[18,33,40,15,8]

Management decisions about livestock grazing need to be made on a case by case basis since there are site factors that change from one riparian community to another. Techniques that attract livestock away from riparian areas, that promote

avoidance of riparian areas, or that exclude livestock from riparian areas can all diminish the impact of grazing in one location. Grazing systems may also limit the duration or time of year when livestock graze in or near a riparian area. With livestock exclusion, consideration must also be given to the effect on wildlife.[7,15,33,40,15,8]

Water developments for livestock away from riparian areas may also benefit wildlife. Proper placement and design of water impoundments can create new wildlife habitat as well as providing water for cattle. "Small, wet meadows can also be created by piping overflow water from livestock troughs into fenced areas thereby creating and maintaining such meadows."[33]

Because of the greater moisture in riparian areas and generally a deeper soil, riparian zones generally have a high rate of recovery of vegetation when they are appropriately managed and protected.

K. Unknowns

How will the expansion of tamarisk into many of the riparian areas of the upper Owyhee subbasin affect the hydrology and vegetation of the area? How would the hydrology and vegetative changes affect wildlife? Will public agencies respond before drastic losses occur?

Not all the riparian areas in the upper Owyhee subbasin have been identified or characterized. In the upper Owyhee subbasin, the potential of riparian areas based on physical, biological, and chemical conditions is not known. The site specific physical, biological, and chemical conditions of riparian areas have not been surveyed. Due to the variability in factors influencing riparian zones and the resulting diversity, a small sample can not necessarily be taken as representative of the whole.

The relative impacts of different uses of riparian areas in the upper Owyhee subbasin are not known. What impacts are river rafters having on riparian areas? There are limited camping areas along the Owyhee River rafting corridor and these tend to be in riparian areas.

What are the actual impacts of livestock on riparian areas? What reaches are not affected and what reaches are affected? An inventory of heavily impacted riparian sites or reaches has not been made. Information on how grazing systems may be used to accomplish such goals as maintenance of woody stream bank vegetation and the prevention of bank crumbling and soil compaction is being developed by experience and research.[33] The management that will result in maintaining, restoring, improving, or expanding riparian areas in the upper Owyhee subbasin is poorly defined.

Information on the site potential for riparian vegetation is lacking.[12] “Studies have shown [that following restoration activities] the improvement to stream morphology, riparian conditions, streambank stability and stream hyporheic conditions may take anywhere from 20 to 100 years.”[12]

What are the cultural resources of riparian zones? The same attributes that lead to a high intensity of modern use in riparian zones have been present for millennia. A greater number of archaeological sites have been reported near water sources than in adjacent uplands.[29] These areas should also have sites of historical significance. River

terraces are nice places to live. Where are these sites and which, if any, of them should be protected or preserved.

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