Upper Rogue Watershed Assessment

Chapter 6 Watershed Conditions and Project Recommendations

Upper Rogue Watershed Association

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6 WATERSHED CONDITIONS AND PROJECT RECOMMENDATIONS

6.1 Introduction

This chapter summarizes information from the previous chapters of this assessment and outlines recommendations on actions that can be pursued to improve fish habitat and water quality. The intent of this section is to identify and prioritize key watershed restoration issues following the Oregon Watershed Enhancement Board's prioritization guidelines. This information can be used by the Upper Rogue Watershed Association to identify specific areas and restoration actions.

Lost Creek Dam blocks access by migratory salmon and steelhead into the upper Rogue River. The watershed above the dam is primarily federal land. Because the streams below the dam are accessible to salmon and steelhead, and contain most of the private lands in the watershed, this chapter summarizes watershed conditions and restoration recommendations for these subwatersheds. The five subwatersheds below the dam are:

- Rogue River – Shady Cove
- Rogue River – Lost Creek
- Trail Creek
- Elk Creek
- Big Butte Creek

To help interpret the information and recommendations in this chapter it is useful to refer to the following maps:

- Map 7, Fish Distribution
- Map 8, Channel Types
- Map 9, Fish Barriers
- Map 10, Riparian Condition Units
- Map 11, Riparian Recruitment Situation
- Map 12, Riparian Shade

6.2 Summary of Watershed Conditions

The geology of the Upper Rogue Watershed shapes streams and has a profound effect on water flow patterns and the quality of fish habitat. The Rogue River begins in a series of large springs within Crater Lake National Park; other springs in the upper watershed also contribute flow to the river. These springs provide cool water with consistent flows throughout the year; even during the summer dry periods (refer to Chapter 1).

In the lower watershed below Lost Creek Dam, the tributary streams are also affected by the watershed's geology. A large proportion of the area within the Big Butte Creek subwatershed is characterized by gentle-sloping Mount Mazama basalt flows, ash falls, and ash flows. Springs and abundant cool ground water inflows contribute to surface water flowing in Big Butte Creek. Ground water feeding these streams is more likely to follow a deeper path as it flows through the

extensive deposits of ash and volcanic material overlaying relatively flat terrain, delaying the delivery of water to streams and providing more consistent release of water throughout the year. As a result, Big Butte Creek and its tributaries generally have greater summer flows, and consistently cooler water temperatures (refer to Chapter 2, Hydrology).

Outside the Big Butte Creek subwatershed, the other tributaries below Lost Creek Dam (Trail Creek, Elk Creek, and other streams) are characterized by steep-sloping terrain made up of tuffaceaous volcanic sediment deposits. Less of the precipitation infiltrates as groundwater on these steeper slopes of less permeable material, and more of it runs off as surface water earlier in the year. Therefore, there is less shallow groundwater to supply baseflow to the streams during the dry summer months. Consequently these streams have lower flows during the summer and warmer water temperatures. This is one of the reasons, in addition to water withdrawals, that streams such as Trail Creek have scant summer flow (refer to Chapter 3, Water Quality).

Historically the Rogue River Basin supported some of the largest salmon and steelhead trout runs in Oregon. Fish populations change over time in response to natural events and human actions. Natural events such as ocean conditions, floods, and droughts help shape stream habitat and affect fish distributions and populations. Human actions such as harvest, construction of roads, diversion of water, and application of land use practices, have modified aquatic and riparian habitat, changed fish passage through rivers and tributary streams, and affected the size of fish populations (refer to Chapter 4, Fish Populations/Habitat).

A combination of factors, including rearing and spawning habitat loss, reduction in summer stream flow, passage impacts at culverts and other obstructions, a decrease in productivity of ocean habitat, and impacts caused by hatchery programs, have all contributed to the decline of the Rogue River salmon and steelhead populations. Despite these changes, these populations persist and the Rogue River Basin's salmon and steelhead populations are among the healthiest in the state. In a recent assessment of native fish populations, all of the Upper Rogue's salmon and steelhead populations, with the exception of spring Chinook salmon, received passing "grades" for indicators of population health (refer to Chapter 4, Fish Populations and Habitat). Due to large numbers of hatchery fish in the basin, the Chinook salmon population failed the reproductive independence criterion.

Fish passage barriers on the Rogue River and tributary streams can pose a significant problem for fish populations. Dams and road-crossing culverts are examples of potential fish passage barriers that exist in the watershed. The construction of Lost Creek Dam in 1997 blocked access to the limited habitat in the upper watershed that was historically accessible to migratory fish, primarily affecting spring Chinook salmon (ODFW, 2005a). Because spring Chinook salmon spawn in the channel of the Upper Rogue River, the dam disproportionately impacted this species, eliminating approximately 9 miles (21%) of historic spring Chinook spawning habitat. The dam also eliminated 12 miles (4% of the historic habitat) of Coho and 25 miles (4% of the historic habitat) of winter/summer steelhead habitat. Elk Creek Dam blocks more than 50 miles of spawning and rearing habitat. In response to the upstream fish passage blockage, the Oregon Department of Fish and Wildlife began a trap-and-haul operation at Elk Creek Dam in the autumn of 1992. Adult salmonids are trapped below the dam and trucked upstream for release. Some fish mortality has resulted from the Elk Creek Dam trapping and transport operation.

There are numerous culverts on the streams and tributaries within the lower watershed. Culverts commonly block fish passage by creating a drop at the outlet that is higher than fish can jump. While some adult trout and salmon can jump obstacles greater than 3 feet, most fish cannot jump that high. Other issues such as a shallow pool at the outlet of the culvert, or water that is traveling through the culvert at velocities high enough to exceed a fish's swimming ability can create fish passage problems. The velocity of water moving through the culvert is determined by a number of factors, but the major one is the gradient of the culvert. A very steep (high gradient) culvert will increase velocities more than a properly installed culvert that is placed nearly flat.

Many of the streams within the Upper Rogue Watershed have reduced stream flows from human actions. These uses include water withdrawals and diversions for irrigation, domestic water supplies, and other uses (refer to Chapter 2, Hydrology). Reduced stream flows, particularly during the normal low flow period during the summer and early fall, can have a dramatic influence on fish habitat and water quality. Low flows can reduce the amount habitat available to fish, create dry channels that trap fish in isolated pools, and increase water temperatures.

Human actions have modified the Upper Rogue Watershed's stream and riparian habitats. Harvest of streamside trees and removal of wood from channels has reduced the amount of wood in streams that helps to create deep pools and cover that form high quality fish habitat (refer to Chapter 4, Fish Populations and Habitat). Along the Rogue River and tributaries, alterations to riparian areas from timber harvest and land use changes have modified riparian areas; reducing shade over streams and limiting future delivery of wood to channels (refer to Chapter 5, Riparian/Wetlands).

6.3 Prioritization of Restoration Projects

Oregon Watershed Enhancement Board has established principles for watershed restoration prioritization (OWEB, 2004) that are intended to help guide watershed councils, landowners and others in the development of restoration strategies and project funding proposals. These principles serve as a useful framework as the Upper Rogue Watershed Association considers project opportunities.

The five principles are:

1. **Restore watershed connectivity limiting fish and wildlife populations.**
   Reconnecting isolated aquatic and terrestrial habitats that are still functional helps reestablish the movement of fish and wildlife species across the landscape through all of their life stages. Projects that reconnect habitats, such as improving fish passage at culverts and other barriers, have a high probability of success, low variability among projects, and relatively quick response times.

2. **Restore watershed processes impacting the aquatic system, water quality-limited streams, and wildlife habitat.**
   Watershed processes include the natural movement and delivery of water, wood, and sediment from the uplands into and through the aquatic system. These processes create the complex array of habitat types to which fish and wildlife species have adapted. Projects that restore watershed processes, such as addressing road-related sediment; have

a high probability of success and low variability among projects. These projects, however, can have longer response times.

3. **Restore key habitats and water quality for Endangered Species Act listed species.**
   Since many of the Rogue River's populations are in trouble (Coho salmon are listed under the Endangered Species Act), improving watershed for Endangered Species Act listed species addresses both political and ecological priorities. For instance, many listed species are indicators for the broader ecological health of a watershed. It is important to improve habitat connectivity, key watershed processes, and habitats that sustain and control the distribution and productivity of these species. Watershed restoration actions for Endangered Species Act listed fish species should focus on creating the natural array of habitats and watershed processes that are essential for each stage of their life cycle – migration, spawning, and rearing. Projects that address issues related to listed species can vary considerably in their success rates, variability among projects, and response times.

4. **Reduce or eliminate human impacts and inputs into watersheds from land use activities in the basin.**
   Activities that reduce or eliminate human inputs (water, nutrients, sediment, pesticides, etc.) into streams are important for maintaining watershed ecological functions. Examples of these projects include irrigation water reuse to eliminate discharges, improving cattle access points to streams, treating urban runoff, irrigation and urban water conservation practices, road abandonment, and incorporating watershed issues into land use. Projects that eliminate human inputs into watersheds can vary considerably in their success rates, variability among projects, and response times.

5. **Address the symptoms of disturbance that impact fish and wildlife populations and water quality-limited streams.**
   Addressing the symptoms of human-related disturbance can help provide important habitats while key watershed processes are recovering. Symptoms of disturbance, for example, can include elevated levels of fine sediments, the lack of wood in streams from poor riparian conditions, altered peak flows, and confined channels from bank alteration. Many functions that create habitat operate at very long time scales. Many decades may be needed, for example, before large wood delivery to stream channels can be restored to appropriate levels to provide quality aquatic habitats. In the short-term, habitat can be improved by placing wood in stream channels to improve pool complexity and accelerate other processes such as capturing and retaining spawning gravels. Projects that address symptoms of watershed disturbance usually have very rapid response time. These projects, however, can vary considerably in their success rates and have high variability among projects.

Prioritization of protection/enhancement actions should also favor those streams that 1) currently have (or have the potential for) fish usage, 2) have channel characteristics that are most responsive to inputs of large woody material, and 3) are limited with respect to stream shading.

6.4 Watershed Indicators

Table 6-1 outlines the watershed characteristics that are important for describing fish habitat and water quality in the Upper Rogue Watershed. The same table format is then used in the following pages to describe these "watershed indicators" for each of the five subwatersheds.

Table 6-1. Watershed Indicators Useful for Understanding the Factors that Contribute to Fish Habitat and Water Quality

Watershed Indicator	Description
Streams and Fish	
Total stream miles	Mapped stream channels within the subwatershed. Some channels, particularly intermittent streams, are usually not mapped. All streams, even those that do not contain fish, will affect downstream areas through processes such as the transport of water, water quality changes, or other issues.
Total fish-bearing stream miles	Miles of stream known to be occupied by fish within the subwatershed; resident trout usually occupy the upper stream miles. Because all streams have not been inventoried, the total extent of fish-bearing streams is probably underestimated.
Fish-bearing stream channels less than 4% gradient (miles)	Lower gradient channels contain most of the higher quality stream habitat, exhibiting frequent pools, more cover, and better sorted gravels; these are stream channels that are more responsive to restoration actions such as the placement of large wood.
Coho distribution (miles)	Extent of Coho salmon distribution within the subwatershed. Coho salmon usually spawn and rear in streams with gradients less than 4%.
Summer steelhead distribution (miles)	Extent of summer steelhead distribution within the subwatershed. Summer steelhead have a wide distribution because they can spawn in higher gradient channels during high flow periods.
High priority fish passage barriers	Fish passage barriers limit the quality and quantity of habitat available to fish. This includes fish passage barriers identified through surveys and by the Rogue Basin Fish Access Team as a high priority for improvement or removal.
Stream Habitat	The channel habitat type and gradient interacts with the other factors that shape streams, including large wood in the channel and the depth and frequency of pools. The fish habitat quality is affected by the amount of wood in the channel, the depth of pools and other factors.
Riparian	
Percent of riparian areas occupied by roads	Riparian area occupied by roads and road right-of-way. There may be opportunities to remove or relocate these roads outside of riparian areas.
Percent of agricultural riparian areas	Riparian areas covered in agricultural crops. There may be opportunities for riparian enhancement in these areas.
Percent of developed riparian areas	Riparian areas occupied by urban or residential development. There may be opportunities to work with landowners in these areas to restore native riparian vegetation.

Table 6-1. Watershed Indicators Useful for Understanding the Factors that Contribute to Fish Habitat and Water Quality

Watershed Indicator	Description
Water Quality and Quantity	
Water quality issues	Identified water quality issues. Parameters include water temperature, nutrients, and turbidity, all of which can affect fish populations.
Percent of riparian areas with less than 20 percent shade	Low levels of shade from streamside vegetation can contribute to water temperature increases. Riparian areas with less than 20 percent shade can be high priority areas for restoration.
Water flow issues	Low summer stream flows can affect stream habitat by reducing the amount of available habitat, limiting fish access (by drying stream channels) and by increasing water temperatures.

6.5 Subwatershed Issues and Restoration Opportunities

Watershed indicators and action recommendations for each of the subwatersheds are based on the Oregon Watershed Enhancement Board's prioritization framework. Actions are not listed in order of priority. For example, all "high priority" recommendations are equal in priority.

6.5.1 Rogue River – Shady Cove Subwatershed

The Rogue River-Shady Cove Subwatershed encompasses 58,435 acres of which 62% is privately owned. This subwatershed includes the Rogue River and tributaries. Key tributaries in the subwatershed include Long Branch, Indian, Dry, Reese, and Brush Creeks. Spring and fall Chinook salmon occupy the Rogue River. Summer steelhead distribution extends into all of these streams, and Coho salmon are found in Indian and Reese Creeks (refer to Map 7, Fish Distribution).

Possible bacteria problems were identified in Reese Creek. There are opportunities in this stream to monitor water quality, address habitat restoration needs, and improve fish passage.

Data indicate that the water quality of the Rogue River as measured at Dodge Bridge is very good, especially compared to measurements at downstream locations (Table 6-2).

As residential development increases, particularly in the Shady Cove area, it will be important to encourage the protection of existing wetlands, and enhance degraded wetlands. The Upper Rogue Watershed Association may wish to work with City and County agencies, as well as developers, and encourage the incorporation of wetland protection and enhancement into development planning. Two good resources to consult are "An Introduction and User's Guide to

Wetland Restoration, Creation, and Enhancement A Guide for the Public"[1] and "Stream Corridor Restoration: Principles, Process and Practices"[2].

Table 6-2. Watershed Indicators for Rogue River – Shady Cove Subwatershed

Watershed Indicator	Description
Streams and Fish	
Total stream miles	Rogue River and tributaries: 329 miles
Total fish-bearing stream miles	Rogue River and tributaries: 57 miles
Fish-bearing stream channels less than 4% gradient (miles)	There are low gradient and unconfined stream sections in Reese Creek, Dry Creek, Long Branch Creek, and Indian Creek: 50 miles
Coho distribution (miles)	Rogue River and tributaries: 30 miles
Summer steelhead distribution (miles)	Rogue River and tributaries: 48 miles
High priority fish passage barriers	RBFAT priority fish passage barriers: pushup dam on Reese Creek; Pond Creek, dam.
Stream habitat	Tributaries: limited in-stream wood is contributing to decreased habitat complexity.
Riparian	
Percent of riparian areas occupied by roads	Rogue River and tributaries: 1%
Percent of agricultural riparian areas	Rogue River and tributaries: 15%
Percent of developed riparian areas	Rogue River and tributaries: 13%
Water Quality and Quantity	
Water quality issues	Water temperatures; high bacteria levels have been observed in Reese Creek.
Percent of riparian areas with less than 20 percent shade	Rogue River and tributaries: 6%
Water flow issues	Lost Creek dam has modified the Rogue River's high and low flow regime. Tributaries: Naturally low flows and water withdrawals contribute to decreased summer stream flows. There are points of diversion on Indian, Long Branch, Dry, and Reese Creeks.

[1] Available at http://www.nmfs.noaa.gov/habitat/habitatconservation/publications/introfinal.pdf.
[2] Available at http://www.nrcs.usda.gov/technical/stream_restoration/newgra.html.

Table 6-3. Recommended Actions for the Rogue River – Shady Cove Subwatershed

Action	Priority
Address fish passage problems.	High
Monitor and identify bacteria issues on Reese Creek.	High
Work with landowners to reduce water withdrawals during low flow periods.	High
Restore riparian vegetation within selected tributary areas.	High
Work with landowners along the Rogue River to restore native vegetation in riparian areas.	High
Restore stream habitat complexity through wood placement or other actions, particularly on streams where Coho salmon spawn and rear.	Medium

6.5.2 Rogue River – Lost Creek Subwatershed

The Rogue River-Lost Creek subwatershed encompasses 36,329 acres of which 64% is privately owned. The subwatershed includes a small portion of the river below the dam and the river channel that was inundated by Lost Creek Lake. Spring Chinook spawn in the area below the dam, and there is a large return of fish to the fish hatchery (refer to Map 7, Fish Distribution).

Table 6-4. Watershed Indicators for Rogue River – Lost Creek Subwatershed

Watershed Indicator	Description
Streams and Fish	
Total stream miles	Rogue River and tributaries: 128 miles
Total fish-bearing stream miles	Rogue River and tributaries: 25 miles
Fish-bearing stream channels less than 4% gradient (miles)	This subwatershed has the greatest length of channels that are inundated. Lost Creek Lake covers more than 24 miles of stream channel (refer to Map 8, Channel Types): 5 miles
Coho distribution (miles)	Rogue River and tributaries: 2 miles
Summer steelhead distribution (miles)	Rogue River and tributaries: 0 miles
High priority fish passage barriers	The major barrier in this portion of the watershed is Lost Creek Dam, which blocked access to historic spring Chinook and steelhead spawning areas.
Stream habitat	Areas inundated by the reservoir have reduced the quantity of stream habitat.

Table 6-4. Watershed Indicators for Rogue River – Lost Creek Subwatershed

Watershed Indicator	Description
Riparian	
Percent of riparian areas occupied by roads	Rogue River and tributaries: not applicable
Percent of agricultural riparian areas	Rogue River and tributaries: not applicable
Percent of developed riparian areas	Rogue River and tributaries: not applicable
Water Quality and Quantity	
Water quality issues	Cool water from the reservoir has modified spring Chinook behavior and biology (spawn timing and juvenile emergence timing).
Percent of riparian areas with less than 20 percent shade	Rogue River and tributaries: n/a
Water flow issues	Lost Creek dam has modified the Rogue River's high and low flow regimes. There are a number of points of diversion within the subwatershed.

Table 6-5. Recommended Actions for the Rogue River – Lost Creek Subwatershed

Action	Priority
Restore riparian vegetation on tributaries within selected areas.	High
Work with landowners along the Rogue River to restore native vegetation in riparian areas.	High

NOTES: Lost Creek Dam obstructs fish passage into the Upper Rogue River. Because it is difficult to address fish passage at the dam, this issue is not listed as a priority.

6.5.3 Trail Creek Subwatershed

Trail Creek subwatershed encompasses 35,346 acres of which 46% is privately owned. Trail Creek and its tributaries are an important spawning and rearing area for Coho salmon and steelhead trout.

Table 6-6. Watershed Indicators for Trail Creek Subwatershed

Watershed Indicator	Description
Streams and Fish	
Total stream miles	Trail Creek and tributaries: 199 miles
Total fish-bearing stream miles	Trail Creek and tributaries: 29 miles
Fish-bearing stream channels less than 4% gradient (miles)	Trail Creek and tributaries: 16 miles
Coho distribution (miles)	Trail Creek and tributaries: 14 miles
Summer steelhead distribution (miles)	Trail Creek and tributaries: 24 miles
High priority fish passage barriers	Most of the human-made barriers are culverts.
Stream Habitat	Limited in-stream wood is contributing to decreased habitat complexity.
Riparian	
Percent of riparian areas occupied by roads	Trail Creek and tributaries: 2%
Percent of agricultural riparian areas	Trail Creek and tributaries: 2%
Percent of developed riparian areas	Trail Creek and tributaries: 2%
Water Quality and Quantity	
Water quality issues	A combination of natural low flows, modified riparian shade, and water withdrawals have contributed to water temperature increases.
Percent of riparian areas with less than 20 percent shade	Trail Creek and tributaries: 9%
Water flow issues	Naturally low flows and water withdrawals contribute to dry sections of stream channel and isolated pools. Volunteers have captured and removed large numbers stranded fish from pools (Fred Fleetwood, personal communication, 2006). There are 159 documented water diversion points within the subwatershed.

Table 6-7. Recommended Actions for the Trail Creek Subwatershed

Action	Priority
Address fish passage problems.	High
Work with landowners to reduce water withdrawals during low flow periods.	High
Restore riparian vegetation within selected areas.	High
Restore stream habitat complexity through wood placement or other actions, particularly on streams where Coho salmon spawn and rear.	Medium

6.5.4 Elk Creek Subwatershed

The Elk Creek subwatershed encompasses 85,509 acres of which 40% is privately owned. Elk Creek and its key tributaries appear to have the capability of producing a large proportion of the wild anadromous salmonids originating in the Upper Rogue River Basin. A sizable proportion of the Coho salmon passing over Gold Ray Dam have returned to Elk Creek. Between 1992 and 2003, returns of wild Coho salmon to the collection facility on Elk Creek ranged from 40 to 982 fish. Between 1992 and 2003, returns of Coho to Elk Creek accounted for 4.5% to more than 30% of the wild Coho salmon that passed the fish counting station at Gold Ray Dam. The most important Coho spawning and rearing streams in the subwatershed are Elk Creek, West Branch, Flat, Surgarpine, and Bitterlick (refer to Map 7, Fish Distribution). While Elk Creek does not appear to have as large a proportion of the basin's steelhead production, the subwatershed is an important spawning and rearing area for steelhead.

Table 6-8. Watershed Indicators For Elk Creek Subwatershed

Watershed Indicator	Description
Streams and Fish	
Total stream miles	Elk Creek and tributaries: 511 miles
Total fish-bearing stream miles	Elk Creek and tributaries: 97 miles
Fish-bearing stream channels less than 4% gradient (miles)	There are low gradient and unconfined stream sections in the lower stream reaches of Elk Creek and Sugarpine Creek: 40 miles
Coho distribution (miles)	Elk Creek and tributaries: 37 miles
Summer steelhead distribution (miles)	Elk Creek and tributaries: 56 miles
High priority fish passage barriers	Rogue Basin Fish Access Team priority fish passage barriers: Elk Creek Dam (blocks access to over 50 miles of habitat; stop logs); concrete dam; stop logs; Jones Creek culvert; West Branch Elk Creek culvert.
Stream Habitat	Limited in-stream wood is contributing to decreased habitat complexity.

Table 6-8. Watershed Indicators For Elk Creek Subwatershed

Watershed Indicator	Description
Riparian	
Percent of riparian areas occupied by roads	Elk Creek and tributaries: 1%
Percent of agricultural riparian areas	Elk Creek and tributaries: 4%
Percent of developed riparian areas	Elk Creek and tributaries: 3%
Water Quality and Quantity	
Water quality issues	A combination of natural low flows, modified riparian shade, and water withdrawals have contributed to water temperature increases.
Percent of riparian areas with less than 20 percent shade	Elk Creek and tributaries: 1%
Water flow issues	Naturally low flows and water withdrawals contribute to decreased summer stream flows. There are many water diversion points in the subwatershed.

Table 6-9. Recommended Actions for the Elk Creek Subwatershed

Action	Priority
Address Elk Creek Dam fish passage problems.	High
Address other fish passage problems.	High
Work with landowners to reduce water withdrawals during low flow periods.	High
Restore riparian vegetation within selected areas.	High
Restore stream habitat complexity through wood placement or other actions, particularly on streams where Coho salmon spawn and rear.	Medium

6.5.5 Big Butte Creek Subwatershed

The Big Butte Creek subwatershed encompasses 158,396 acres of which 43% is privately owned. Big Butte Creek and its tributaries are an important production area for Coho salmon and steelhead. Chinook salmon spawn in the lower section of Big Butte Creek.

Table 6-10. Watershed Indicators for Big Butte Creek Subwatershed

Watershed Indicator	Description
Streams and Fish	
Total stream miles	Big Butte Creek and tributaries: 484 miles
Big Butte Creek Subwatershed	Big Butte Creek and tributaries: 163 miles
Fish-bearing stream channels less than 4% gradient (miles)	There are low gradient and unconfined stream sections with reaches of Big Butte Creek, the North and South Forks, McNeil Creek, Bowen Creek, and Willow Creek: 92 miles
Coho distribution (miles)	Big Butte Creek and tributaries: 31 miles
Summer steelhead distribution (miles)	Big Butte Creek and tributaries: 61 miles
High priority fish passage barriers	RBFAT priority fish passage barriers: N.F. Big Butte Creek, Brophy Ditch; N.F. Big Butte Creek, Alberts Ditch; South Fork Big Butte Creek, EPID Diversion; Eighty Acre Creek, Eighty Acre Ditch; Big Butte Creek, Big Butte Creek Weir; South Fork Big Butte Creek (near mouth of Ginger Creek), Butte Falls Hatchery Intake.
Stream Habitat	Limited in-stream wood is contributing to decreased habitat complexity.
Riparian	
Percent of riparian areas occupied by roads	Big Butte Creek and tributaries: 2%
Percent of agricultural riparian areas	Big Butte Creek and tributaries: 3%
Percent of developed riparian areas	Big Butte Creek and tributaries: 0.2%
Water Quality and Quantity	
Water quality issues	Water temperature.
Percent of riparian areas with less than 20 percent shade	Big Butte Creek and tributaries: 3%
Water flow issues	Naturally low flows and numerous water withdrawals contribute to decreased summer stream flows. The stream flows in Big Butte creek are over allocated. There are a number of points of diversion in the subwatershed, including Eagle Point Irrigation District (EPID) diversion and the Medford Water Commission diversion.

Table 6-11. Recommended Actions for the Big Butte Creek Subwatershed

Action	Priority
Address fish passage problems.	High
Work with landowners and other organizations to reduce water withdrawals during low flow periods.	High
Restore riparian vegetation within selected areas.	High
Restore stream habitat complexity through wood placement or other actions, particularly on streams where Coho salmon spawn and rear.	Medium

REFERENCES

OWEB 2004. Improvement Priorities at Watershed and Basin Scales. Oregon Watershed Enhancement Board. http://www.oregon.gov/OWEB/GRANTS/docs/grants_restoration_prioritization_frmwork.pdf

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