Water Quality Restoration Plan

Southern Oregon Coastal Basin

North and South Forks Little Butte Creek Key Watershed

Bureau of Land Management (BLM)

Medford District

Ashland Resource Area
Butte Falls Resource Area

Lakeview District

Klamath Falls Resource Area

May 2006

North and South Forks Little Butte Creek Key Watershed at a Glance	
Hydrologic Unit Code Number (Little Butte Creek)	**1710030708**
WQRP Area/Ownership	Total: 125,778 acres BLM: 26,959 acres (21%) U. S. Forest Service: 59,875 acres (48%) Bureau of Reclamation: 5 acres (<.01%) Private: 38,939 acres (31%)
303(d) Stream Miles Assessed	Total: 65.4 miles BLM Ownership: 15.7 miles
303(d) Listed Parameters	Temperature, Sedimentation, E. Coli, pH
Key Resources and Uses	Salmonids, domestic, aesthetic
Known Human Activities	Agriculture, forestry, roads, recreation, rural residential development
Natural Factors	Geology: volcanic Soils: various series and complexes

Statement of Purpose

This water quality restoration plan is prepared to meet the requirements of Section 303(d) of the 1972 Federal Clean Water Act.

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A. Introduction

This document describes how the Bureau of Land Management (BLM) will meet Oregon water quality standards for 303(d) listed streams on BLM-administered lands within the North and South Forks Little Butte Creek Key Watershed. It contains information that will support the Oregon Department of Environmental Quality's (DEQ) development of the Rogue Basin Total Maximum Daily Load (TMDL). Its organization is designed to be consistent with the DEQ's Rogue Basin Water Quality Management Plan (WQMP) when it is completed. The area covered by this Water Quality Restoration Plan (WQRP) includes all lands managed by the BLM, Medford and Lakeview Districts within the North and South Forks Little Butte Creek Key Watershed, including the North and South Forks but not the mainstem Little Butte Creek. This area is referred to as the Key Watershed or plan area.

Beneficial Uses

The Oregon Environmental Quality Commission has adopted numeric and narrative water quality standards to protect designated beneficial uses (Table 1). In practice, water quality standards have been set at a level to protect the most sensitive uses. Cold-water aquatic life such as salmon and trout are the most sensitive beneficial uses (Table 2) in the Rogue Basin (ODEQ 2004:5). Seasonal standards may be applied for uses that do not occur year round.

Table 1. Beneficial Uses in the North and South Forks Little Butte Creek Key Watershed (ODEQ 2004:5)

Beneficial Use	*Occurring*	*Beneficial Use*	*Occurring*
Public Domestic Water Supply	✓	Anadromous Fish Passage	✓
Private Domestic Water Supply	✓	Salmonid Fish Spawning	✓
Industrial Water Supply	✓	Salmonid Fish Rearing	✓
Irrigation	✓	Resident Fish and Aquatic Life	✓
Livestock Watering	✓	Wildlife and Hunting	✓
Boating	✓	Fishing	✓
Aesthetic Quality	✓	Water Contact Recreation	✓
Commercial Navigation & Trans.		Hydro Power	✓

Table 2. Sensitive Beneficial Uses in the North and South Forks Little Butte Creek Key Watershed

Sensitive Beneficial Use	*Species*[1]
Salmonid Fish Spawning & Rearing	Coho (t), summer and winter steelhead trout (c), spring and fall chinook
Resident Fish & Aquatic Life	Resident Fish: Rainbow trout, cutthroat trout (c), sucker, sculpin Other Aquatic Life: Pacific giant salamander, western pond turtle (s), beaver, and other species of frogs, salamanders, and snakes

1/ Status: (t) = threatened under Federal Endangered Species Act (ESA); (c) = candidate; and (s) = sensitive.

Listing Status

Section 303 of the Clean Water Act of 1972, as amended by the Water Quality Act of 1987, provides direction for designation of beneficial uses and limiting discharge of pollutants to waters of the state. The DEQ includes streams that do not meet established water quality criteria for one or more beneficial uses on the state's 303(d) list, which is revised every two years, and submitted to the Environmental Protection Agency (EPA) for approval. Section 303 of the Clean Water Act further requires that TMDLs be developed for waters included on the 303(d) list. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. A WQMP is developed to describe a strategy for reducing water pollution to the level of the load allocations and waste load allocations prescribed in the TMDL. The approach is designed to restore the water quality and result in compliance with the water quality standards, thus protecting the designated beneficial uses of waters of the state.

At the time of this writing, the draft 2004 303(d) list has been released (ODEQ 2005). This WQRP addresses all stream listings on the draft 2004 303(d) list for the plan area: two streams listed for exceeding the bacteria (E. coli) criterion, one stream exceeds the pH criterion, four streams listed for exceeding the sedimentation criterion, and six streams listed for exceeding the temperature criterion (Table 3). In addition to the stream listings, Fish Lake on North Fork Little Butte Creek exceeds the pH criterion (Table 3). Fish Lake is located on U.S. Forest Service (USFS)-administered land and will not be addressed in this WQRP for BLM-administered land. Changes from the 2002 303(d) list for streams in the plan area include the addition of Conde and Dead Indian Creeks for summer temperature, North Fork Little Butte Creek for fall/winter/spring E. coli and summer pH, and South Fork Little Butte Creek for summer E. coli.

Table 3. Draft 2004 303(d) Listings in the North and South Forks Little Butte Creek Key Watershed (ODEQ 2005)

303(d) List Date	Stream Segment	Listed Parameter	Season	Applicable Rule (at time of listing)	Total Miles Affected
2004	Conde Creek	Temperature	Year around	OAR 340-041-0028(4)(b)	4.4
2004	Dead Indian Creek	Temperature	Year around	OAR 340-041-0028(4)(b)	9.6
1998	Deer Creek	Sedimentation		OAR 340-041-0365(2)(j)	3.2
1998	Lost Creek	Sedimentation		OAR 340-041-0365(2)(j)	8.4
1998	Lost Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	8.4
2004	North Fork Little Butte Creek	E. coli	Fall/winter/spring	OAR 340-041-0009(1)(a)(A,B)	6.5
2002	North Fork Little Butte Creek	E. coli	Summer	OAR 340-41-0365 (2)(e,f)	6.5
2004	North Fork Little Butte Creek	pH	Summer	OAR 340-041-0021(1)(a)	17.8
1998	North Fork Little Butte Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	6.5
1998	North Fork Little Butte Creek/Fish Lake	pH	Summer	OAR 340-041-0365(2)(d)	1.7
2004	North Fork Little Butte Creek/Fish Lake	pH	Summer	OAR 340-041-0275(1)(c)	1.7
1998	Soda Creek	Sedimentation		OAR 340-041-0365 (2)(j)	5.6

303(d) List Date	Stream Segment	Listed Parameter	Season	Applicable Rule (at time of listing)	Total Miles Affected
1998	Soda Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	5.6
2004	South Fork Little Butte Creek	E. coli	Summer	OAR 340-041-0009(1)(a)(A,B)	16.4
1998	South Fork Little Butte Creek	Sedimentation		OAR 340-041-0365 (2)(j)	16.4
1998	South Fork Little Butte Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	16.4
Total Stream Miles listed for E. coli Criteria (Summer)					22.9
Total Stream Miles listed for E. coli Criteria (Winter/spring/fall)					6.5
Total Stream Miles listed for pH Criteria (Summer)					17.8
Total Stream Miles listed for Sedimentation Criteria					33.6
Total Stream Miles listed for Temperature Criteria (Summer)					36.9
Total Stream Miles listed for Temperature Criteria (Year around)					14.0

Within the plan area, there are a total of 65.4 stream miles on the draft 2004 303(d) list, of which 15.7 miles cross BLM-managed lands. The water quality limited stream reaches on BLM-managed lands are: Conde Creek, 1.1 miles for year-around temperature; Dead Indian Creek, 1.2 miles for year-around temperature; Deer Creek, 1.6 miles for sedimentation; Lost Creek, 4.4 miles for summer temperature and sedimentation; North Fork Little Butte Creek, 0.4 miles for summer temperature and year-around E. coli, 0.8 miles for pH; Soda Creek, 5.2 miles for summer temperature and sedimentation; and South Fork Little Butte Creek, 1.4 miles for summer temperature, sedimentation, and E. coli.

B. Watershed Characterization

The North and South Forks Little Butte Creek Key Watershed covers approximately 197-square miles (125,778 acres) in the southern Cascade range in southwestern Oregon (Figure 1). The Key Watershed lies within the Upper Rogue Subbasin (Figure 2), which is subdivided into eight watersheds: Upper Rogue River, South Fork Rogue River, Rogue River-Lost Creek, Big Butte Creek, Elk Creek-Rogue River, Trail Creek, Rogue River-Shady Cove, and Little Butte Creek (Figure 3). The plan area is in the eastern portion of the Little Butte Creek Watershed and extends from the confluence of the North and South Forks Little Butte Creek to the headwaters. Elevation ranges from approximately 1,660 feet at the confluence of North and South Forks Little Butte Creek to 9,495 feet at the top of Mount McLoughlin. The North and South Forks Little Butte Creek are tributaries to Little Butte Creek, however, Little Butte Creek is not covered by this plan. Major tributaries to the North and South Forks Little Butte Creek include Wasson, Lost, Deer, Soda, Dead Indian, and Beaver Dam Creeks.

The North and South Forks Little Butte Creek Key Watershed is primarily within Jackson County with the eastern edge extending into Klamath County. The plan area is east of the city of Medford and southeast of the town of Eagle Point. The unincorporated rural neighborhood of Lake Creek is near the confluence of the North and South Forks Little Butte Creek.

Figure 1. Location of the North and South Forks Little Butte Creek Key Watershed

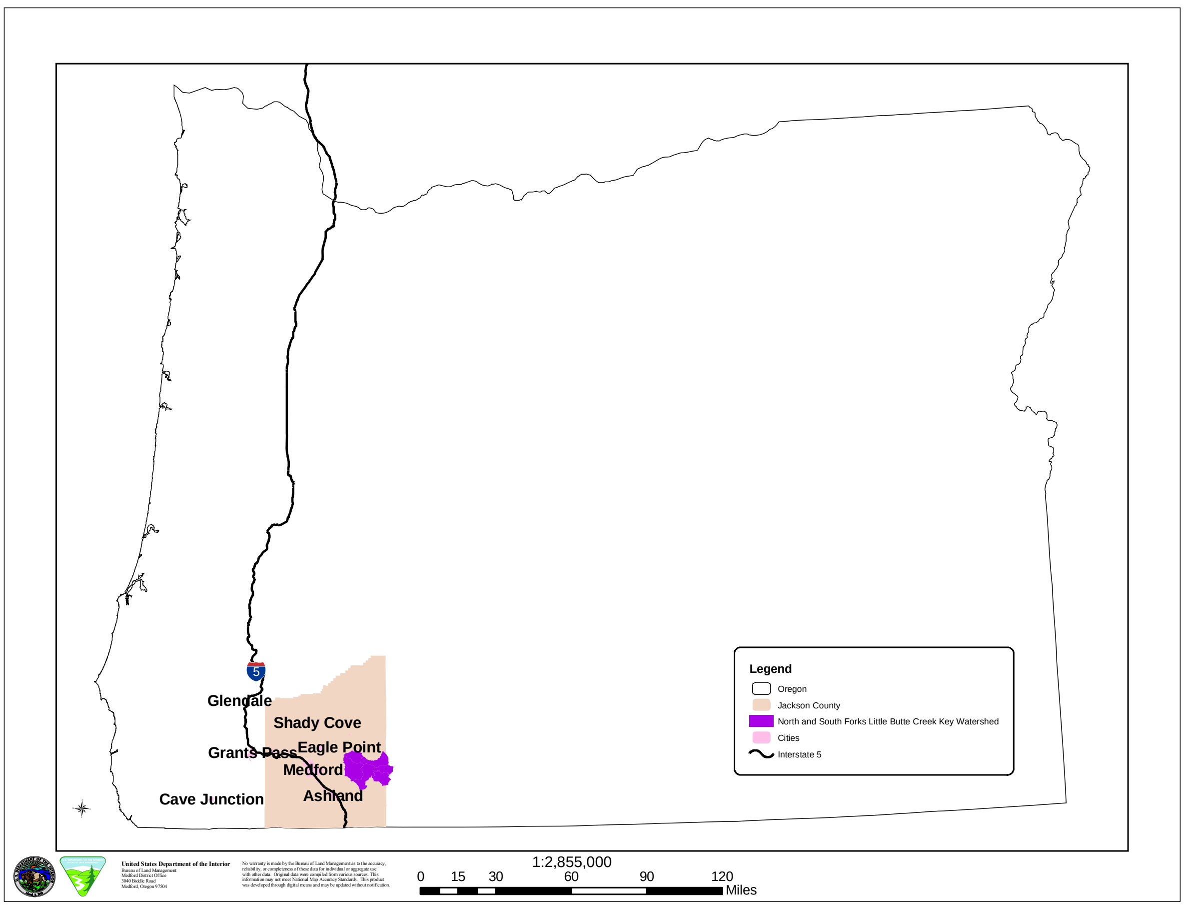

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Figure 2. Rogue Basin and the Upper Rogue Subbasin

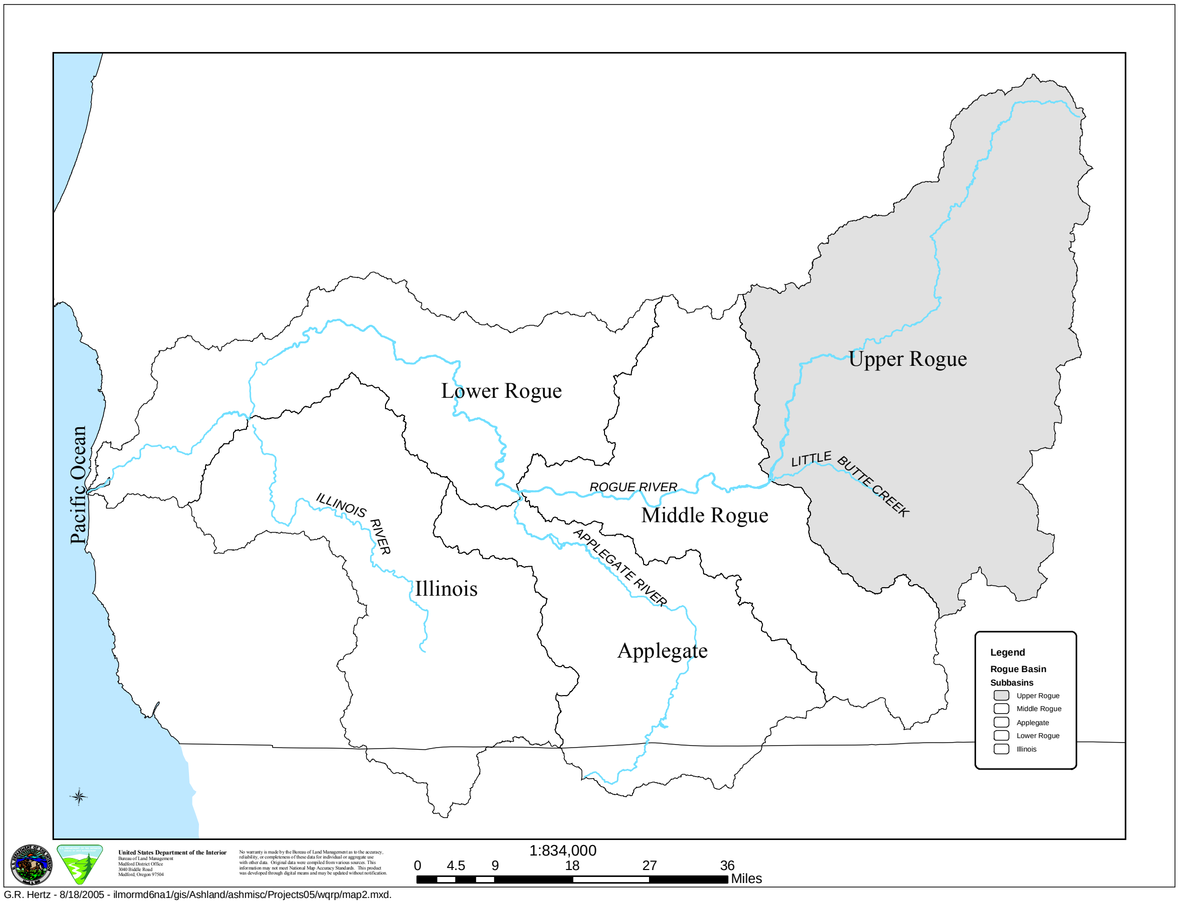
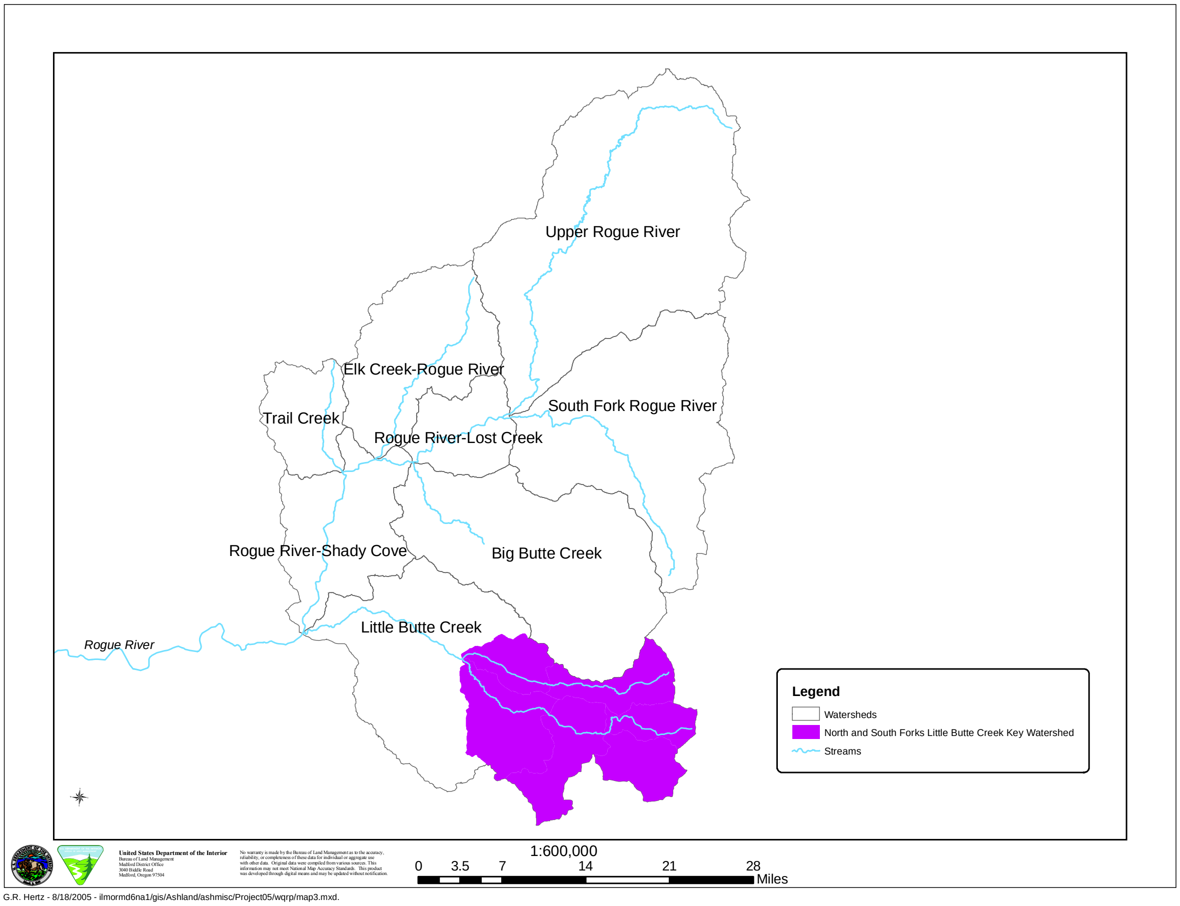


Figure 3. Watersheds within the Upper Rogue Subbasin



Land Ownership and Use

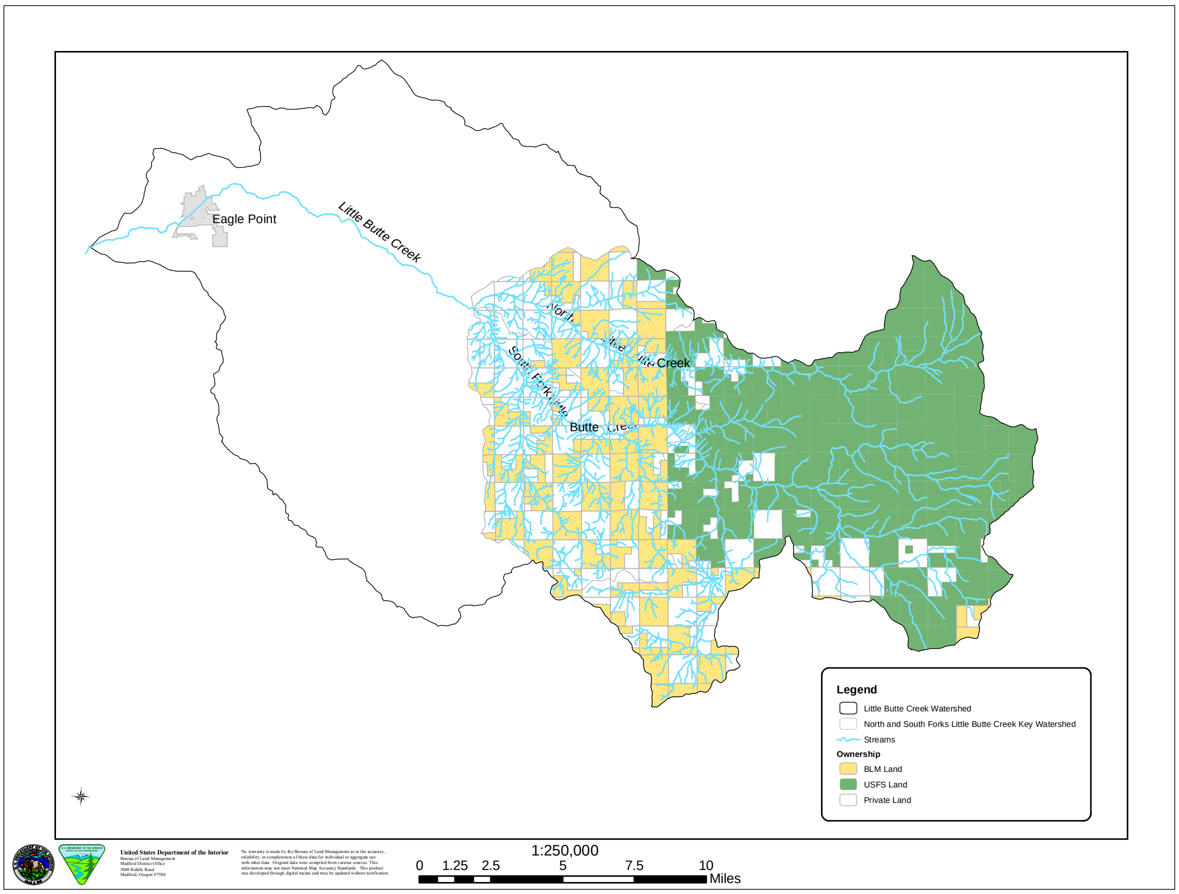
The BLM manages 26,959 acres (21 percent) within the North and South Forks Little Butte Creek Key Watershed (Table 4 and Figure 4). Two BLM administrative units manage lands for the Medford District: Ashland and Butte Falls Resource Areas; and Klamath Falls Resource Area manages BLM lands within the Lakeview District. The Butte Falls Resource Area lands are north of the North Fork Little Butte Creek; the Klamath Falls Resource Area manages 502 acres in the headwaters of Beaver Dam Creek (southeast corner of the Key Watershed); and the Ashland Resource Area manages the remaining BLM lands. The USFS (Rogue River-Siskiyou and Winema National Forests) manages 59,875 acres within the Key Watershed. The Bureau of Reclamation manages 5 acres where Dead Indian Creek is diverted into a canal that transports water to Howard Prairie Reservoir. The remaining 31 percent of the plan area consists of private lands.

BLM-administered lands occupy a "checkerboard" pattern with private lands in the lower and middle elevations of the Key Watershed, and the Forest Service lands are mostly a contiguous block in the higher elevations. Some of the large blocks of private lands are managed as industrial forest and ranches, while ownership of the remaining privately-held land in the watershed is typically held in relatively small parcel holdings.

Table 4. Ownership within the North and South Forks Little Butte Creek Key Watershed

Ownership	Acres	Percent
BLM – Ashland Resource Area	22,335	17.7%
BLM - Butte Falls Resource Area	4,122	3.3%
BLM – Klamath Falls Resource Area	502	0.4%
USFS	59,875	47.6%
Bureau of Reclamation	5	<.1%
Private	38,939	31%
Total	**125,778**	100%

Figure 4. BLM Land Ownership in the North and South Forks Little Butte Creek Key Watershed



BLM land allocations within the plan area include matrix, Tier 1 Key Watershed, and Riparian Reserves. Special areas include Hollenbeck Environmental Education Area, Lost Lake Research Natural Area, and Hole-in-the-Rock Area of Environmental Concern. Objectives and management actions/directions for these land allocations and special areas are found in the *Medford District Record of Decision and Resource Management Plan* (USDI 1995a:24-40; 56-68) and the *Klamath Falls Resource Area Record of Decision and Resource Management Plan* (USDI 1995b:9-27).

The Northwest Forest Plan (NWFP) (USDA and USDI 1994) Standards and Guidelines incorporate the Aquatic Conservation Strategy (ACS) (amended March 2004, USDA and USDI 2004) to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. A component of the ACS is the designation of Tier 1 Key Watersheds, which are areas that either provide, or are expected to provide, high quality aquatic habitat. Tier 1 Key Watersheds are intended to serve as refugia for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. The NWFP designates the North and South Forks Little Butte Creek as a Tier 1 Key Watershed.

Major land uses in the North and South Forks Little Butte Creek Key Watershed include agriculture, timber, and recreation. Cattle operations are the largest non-forestry agricultural venture. The BLM manages 12 grazing allotments within the plan area, of which 10 (approximately 26,105 acres) are currently in use.

The largest private ranches in the plan area are the C-2 Cattle Company on North Fork Little Butte Creek and the Cascade Ranch on South Fork. The C-2 Cattle Company currently raises horses on irrigated pastures and leases its cattle range to other operators (USDI and USDA 1997:55). Cascade Ranch runs cattle on most of its 2,095 acres of improved pasture, as well as all of its permanent range and transitory grazing lands (USDI and USDA 1997:55). Cascade Ranch also leases BLM-managed allotments and timber company land within the vicinity of their property. The combination of private and public lands utilized by Cascade Ranch forms the basis of the Coordinated Resource Management Plan of the Cascade Ranch complex. This cooperative agreement involves timber, livestock, wildlife, and riparian management strategies designed and overseen by the ranch, the timber companies involved, the BLM, Oregon Department of Fish and Wildlife, Oregon and Jackson County agriculture departments, and two U.S. Department of Agriculture representatives: Oregon State University Cooperative Extension and the Natural Resource Conservation Service.

Logging has occurred in the plan area since the 1870s when a water-powered sawmill operated on the North Fork Little Butte Creek. However, the area's lack of railroad accessibility and scattered nature of its high valued timber kept large-scale logging from occurring until the 1940s. From the 1940s through the 1960s, clearcut harvesting took place extensively on Forest Service and BLM lands in the high plateau (upper North and South Forks and upper Dead Indian Creek). Logging continued through the 1980s, however, silvicultural prescriptions changed from clearcut to shelterwood harvests. The most recent harvest on BLM-administered lands occurred in 2003 in the South Fork Little Butte Creek (Dead Indian, Conde, and Soda Creek drainages) and in 2006 in the North Fork Little Butte Creek (Wasson Canyon drainage). These harvests were designed under the Northwest Forest Plan and prescriptions were primarily for density management with some regeneration and fire salvage (Wasson Fire in 2005). A timber sale in the South Fork Little Butte Creek is scheduled to be offered in 2006.

Recreation activities occur on a year-round basis throughout the Key Watershed. Summer use is dominated by camping (at developed and dispersed sites), hiking, picnicking, and fishing but includes other activities such as mountain biking, horseback riding, off-highway vehicle (OHV) use, and pleasure driving. Fall use is primarily big game hunting. Winter uses are mostly centered around Nordic skiing and snowmobiling, but also include activities such as fishing and winter camping. There are no developed facilities managed by BLM within the plan area, however, developed private facilities include Camp Latgawa and Fish Lake Resort.

Roads distributed throughout the plan area provide vehicle access to managed forestlands, residences, and recreational areas. There are approximately 637 road miles within the Key Watershed, of which 27 percent are controlled by the BLM and 41 percent by the Forest Service (USDI and USDA 1997:87).

Geology

The North and South Forks Little Butte Creek Key Watershed is located in the Cascades Physiographic Province, which is composed of two volcanic subprovinces: the Western and High

Cascades. BLM-administered lands within the Key Watershed are primarily found in the Western Cascades, while most of the High Cascades are managed by the Forest Service. The Western Cascade geology is composed of older, softer volcanic materials. High Cascade rock types are much younger and are composed mainly of harder lava flows.

The Western Cascades are deeply dissected and have a well-developed dendritic drainage pattern in response to landsliding and surface erosion. A majority of the Western Cascades are dominated by lava flows of basaltic andesite, basalt, and andesite of the Wasson, Heppsie, and Roxy formations. These lavas are interlayered with softer pyroclastic flows of andesitic tuff, basaltic breccia, ash flow tuff, dacite tuff, and andesitic breccia. Western Cascade soils have a higher clay content than the High Cascades soils and, consequently, have much lower infiltration rates.

High Cascades lava flows are characterized as having gentler, smoother, and much less dissected slopes than the Western Cascades. The High Cascades materials are less erodible and not as unstable as the Western Cascades soils and rocks. Rock types of the High Cascades include basaltic andesite, andesite, and basalt lavas. High Cascades soils contain more silt, sand, and gravels than the Western Cascades and are generally shallower and less weathered.

Climate

Mild, wet winters and hot, dry summers characterize the North and South Forks Little Butte Creek Key Watershed. During the winter months, the moist, westerly flow of air from the Pacific Ocean results in frequent storms of varied intensities. Average annual precipitation ranges from approximately 26 inches at the North and South Forks confluence to 66 inches at Mount McLoughlin. Winter precipitation in the higher elevations (generally above 5,000 feet) usually occurs as snow, which ordinarily melts during the spring runoff season from April through June. Rain predominates in the lower elevations (generally less than 3,500 feet) with the majority occurring in the late fall, winter, and early spring. A mixture of snow and rain occurs between approximately 3,500 feet and 5,000 feet and this area is referred to as either the rain-on-snow zone or transient snow zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. The transient snow zone occupies approximately 46 percent of the Key Watershed, while the snow and rain-dominated precipitation zones occupy 29 and 25 percent, respectively.

During the summer months, the plan area is dominated by the Pacific high pressure system, which results in hot, dry summers. Summer rainstorms occur occasionally and are usually of short duration and limited area coverage. Air temperatures can display wide variations daily, seasonally, and by elevation. The nearest NOAA weather stations with air temperature data are located at Howard Prairie Dam (located south of the plan area) and the Medford Weather Station (west of the plan area). The highest average maximum monthly temperatures occur in July and August, where they reach 79.2^{o}F and 79.7^{o}F at the Howard Prairie Dam Station and 90.5^{o}F and 90.8^{o}F at the Medford Station (USDI and USDA 1997:21).

Streamflows

Streamflows in the North and South Forks Little Butte Creek Key Watershed fluctuate with seasonal variation of precipitation. Moderate to high flows generally occur from mid-November through May. Streamflows during the months of April and May and part of June are augmented by melting snowpack in the high elevations.

Low flows for the South Fork Little Butte Creek normally coincide with the period of low precipitation from July through September or October. Summer streamflows in the South Fork are dramatically altered by transbasin diversions. Water is diverted from South Fork Little Butte Creek and its tributaries into collection canals that transport the water to Howard Prairie Reservoir in the Klamath Basin. There are five points of diversion located on Conde Creek, Dead Indian Creek, South Fork Little Butte Creek, Daley Creek, and Beaver Dam Creek. A total of 62,000 acre-feet is allowed to be transferred out of the South Fork and its tributaries during the irrigation season.

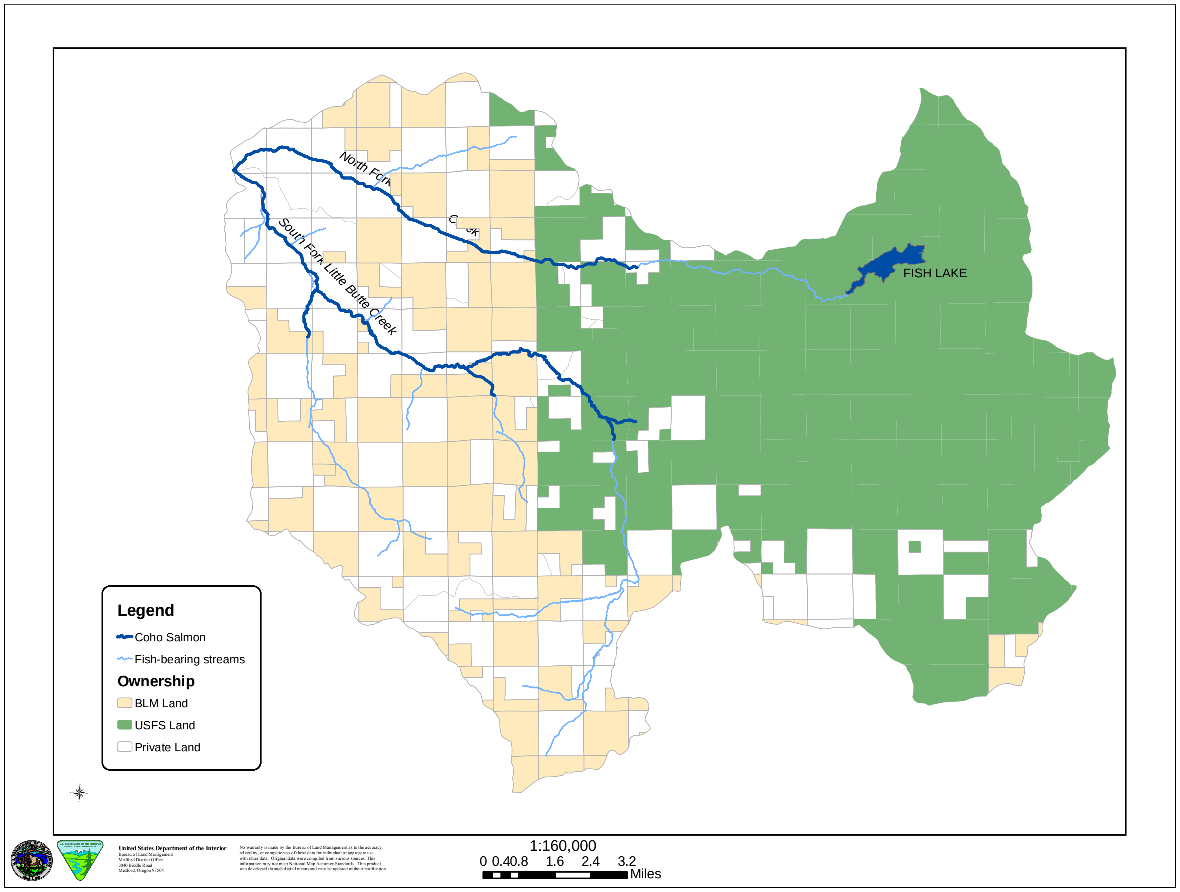
Streamflow patterns in North Fork Little Butte Creek are dramatically altered by the water transported to Fish Lake from Four Mile Lake in the Klamath Basin. Winter flows in North Fork Little Butte Creek are moderated by storage in Fish Lake and summer flows are greatly increased by releases from Fish Lake. Outflows from Fish Lake are sent down the North Fork to the confluence with South Fork Little Butte Creek where the water is diverted to the South Fork. From the South Fork, water is diverted via irrigation ditches to supply Agate Lake with irrigation water for Bear Creek Watershed.

Aquatic Wildlife Species

There are three native anadromous salmonids that spawn and rear in the North and South Fork Little Butte Creek Key Watershed: coho salmon, chinook salmon (spring and fall runs), and steelhead trout (summer and winter runs). Although the BLM manages 21 percent of the land within the Key Watershed, only 12 percent of the anadromous salmonid habitat crosses BLM-administered land.

Southern Oregon/Northern California Coho salmon (*Oncorhynchus kisutch*), a species listed as threatened under the Endangered Species Act (May 1997) are present in North and South Forks Little Butte, Lost, Soda, and Dead Indian Creeks for a total of 27 miles (Figure 5). The coho salmon population in the Key Watershed is depressed due to loss of habitat and poor water quality (USDI and USDA 1997:44). South Fork Little Butte Creek is one of the primary rearing areas within the range of this depressed population of coho salmon.

Figure 5. Coho Distribution in the North and South Forks Little Butte Creek Key Watershed



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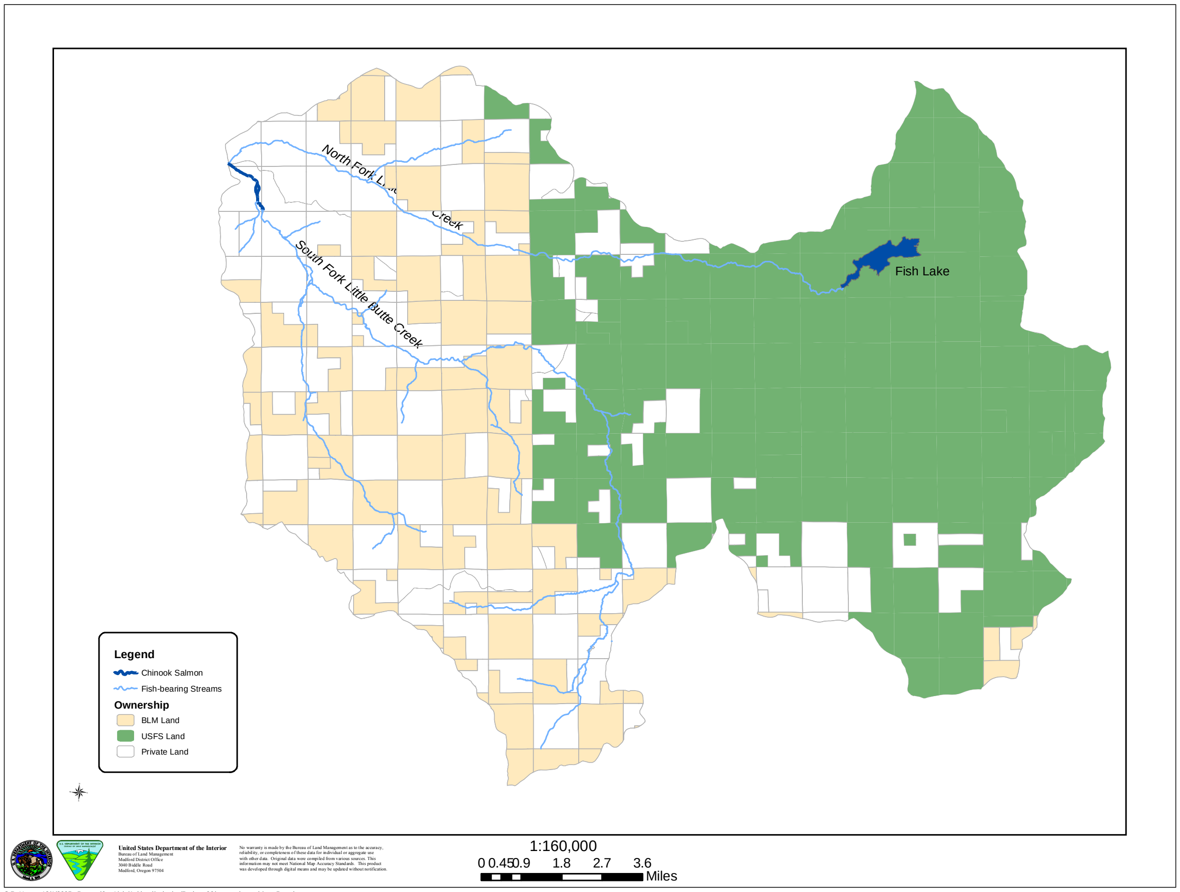
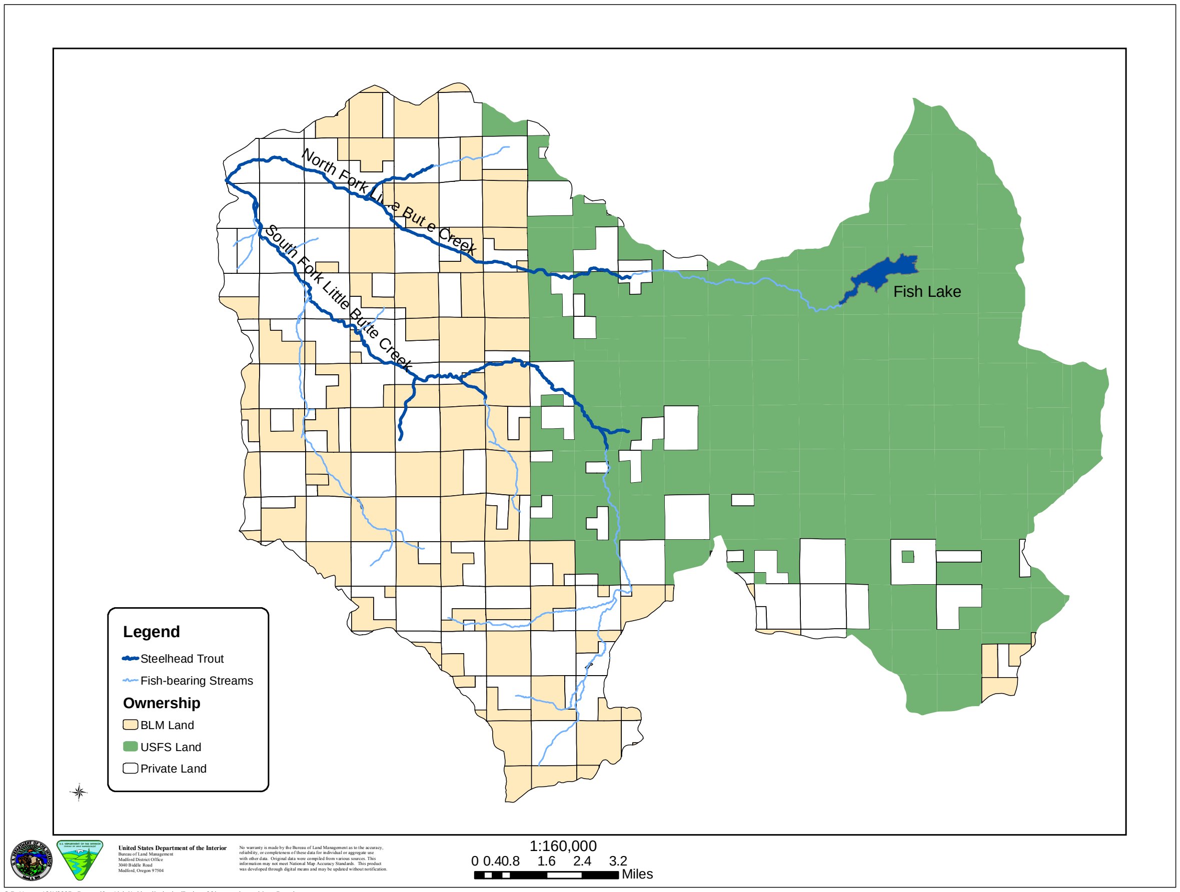
Spring chinook salmon (*O. tshawytscha*) spawn in the lower 1.8 miles of South Fork Little Butte Creek (Figure 6). The spring chinook population is depressed. A small number of fall chinook salmon are found up to river mile 1.0 on the North Fork Little Butte Creek. The fall chinook population is robust. Coho and chinook salmon spawn in the fall.

Figure 6. Chinook Distribution in the North and South Forks Little Butte Creek Key Watershed



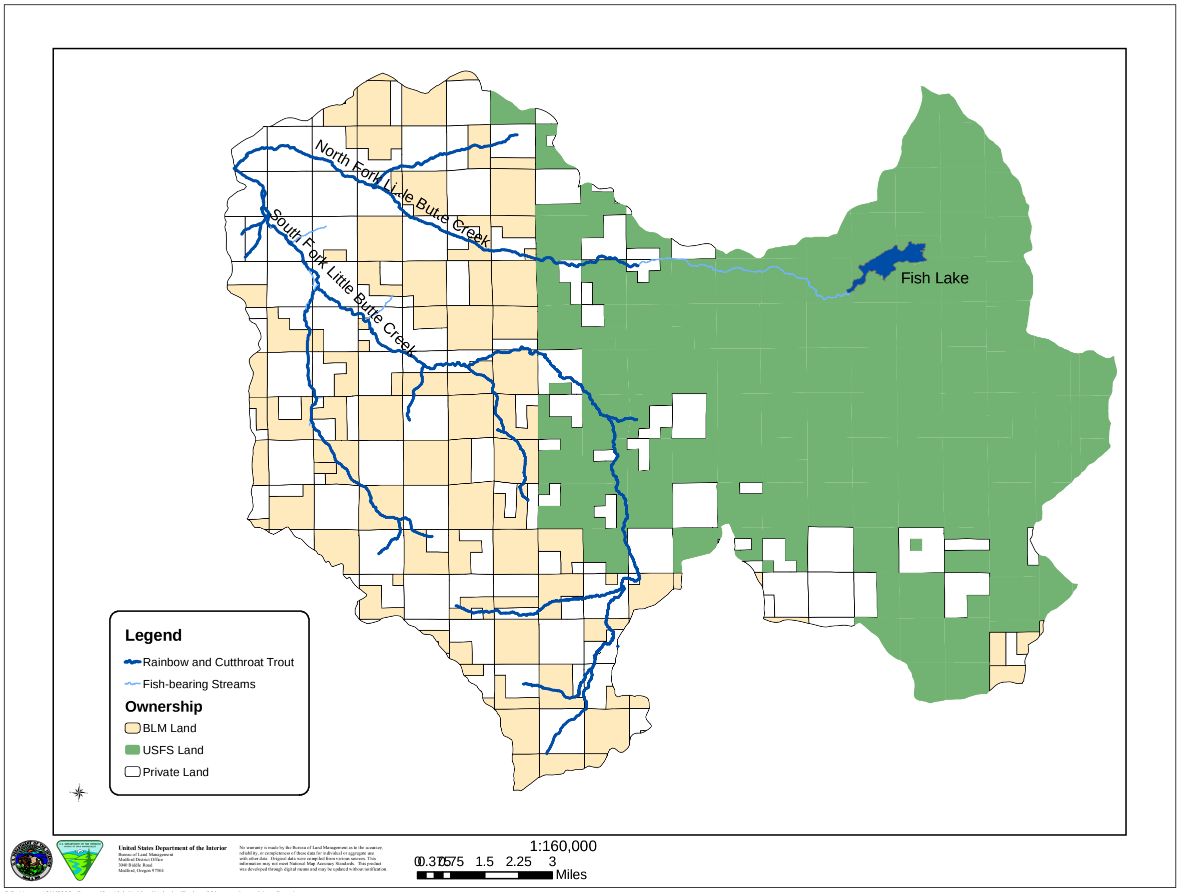
Summer and winter steelhead (*O. mykiss*) use a total of 29.7 miles of habitat in North and South Forks Little Butte Creek, and the lower reaches of Wasson, Deer, Soda, and Dead Indian Creeks (Figure 7). Summer and winter steelhead trout spawn from January to May.

Figure 7. Summer and Winter Steelhead Distribution in the North and South Forks Little Butte Creek Key Watershed



Native resident fish species in the Key Watershed (Figure 8) include cutthroat trout (*O. clarki*), rainbow trout (*O. mykiss*), Klamath smallscale sucker (*Catostomus rimiculus*) and reticulate sculpin (*Cottus perplexus*). Cutthroat trout are found in North and South Forks Little Butte, Wasson, Deer, Soda, Dead Indian, and Conde Creeks for a total of 39.7 miles. There are 48.8 miles of habitat available to rainbow trout in the plan area, most of which is found in North and South Forks Little Butte Creek. Additional habitat is found in Lost, Deer, Soda, and Dead Indian Creeks. The Klamath smallscale sucker is only known to inhabit the South Fork Little Butte Creek, while the reticulate sculpin has been found in the North and South Forks Little Butte Creek as well as the lower reaches of Deer, Soda, and Dead Indian Creeks.

Figure 8. Resident Trout Distribution in the North and South Forks Little Butte Creek Key Watershed



Pacific giant salamanders have been observed throughout the plan area, although little is known about their status.

The major limiting factors influencing aquatic species distribution and instream habitat condition are: high summer stream temperatures and sedimentation in low gradient, unconfined stream channels. Other limiting factors include: riparian degradation, instream degradation, fish passage barriers, fish carcass reduction, and wetland and floodplain losses (USDI and USDA 1997:108 and 172).

Watershed Analysis

The Northwest Forest Plan (NWFP) Standards and Guidelines (USDA and USDI 1994) incorporate the Aquatic Conservation Strategy (ACS) (amended March 2004, USDA and USDI 2004) to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Watershed analyses are a required component of the ACS under the NWFP. The *Little Butte Creek Watershed Analysis* includes the Key Watershed and was completed in November 1997 (USDI and USDA 1997). This WQRP tiers to and appends the watershed analysis. A summary of historical and present watershed conditions in the North and South Forks Little Butte Creek Key Watershed has been compiled from the watershed analysis (Table 5). The analysis and recommendations found in this WQRP use data from the watershed analysis. Additional analysis and recommendations have been included in this WQRP where the watershed analysis data were incomplete or new information was available.

Table 5. Summary of Watershed Conditions on BLM-Administered Lands in the North and South Forks Little Butte Creek Key Watershed

Riparian Vegetation	
Historical Condition	• Late seral vegetation dominant. • Diverse mix of species and age classes.
Present Condition	• Mature hardwoods and small-diameter conifers with dense understory. • Non-native blackberries along lower elevation stream corridors.
Forest Health & Productivity	
Historical Condition	• Frequent, low intensity fires maintained low fuel levels and open under-story. • Forest stands had fewer trees per acre with trees of larger diameter. • Forest stands had diverse age classes. • Forests predominately composed of Douglas-fir, pine, and hardwood mixtures. • Areas of open mature oak forest.
Present Condition	• Fire exclusion resulting in high fuel loads. • High vegetation densities resulting in low vigor and/or poor growth. • Forest stands lack resiliency. • Forests experiencing mortality due to beetle infestations.
Large Wood	
Historical Condition	• Probably an adequate supply of large wood in the stream channels.
Present Condition	• Some stream reaches lack adequate large wood. • Road stream crossings disrupt transport of wood and sediment.
Roads	
Historic Condition	• Few roads before industrial timber harvesting began in the early 1950s.
Present Condition	• Areas with high road density. • Roads in riparian areas. • High number of stream crossings with many culverts undersized for 100-year flood. • Stream network extension (due to road ditch lines) increases winter peak flows.
Flow Regime	
Historic Condition	• Channel morphology developed in response to climatic conditions and natural ranges of streamflows. • Most likely, peak flows were lower in magnitude and frequency. • Summer low flows were directly related to the amount and timing of precipitation events.
Present Condition	• Winter peak flows possibly increased by roads and harvest. • Summer low flows reduced by water withdrawals and interbasin transfer.

C. Temperature

Introduction

The most sensitive beneficial uses affected by excessive temperatures include resident fish and aquatic life, salmonid fish spawning, and rearing (ODEQ 2004:5).

The Oregon water quality temperature standard that applies to the North and South Forks Little Butte Creek Key Watershed was approved by EPA on March 2, 2004 and is found in OAR 340-041-0028 (4) (a-c) (ODEQ 2006). Excerpts of the 2004 standard read as follows:

> *(4) Biologically Based Numeric Criteria. Unless superseded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for State waters supporting salmonid fishes are as follows:*
>
> *(a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to OAR 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;*
>
> *(b) The seven-day-average maximum temperature of a stream identified as having core cold water habitat use on subbasin maps set out in OAR 340-041-101 to OAR 340-041-340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit);*
>
> *(c) The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to OAR 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);*

Fish Use maps 271A and 271B for the Rogue Basin temperature water quality standards can be found at: http://www.deq.state.or.us/wq/standards/WQStdsFinalFishUseMaps.htm. Salmon and steelhead spawning use designations (map 271B) vary by stream: for South Fork Little Butte Creek it is September 15 through June 15 from the mouth to just below Soda Creek and October 15 through June 15 above that point; for North Fork Little Butte Creek it is October 15 through June 15 for the lower portion and January 1 through June 15 for the upper reach; for Peck Gulch, Wasson Creek, Lost Creek, Grizzly Creek, and the lower reaches of Deer, Soda, and Dead Indian Creeks it is January 1 through June 15. The seven-day average maximum temperature for these streams may not exceed 13.0°C (55.4°F) during the stated period of spawning use. Perennial streams in the North and South Forks Little Butte Creek Key Watershed are designated as core cold-water habitat on fish use map 271A, therefore the seven-day-average maximum for these streams may not exceed 16.0°C (60.8°F) outside the salmon and steelhead period of spawning use.

A stream is listed as water quality limited for temperature if there is documentation that the seven-day moving average of the daily maximums (7-day statistic) exceeds the appropriate standard listed above. This represents the warmest seven-day period and is calculated by a moving average of the daily maximums.

Conde and Dead Indian Creeks are the only streams listed for temperature based on a 2004 list date. These are non-spawning streams that are listed for exceeding the temperature criterion year around.

The other temperature-listed streams on the draft 2004 303(d) list are listed based on a 1998 list date (Table 3). These listings use the State of Oregon water quality standards adopted in 1996. Excerpts of the 1996 standard (OAR 340-041-0365(2)(b)) read as follows:

A) To accomplish the goals identified in OAR 340-041-0120(11), unless specifically allowed under a Department-approved surface water temperature management plan as required under OAR 340-041-0026(3)(a)(D), no measurable surface water temperature increase resulting from anthropogenic activities is allowed:
(i) In a basin for which salmonid fish rearing is a designated beneficial use, and in which surface water temperatures exceed 64.0°F (17.8°C);
(ii) In waters and periods of the year determined by DEQ to support native salmonid spawning, egg incubation, and fry emergence from the egg and from the gravels in a basin which exceeds 55.0°F (12.8°C);
(iii) In waters determined by DEQ to support or to be necessary to maintain the viability of native Oregon bull trout, when surface water temperatures exceed 50.0°F (10.0°C);
(iv) In waters determined by DEQ to be ecologically significant cold-water refugia;
(v) In stream segments containing federally listed Threatened and Endangered species if the increase would impair the biological integrity of the Threatened and Endangered population;
(vi) In Oregon waters when the dissolved oxygen (DO) levels are within 0.5 mg/l or 10 percent saturation of the water column or intergravel DO criterion for a given stream reach or subbasin;
(vii)In natural lakes.

Within the Key Watershed, North and South Forks Little Butte, Lost, and Soda Creeks are on the draft 2004 303(d) list for exceeding the 64.0°F 7-day statistic for rearing salmonids as found in the 1996 standard.

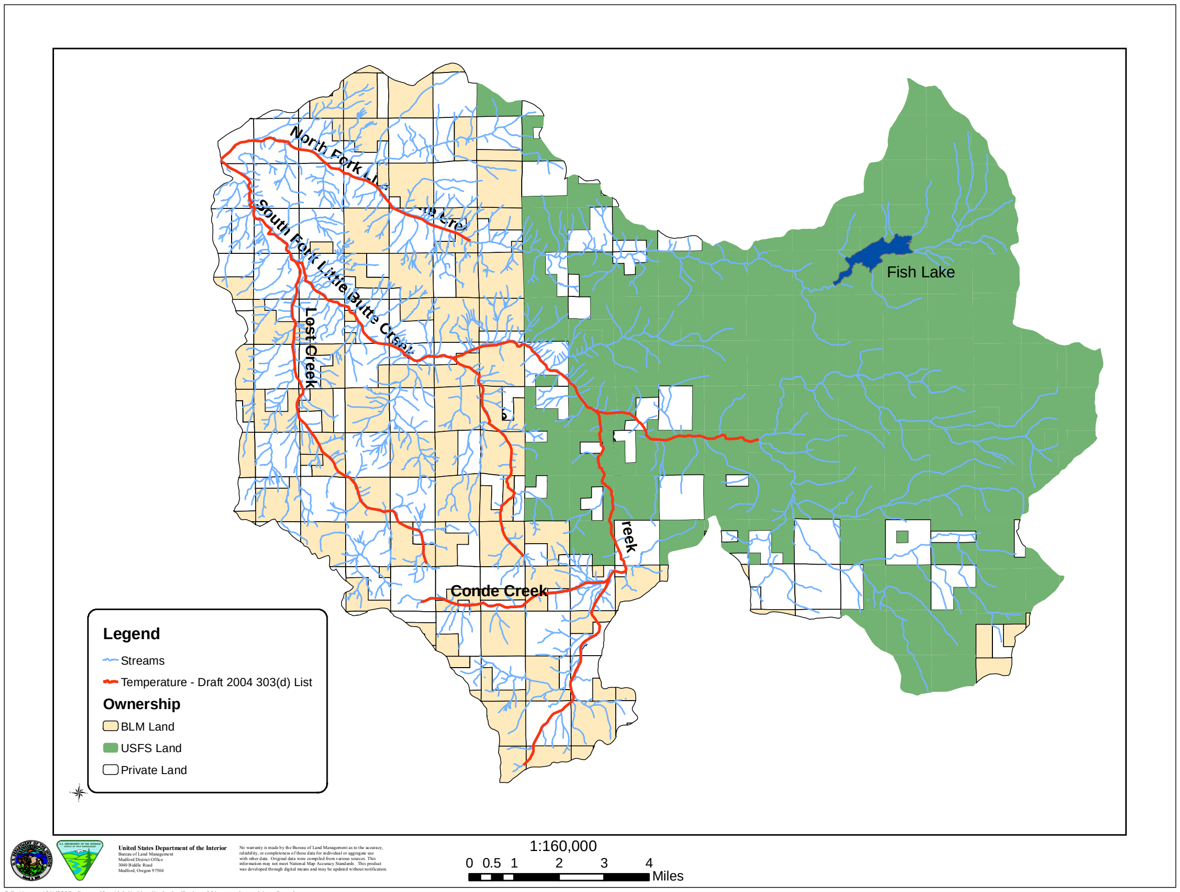
There are a total of 50.9 stream miles listed for temperature (36.9 miles for summer temperature and 14.0 miles for year around temperature) in the Key Watershed of which 13.7 miles (1.1 miles on Conde Creek, 1.2 miles on Dead Indian Creek, 4.4 miles on Lost Creek, 0.4 miles on North Fork Little Butte Creek, 5.2 miles on Soda Creek, and 1.4 miles on South Fork Little Butte Creek) are on BLM-administered lands (Table 6 and Figure 9).

Table 6. 303(d) Temperature-Listed Reaches in the North and South Forks Little Butte Creek Key Watershed.

303(d) List Date	Stream Segment	Season	Applicable Rule (at time of listing)	Total Miles Affected	BLM Miles Affected
2004	Conde Creek	Year around	OAR 340-041-0028(4)(b)	4.4	1.1
2004	Dead Indian Creek	Year around	OAR 340-041-0028(4)(b)	9.6	1.2
Total Stream Miles listed for Temperature Criteria (Year around)				**14.0**	**2.3**
1998	Lost Creek	Summer	OAR 340-041-0365(2)(b)(A)	8.4	4.4
1998	North Fork Little Butte Creek	Summer	OAR 340-041-0365(2)(b)(A)	6.5	0.4
1998	Soda Creek	Summer	OAR 340-041-0365(2)(b)(A)	5.6	5.2
1998	South Fork Little Butte Creek	Summer	OAR 340-041-0365(2)(b)(A)	16.4	1.4

303(d) List Date	Stream Segment	Season	Applicable Rule (at time of listing)	Total Miles Affected	BLM Miles Affected
Total Stream Miles listed for Temperature Criteria (Summer)				**36.9**	**11.4**

Figure 9. Draft 2004 303(d) Temperature-Listed Streams for the North and South Forks Little Butte Creek Key Watershed



The BLM collected summertime stream temperature data at locations within the North and South Forks Little Butte Creek Key Watershed between 1994 and 2005 (Table 7). The 7-day statistics for all sites listed in Table 7 exceed both the 1996 and 2004 temperature criteria.

Table 7. Temperature Summary for the North and South Forks Little Butte Creek Key Watershed

Stream Name	Period of Record[1]	7-day Statistic (ave. for all years) (°F)	Range of 7-day Statistic (for all years) Minimum (°F)	Range of 7-day Statistic (for all years) Maximum (°F)
Conde Creek (above TID diversion)	1994-1997, 1999-2003, 2005	72.1	69.2	74.0
Dead Indian Creek (above Conde Creek)	1994-2001, 2003-2005	74.9	72.5	77.6
Deer Creek (near mouth)	1994-1995, 1997-2001, 2003	64.3	61.2	66.6
Lost Creek (above Coon Creek)	1995-1996, 1998-2001, 2003-2005	70.1	64.8	72.8
North Fork Little Butte Creek (near Heppsie Mtn. Rd.)	1994-2001	64.2	60.2	67.9
Soda Creek (near South Fork confluence)	1994-2001, 2003-2005	67.7	63.6	70.4
South Fork Little Butte Creek (near North Fork confluence)	1994, 1998, 2000	78.5	77.9	79.3
South Fork Little Butte Creek (above Soda Creek)	1994, 1998-2001, 2004-2005	73.4	70.6	74.8

1/ Temperature measured from June to September

Nonpoint Source Temperature Factors

Stream temperature is influenced by riparian vegetation, channel morphology, hydrology, climate, and geographic location. While climate and geographic location are outside of human control, the condition of the riparian area, channel morphology and hydrology can be altered by land use. Human activities that contribute to degraded thermal water quality conditions in the North and South Forks Little Butte Creek Key Watershed include: agricultural activity; rural residential developments; water withdrawals; timber harvests; local and forest access roads; and state highways (USDI and USDA 1997). Timber harvest, roads, and livestock grazing are the primary impacts specific to federally managed lands that have the potential to affect water quality conditions in the plan area. For the Rogue Basin temperature TMDL, there are four nonpoint source factors that may result in increased thermal loads: stream shade, stream channel morphology, flow, and natural sources (ODEQ 2004:8).

Temperature Factor 1: Stream Shade

Stream temperature is driven by the interaction of many variables. Energy exchange may involve solar radiation, long wave radiation, evaporative heat transfer, convective heat transfer, conduction, and advection (USDA and USDI 2005). While interaction of these variables is complex, some are much more important than others (USDA and USDI 2005). The principal source of heat energy for streams is solar energy striking the stream surface (USDA and USDI 2005). Exposure to direct solar radiation will often cause a dramatic increase in stream temperatures. Highly shaded streams tend to experience cooler stream temperatures due to reduced input of solar energy. Stream surface shade is dependent on riparian vegetation height, location, and density. The ability of riparian vegetation to shade the stream throughout the day depends on vegetation height and the vegetation position relative to the stream. For a stream with a given surface area and stream flow, any increase in the amount of heat entering a stream from solar radiation will have a proportional increase in stream temperature (USDA and USDI 2005).

Removal of riparian vegetation, and the shade it provides, contributes to elevated stream temperatures. Activities in riparian areas such as timber harvest, road construction, residential and agricultural clearing, and livestock grazing, have reduced the amount of riparian vegetation in the North and South Forks Little Butte Creek Key Watershed. Riparian areas in the plan area cover less area and contain fewer species than under historic conditions. They tend to be younger in age and dominated by hardwoods (USDI and USDA 1997). Conifers, such as Douglas-fir, ponderosa pine, and white fir are a bigger component of the riparian vegetation as the elevation increases, however the average diameter is smaller than what existed historically. Riparian vegetation appears patchy: areas with many layers of riparian vegetation, including large-diameter trees, are scattered in between clumps of even-aged alder and cottonwood and shrub-dominated areas. Woodland stands are fragmented, creating a patchy, poorly connected landscape of simpler and less biologically productive habitat. These changes have resulted in less shade on stream surfaces and an increase in stream water temperatures. Such altered riparian areas are not sources of large wood and they lack the cool, moist microclimate that is characteristic of healthy riparian zones.

The primary reason for elevated stream temperatures on BLM-managed lands is an increase in solar radiation reaching the stream surface following timber harvest or road construction that removed stream shading vegetation. Pre-NWFP management activities along streams on federal lands in the plan area have left a mosaic of vegetation age classes in the riparian areas. The amount of riparian area with late-successional forest characteristics has declined on federal lands primarily due to timber harvest and road construction within or adjacent to riparian areas. In some cases the large conifers have been replaced by young, small diameter conifer stands and in other cases, hardwoods have replaced conifers as the dominant species in riparian areas. In riparian areas where the trees are no longer tall enough to adequately shade the adjacent streams, the water flowing through these exposed areas is subject to increased solar radiation and subsequent elevated temperatures.

Temperature Factor 2: Stream Channel Morphology

Stream channel morphology can also affect stream temperature. Wide channels tend to have lower levels of shade due to simple geometric relationships between shade producing vegetation and the angle of the sun. For wide channels, the surface area exposed to radiant sources and ambient air temperature is greater, resulting in increased energy exchange between the stream and its environment (ODEQ 2004:8). Conversely, narrow channels are more likely to experience higher levels of shade. An additional benefit inherent to narrower/deeper channel morphology is a higher frequency of pools that contribute to aquatic habitat or cold water refugia (ODEQ 2004:8).

Large wood plays an important role in creating stream channel habitat. Obstructions created by large wood help to settle out gravel. The deposition of gravel helps to decrease thermal loading by reducing the amount of water exposed to direct solar input, as a portion of the water will travel sub-gravel and not be exposed to sun. The loss of large wood in the North and South Forks Little Butte Creek Key Watershed has had a direct impact on stream channel morphology. Once the large wood was removed, the alluvial material held behind it washed out, causing channels to down-cut and eventually widen, allowing for increased thermal loading and stream heating.

Channel widening is often related to degraded riparian conditions that allow increased streambank erosion and sedimentation of the streambed. Both active streambank erosion and sedimentation correlate strongly to riparian vegetation type and age. Riparian vegetation contributes to rooting strength and floodplain/streambank roughness that dissipates erosive energies associated with flowing water. Established mature woody riparian vegetation adds the highest rooting strengths and floodplain/streambank roughness. Annual (grassy) riparian vegetation communities offer less rooting strength and floodplain/streambank roughness. It is expected that width to depth ratios would be lower (narrower and deeper channels) when established mature woody vegetation is present. Annual (grassy) riparian communities may allow channels to widen and become shallower.

Changes in sediment input can lead to a change in channel morphology. When sediment input increases over the transport capability of the stream, sediment deposition can result in channel filling, thereby increasing the width-depth ratio. During storm events, management-related sources can increase sediment inputs over natural levels and contribute to channel widening and stream temperature increases. Natural erosion processes occurring in the plan area such as landslides, surface erosion, and flood events contribute to increased sedimentation (USDI and USDA 1997:99). Sediment sources resulting from human activities include roads; logging (tractor skid trails, yarding corridors, and landings); off-highway vehicle (OHV) trails; concentrated livestock grazing in riparian zones; residential and agricultural clearing of riparian zones; maintenance of irrigation diversions; irrigation return flows; and irrigation ditch blowouts (USDI and USDA 1997:99). Roads appear to be the primary human-caused sediment source from BLM-administered lands in the plan area.

Temperature Factor 3: Streamflow

Streamflow can influence stream temperature. The temperature change produced by a given amount of heat is inversely proportional to the volume of water heated (USDA and USDI 2005). A stream with less flow will heat up faster than a stream with more flow given all other channel and riparian characteristics are the same.

The North and South Fork Little Butte Creek Key Watershed experiences extreme flow conditions typical of southwest Oregon streams. Historical flows are a function of seasonal weather patterns: rain and snow in the winter months contribute to high flow volumes, while the summer dry season reduces flow.

Summer streamflows have been dramatically altered by transbasin diversions for irrigation. A total of 62,000 acre-feet is permitted to be transferred from South Fork Little Butte Creek and its tributaries to

Howard Prairie Reservoir (in the Klamath Basin) during the irrigation season. Conversely, water is diverted from Fourmile Lake in the Klamath Basin to Fish Lake in the Rogue Basin. Outflows from Fish Lake are sent down North Fork Little Butte Creek to the confluence with South Fork Little Butte Creek where the water is diverted to the South Fork. From South Fork, water is transported via irrigation ditches to the Bear Creek Watershed.

Water withdrawals and irrigation return flows likely result in increased thermal loads within the Key Watershed. The management of water withdrawals is within the jurisdiction of the Oregon Water Resources Department (OWRD). There are approximately 17 small (0.7 acre feet or less) BLM-managed and OWRD-permitted reservoirs within the plan area that are used for wildlife, livestock, prescribed fire, and road operations.

Temperature Factor 4: Natural Sources
Natural processes that may elevate stream temperature include drought, floods, fires, insect and disease damage to riparian vegetation, and blowdown in riparian areas. The gain and loss of riparian vegetation by natural process will fluctuate within the range of natural variability. The processes in which natural conditions affect stream temperature include increased stream surface exposure to solar radiation and decreased summertime flows (ODEQ 2004:9). These natural events and their effects on stream temperature are considered natural background and no attempt is made to quantify the impact or frequency of such events in this WQRP.

Temperature TMDL Loading Capacity and Allocations
DEQ's draft 2004 303(d) list identifies six streams (Conde, Dead Indian, Lost, Soda, and North and South Forks Little Butte Creeks) within the plan area that exceed the numeric water quality criteria from the 1996 and 2004 standards (64°F and 60.8°F, respectively). In the absence of a completed TMDL and related analysis, this condition requires that the standard "no measurable surface water temperature increase resulting from anthropogenic activities is allowed" is met (ODEQ 2004:10).

For the plan area, loading capacity is defined as the thermal load in btu/ft^2/day when: (1) National Pollution Discharge Elimination System (NPDES) permitted point source effluent discharge results in no measurable temperature increases in surface waters and (2) solar loading is reduced to that of system potential (ODEQ 2004:10).

Prior to the completion of the TMDL for the plan area, guidance from the DEQ assumes that streams at system potential will not meet the temperature criterion during the hottest time of year (ODEQ 2004:11). Therefore, 100 percent of the load allocation for the North and South Forks Little Butte Creek Key Watershed is assigned to natural sources and the allocation for BLM-managed lands is zero percent. Any activity that results in anthropogenic-caused heating of the stream is unacceptable. This load allocation may be modified upon completion of the Rogue Basin TMDL.

The TMDL temperature load allocation for BLM-managed lands is defined as system potential riparian conditions. System potential is the near stream vegetation community that can grow and reproduce on a site, given elevation, soil properties, plant biology, and hydrologic processes (ODEQ 2003). System potential is an estimate of a condition without anthropogenic activities that disturb or remove near-stream vegetation (ODEQ 2003).

The nonpoint source loading allocation is defined as the amount of solar radiation that reaches a stream surface when riparian vegetation and stream channels have achieved system potential. A TMDL allows for the use of surrogate measures to achieve loading capacity. Percent-effective shade serves as the surrogate measure for meeting the temperature TMDL. Percent-effective shade is defined as the percent reduction of solar radiation load delivered to the water surface (ODEQ 2003). It can be measured in the field and relates directly to solar loading.

System potential shade targets (percent-effective shade) along with current shade were calculated for eight streams on BLM-administered lands within the North and South Forks Little Butte Creek Key Watershed: Conde, Dead Indian, Deer, Lost, North and South Forks Little Butte, Soda, and West Fork Dead Indian Creeks (Table 8). The Shadow model (USDA 1993) was used for the shade assessment. The Shadow model determines the system potential targets and number of years needed to obtain shade recovery using forest growth curves for various tree species within southwestern Oregon. The growth curves project growth rates and maximum heights for the dominant riparian tree species. Target shade values represent the maximum potential stream shade based on the system potential tree height.

The BLM-administered lands along the assessed reaches of Conde, Dead Indian, Deer, Lost, North Fork Little Butte, and West Fork Dead Indian Creeks meet the target shade. The BLM-administered lands on the assessed reaches of Soda and South Forks Little Butte Creeks need 30 and 40 years, respectively, to reach the target shade. Of the 4.9 miles assessed for shade on Soda Creek, only the upper 0.8 mile is in need of additional shade. Existing shade on this upper reach is 12 percent and target shade is 80 percent. Current shade on the rest of Soda Creek is equal to the target shade.

Table 8. Percent-Effective Shade Targets for BLM-Managed Lands in the North and South Forks Little Butte Creek Key Watershed (ODEQ 2004: Appendix A)

Stream	Tributary to	Stream Miles Assessed on BLM	Current Shade[1] (%)	Target Shade[1] (%)	Additional Shade Needed[2] (%)	Time to Recovery[3] (years)
Conde Creek	Dead Indian Creek	1.1	88	88	0	0
Dead Indian Creek	South Fork Little Butte Creek	0.4	87	87	0	0
Deer Creek	South Fork Little Butte Creek	1.6	95	95	0	0
Lost Creek	South Fork Little Butte Creek	4.4	92	92	0	0
North Fork Little Butte Creek	Little Butte Creek	0.8	95	95	0	0
Soda Creek	South Fork Little Butte Creek	4.9	78	89	11	30
South Fork Little Butte Creek	Little Butte Creek	1.4	62	74	12	40
West Fork Dead Indian Creek	Dead Indian Creek	0.9	33	33	0	0

1/ Current shade and target shade refer to percent-effective shade defined as the percent reduction of solar radiation load delivered to the water surface. Shade values are averages for all BLM stream miles assessed.

2/ Additional shade needed is the increase in percent-effective shade required to meet the target shade.

3/ If current shade is greater than or equal to the target shade, the time to recovery is listed as 0 years. If current shade is less than the target shade, the time to recovery is listed as the number of years needed to reach full system potential percent-effective shade. At a value equal to the target shade or ≥ 80 percent effective shade, a stream is considered recovered and the stream should not be a candidate for active restoration. Additional shade should come from passive management of the riparian area. Any increase over the target shade or 80 percent effective shade is considered a margin of safety. Years to recovery are a weighted average of recovery time for individual stream reaches.

D. Sedimentation

Introduction

Sedimentation has been identified as a water quality parameter of concern for four streams in the North and South Forks Little Butte Creek Key Watershed. Resident fish and aquatic life and salmonid fish spawning and rearing are the most sensitive beneficial uses affected by sedimentation (ODEQ 1998:24).

State of Oregon water quality criteria related to sedimentation are found in the following Oregon Administrative Rules (ODEQ 2004:6-7):

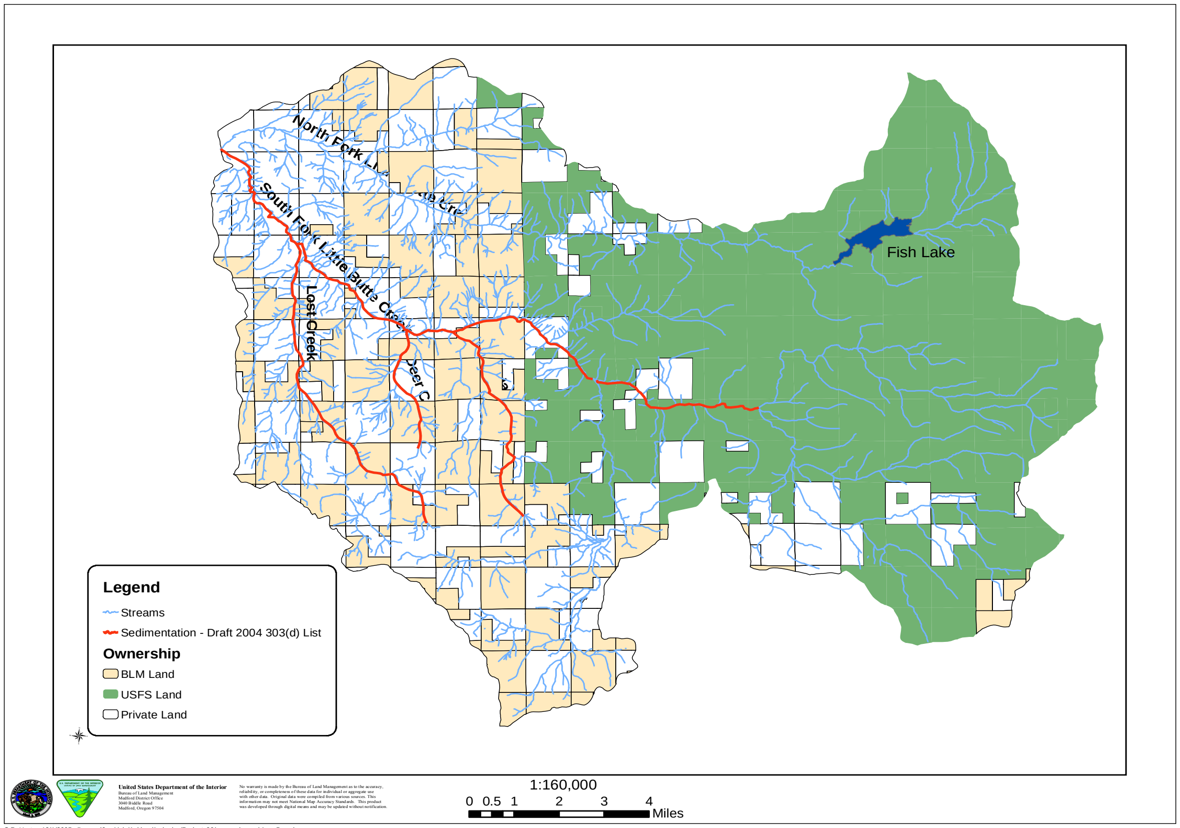
> *Sedimentation* OAR 340-041-0365(2)(j) – "The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed."
>
> *Biological criteria* OAR 340-41-027 – "Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities."
>
> *Turbidity* OAR 340-41-0365(2)(c) - "No more than a ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity."

There are a total of 33.6 stream miles listed for sedimentation, of which 12.6 miles (38 percent) cross BLM-administered lands (Table 9 and Figure 10).

Table 9. 303(d) Sedimentation-Listed Reaches in the North and South Forks Little Butte Creek Key Watershed

303(d) List Date	Stream Segment	Applicable Rule (at time of listing)	Total Miles Affected	BLM Miles Affected
1998	Deer Creek	OAR 340-041-0365 (2)(j)	3.2	1.6
1998	Lost Creek	OAR 340-041-0365(2)(j)	8.4	4.4
1998	Soda Creek	OAR 340-041-0365 (2)(j)	5.6	5.2
1998	South Fork Little Butte Creek	OAR 340-041-0365 (2)(j)	16.4	1.4
Total Stream Miles listed for Sedimentation Criteria			**33.6**	**12.6**

Figure 10. Draft 2004 303(d) Sedimentation-Listed Streams for the North and South Forks Little Butte Creek Key Watershed



The four sediment-listed streams in the plan area were designated as a result of Oregon Department of Fish and Wildlife (ODFW) reporting that a high percentage of fine sediment was measured in most reaches during a 1994 survey (Table 10). Fine sediments (silt and sand) as a percent of the wetted area totaled 33 percent in Deer Creek, 34 percent in Lost Creek, 34 percent in Soda Creek, and 23 percent in South Fork Little Butte Creek for the reaches surveyed. ODFW also noted a high percentage of actively eroding streambanks for Deer, Lost, and Soda Creeks (Table 10). These streams either support coho salmon or ODFW considers them coho critical habitat. Coho salmon in the plan area are listed as threatened under the Endangered Species Act (May 1997).

Table 10. Substrate and Streambank Stability for Sedimentation-Listed Streams

Stream Name	Miles Surveyed	Substrate[1] (Percent Wetted Area)						Streambank Stability[1] (Percent Actively Eroding)
		Silt/Fine Organics (<.062 mm)	Sand (.062-2 mm)	Gravel (2-64 mm)	Cobble (64-256 mm)	Boulder (>256 mm)	Bed-rock	
Deer Creek	2.9	9	24	27	16	13	11	51.3
Lost Creek	6.9	25	9	25	19	16	6	32.3
Soda Creek	5.5	22	12	19	11	13	23	62.9
South Fork Little Butte Creek	21.0	16	7	34	28	13	2	15.0

1/ Source: ODFW 1994

Sediment is a vital natural component of waterbodies and the uses they support. However, sediments can impair designated uses, including aquatic life, in many ways. Excessive sediments deposited on stream bottoms can choke spawning gravels (reducing survival and growth rates), impair fish food sources, fill in rearing pools (reducing cover from prey and thermal refugia), and reduce habitat complexity in stream channels. Excessive suspended sediments can make it more difficult for fish to find prey and at high levels can cause direct physical harm, such as clogged gills (USEPA 1999).

Sediment Sources

Sediment is a natural part of a healthy stream system with equilibrium between sediment input, routing, and in-stream storage. Under natural conditions, there is generally a balance between the amount of fine sediment, coarse bed load sediment, and larger elements of instream structure (i.e. wood, boulders). Sedimentation results from either stream channel or upland erosion. Disturbances that change riparian vegetation, increase the rate or amount of overland flow, or destabilize a stream bank may increase the rates of stream bank erosion and result in sedimentation increases (ODEQ 2004:9). Disturbances in the uplands that remove vegetation, reduce soil stability on slopes, or channel runoff can increase sediment inputs (ODEQ 2004:9). Sediment created from upland erosion is delivered to a stream channel through various erosional processes.

Erosion in the plan area occurs in the form of mass wasting (earthflows, slump earthflows, debris slides, and debris flows/torrents) and surface erosion (ravel, rill and gully erosion) (USDI and USDA 1997:28-29). These are natural cyclic processes that strongly influence sediment production and delivery in the Key Watershed. Natural processes that can affect erosion rates include: floods, wildfire, and slope instability (USDI and USDA 1997:58-60). Sediment inputs are dependent on quantity and intensity of precipitation. In steep areas of the Western Cascades, major precipitation events have a greater likelihood of triggering mass soil movements that subsequently introduce large pulses of sediment to stream channels. Winter is the time of maximum sediment input and maximum movement of sediments through the stream system however, impacts from sediment are year-long.

The dominant erosion process for the sediment-listed streams is mass wasting with episodic ("pulsed") sediment inputs. This was demonstrated during two recent events: the January 1, 1997 flood and multiple storms during December 2005. Major storms during these two periods triggered landslides and debris torrents. The resulting transport of large volumes of water, sediment, boulders, and debris into the stream systems was responsible for major stream channel erosion, especially in the mainstem of South Fork Little Butte Creek during the January 1997 flood. Debris torrents originating in Deer Creek tributaries during December 2005 sluiced out channels and scoured them to bedrock. These types of mass wasting events are natural erosion processes for the plan area; however, their rate of occurrence can be influenced by management actions such as road construction and timber harvest.

Sediment Sources on BLM-Administered Lands

Sediment sources on BLM-administered lands are nonpoint sources associated with management activities such as road development, timber harvest, and livestock grazing which can accelerate both upland and stream channel erosion rates.

The BLM only manages a portion of the watersheds draining into the four sediment-listed streams (Table 11). The Forest Service and private land owners also conduct management activities that contribute sediment to the listed streams.

Table 11. BLM Ownership for Sedimentation-Listed Watersheds

Listed Stream Name	Watershed Acres		% BLM Ownership
	Total	BLM	
Deer Creek	3,060	1,637	53.5
Lost Creek	11,444	5,418	47.4
Soda Creek	7,078	4,372	61.8
South Fork Little Butte Creek[1]	89,737	21,018	23.4

1/ South Fork Little Butte Creek watershed area includes the Deer, Lost, and Soda Creek watersheds.

Sediment Source 1: Road Development

Road construction has produced the most sediment generated from human-caused activities in the plan area (USDI and USDA 1997:60). There are two processes by which roads increase sediment loads in streams: 1) by increasing the incidence of mass failures; and 2) by erosion of the road surface, cut banks and ditches and subsequent transport of this material to the stream (Duncan et al. 1987). Although they occur infrequently, mass failures are likely responsible for contributing more sediment than surface erosion to the sediment-listed streams in the plan area.

Road-caused mass soil movement generally results from placing road fill material on steep slopes with shallow, non-cohesive soils. Road cuts through the toe of old earthflows can reinitiate them or increase their rate of movement. Fill material placed over the top of an old slump block can create an active slump-earthflow that can extend directly down into stream channels. Road drainage systems that route water onto these areas add to the risk of slope failure. Debris torrents can be initiated directly by discharging excessive amounts of surface water into steep first-order drainages.

Road density, use, design, and location can be important factors that affect the extent and magnitude of road-related sediment production (Reiter et al. 1995); however there is not a direct correlation between road density and sediment yield (Luce and Black 1999). There is high variability in sediment production from road segment to road segment. Most segments produce little sediment, while only a few produce a great deal (Luce and Black 1999). Sections of road having a steep gradient, being heavily used, and draining directly into larger streams have the highest potential to produce and deliver material of a size most apt to deposit on or in the streambed (Bilby et al. 1989). Older roads in mid-slope positions dominate the production of sediment during extreme storms (Wemple et al. 2001). Ridgetop roads usually have the least effect on streams (Furniss et al. 1991).

Roads can intercept streams and concentrate water onto unstable soils, thus setting up conditions that lead to slope failures and surface erosion. Undersized culverts at stream crossings can become plugged with debris during a high flow event and result in road fill failures. High energy runoff during intense rain storms can become concentrated into rills on steep road grades, especially if the road is unsurfaced. Surfaced roads are less likely to produce sediment (Swift 1984). Vegetation on the cutslope and ditch can be effective in reducing erosion from forest roads (Luce and Black 1999). Roads constructed adjacent to stream channels tend to confine the stream and restrict the natural tendency of streams to move laterally. This can lead to downcutting of the stream bed and accelerated channel erosion.

Natural or unsurfaced roads are generally more likely than surfaced roads (rocked or paved) to contribute sediment to streams. Road miles by surface type were determined for all roads on BLM-administered lands and BLM-controlled roads on non-BLM lands within each sediment-listed stream's watershed (Table 12). The road miles for South Fork Little Butte Creek include those shown for Deer, Lost, and Soda Creeks since these three streams are tributaries to South Fork. The road information was obtained from BLM's database in addition to an aerial photo analysis (using 2005 photos) that identified roads not in the database. All roads from the aerial photo analysis and those from the database with an unknown surface type were designated as natural surface for the purpose of analysis. Lost and South Fork Little Butte Creeks have the highest percentage of natural-surfaced roads.

Table 12. Road Miles by Surface Type for BLM-Administered Lands and BLM-Controlled Roads on Non-BLM Lands

Stream Name[1]	Road Surface Type			Total	% Natural Surface
	Natural (miles)	Rocked (miles)	Paved (miles)		
Deer Creek	4.4	13.1	0	17.5	25.2
Lost Creek	18.5	24.8	0	43.3	42.8
Soda Creek	7.9	26.1	7.3	41.3	19.1
South Fork Little Butte Creek	69.6	91.1	16.9	177.6	39.2

1/ Values listed in the table are for the watersheds associated with these streams.

Roads constructed on steep slopes are generally of greater concern with regards to sediment delivery to streams than those on flatter gradients. Using the same road data sources as for the surface-type analysis, road miles on slopes 60 percent or greater (Hass 2006) were calculated (Table 13). Deer Creek has the highest percentage of roads that are located on slopes 60 percent or greater.

Table 13. Road Miles on Slopes ≥60% for BLM-Administered Lands and BLM-Controlled Roads on Non-BLM Lands

Stream Name[1]	Roads Miles on Slopes ≥60%	% of Road Miles on Slopes ≥60%
Deer Creek	3.0	17.2
Lost Creek	0.5	1.2
Soda Creek	2.3	5.6
South Fork Little Butte Creek	6.4	3.6

1/ Values listed in the table are for the watersheds associated with these streams.

Roads located within riparian areas adjacent to streams are more likely to be responsible for contributing to sediment entering stream channels than those located farther away. Roads within Riparian Reserves that are either under BLM control or on BLM-administered lands were analyzed for the watersheds associated with the sediment-listed streams (Table 14). Riparian Reserve widths are based on site potential tree heights and for BLM-administered lands in the South Fork Little Butte Creek watershed they range from: 320 feet to 400 feet for fish-bearing streams, lakes, and natural ponds; 150 feet to 200 feet for perennial nonfish-bearing streams, constructed ponds and reservoirs, and wetlands greater than 1 acre; 100 feet to 200 feet for intermittent streams; and 100 feet for wetlands less than 1 acre. For unstable and potentially unstable ground, Riparian Reserves are designated 200 feet above and 75 feet along each side. Deer Creek has the highest percentage of roads within Riparian Reserves.

Table 14. Road Miles within Riparian Reserves for BLM-Administered Lands and BLM-Controlled Roads on Non-BLM Lands

Stream Name[1]	Roads Miles within Riparian Reserves	Road Miles within Riparian Reserves for Unstable Areas	% of Total Road Miles within all Riparian Reserves
Deer Creek	5.6	0.4	34.4
Lost Creek	9.4	0.9	23.8
Soda Creek	6.9	0.3	17.6
South Fork Little Butte Creek	36.6	1.7	21.5

1/ Values listed in the table are for the watersheds associated with these streams.

The potential for sediment input to streams is greatest where roads cross streams. The number of stream crossings was computed for roads on BLM-administered lands and those under BLM control on non-BLM lands (Table 15). Stream crossing frequency for BLM-controlled roads and those on BLM-administered lands is highest in the Deer Creek watershed, with 2.1 road stream crossings per stream mile.

Table 15. Road Stream Crossings for BLM-Administered Lands and BLM-Controlled Roads on Non-BLM Lands

Stream Name[1]	Total Stream Miles	Number of Stream Crossings	Number of BLM Crossings per Stream Mile
Deer Creek	23.6	50	2.1
Lost Creek	77.6	69	0.9
Soda Creek	33.1	44	1.3
South Fork Little Butte Creek	293.9	269	0.9

1/ Values listed in the table are for the watersheds associated with these streams.

Sediment Source 2: Timber Harvest

Potential sediment sources from timber harvest include vegetation removal adjacent to stream channels, clearcutting on unstable soils, and ground-disturbing yarding operations that channel runoff.

Vegetation along stream channels provides two critical functions that affect sediment input: stabilizing streambanks and filtering sediments. Harvesting trees along stream channels can reduce streambank stability and thus cause an increase in the rate of streambank erosion. It also removes vegetation that can trap sediments. BLM management practices prior to the 1994 Northwest Forest Plan (USDA and USDI 1994) included timber harvest up to the edge of nonfish-bearing streams, including portions of Deer, Lost, and Soda Creeks. No timber harvest has occurred along the BLM-managed reaches of South Fork Little Butte Creek. Implementation of Riparian Reserves under the Northwest Forest Plan protects streamside vegetation.

Forest vegetation lends stability to steep hillslopes by providing additional cohesion from root systems and by reducing soil water content through transpiration (Sidle 1980). Removing vegetation from these slopes results in reduced root strength and the potential for increased soil moisture. Mass soil movement may increase after trees are removed on steep, unstable slopes. Clearcut logging on steep slopes has a higher risk for activating mass soil movements than other harvest methods. Clearcut logging on BLM-administered lands in the vicinity of the sedimentation-listed streams was conducted prior to 1994. Under the Medford District Resource Management Plan (USDI 1995a), a minimum of 16 to 25 large, green conifer trees per acre are left on the hillslopes within the watersheds for the sedimentation-listed streams.

The potential for surface erosion is directly related to the amount of bare compacted soil exposed to rainfall and runoff (Chamberlin, et al. 1991). Soil compaction resulting from ground-disturbing yarding operations, such as tractor skid trails, can concentrate runoff that causes rill erosion. Skid trails that intersect stream channels are more likely to deliver sediment to the waterbody. Past logging practices used tractor yarding extensively. Current yarding practices limit tractor yarding to slopes that are less than 35 percent and soil compaction from tractors is limited to less than 12 percent of the harvest area (USDI 1995a, USDI 1995b). Tractor yarding is not used to harvest trees in Riparian Reserves, however, they may cross streams to access timber harvest units. The number of tractor stream crossings is much less under current management practices than the past.

Sediment Source 3: Livestock Grazing

Improper livestock management can contribute to sedimentation through excessive grazing and trampling within riparian areas. The principal causes of increased sedimentation are the trampling of streambanks and the reduction or elimination of riparian vegetation. BLM stream surveys in 1996 (Deer Creek) and 1998 (Lost, Soda, and South Fork Little Butte Creeks) noted many reaches with these types of grazing impacts. Most reaches with grazing impacts were on tributaries to the sedimentation-listed streams, however, several reaches of Deer and Soda Creeks were also identified. The sedimentation-listed streams fall within 11 allotments, two of which are vacant (Table 16). No sedimentation-listed streams are located within the Big Butte allotment.

Table 16. Allotments Containing Sedimentation-Listed Streams (BLM-Administered Lands)

Allotment Name	Deer Creek and Tributaries (Allotment Acres)	Lost Creek and Tributaries (Allotment Acres)	Soda Creek and Tributaries (Allotment Acres)	South Fork Little Butte Creek and Tributaries (Allotment Acres)
Cartwright[1]				40
Conde Creek	18	1,055	1,928	5,347
Deadwood				520
Deer Creek Reno Lease	1,613	839	1,111	4,062
Grizzly		514		514
Heppsie Mtn.				2,388
Keene Creek				2,489
Lake Creek Spring				216
Lake Creek Summer	6	2,934		2,940
Lost Creek[1]		77		78
Poole Hill			1,332	1,731
Total Acres in Allotments	1,637	5,419	4,371	20,325

1/ Vacant allotment

Riparian vegetation is a key factor involved in all three sediment sources stemming from BLM-administered lands. The BLM uses a proper functioning condition (PFC) assessment to determine the condition of riparian areas. PFC is a qualitative method based on quantitative science (USDI and USDA 1998). This assessment considers hydrology, vegetation, and erosion/deposition attributes and processes to evaluate the condition of riparian areas. The assessment places riparian areas into one of four categories: proper functioning, functional-at risk, nonfunctional, or unknown. The functional-at risk category is further defined by a trend: upward, downward, or not apparent. PFC assessments were conducted during BLM stream surveys in Deer (1996), Lost (1998), Soda (1995 and 1998), and South Fork Little Butte Creeks (1998). The majority of BLM-managed riparian areas along the four sedimentation-listed streams are rated as being in proper functioning condition or functional-at risk with an upward trend with the exception of Deer Creek (Table 17).

Table 17. Proper Functioning Condition Assessment for Sedimentation-Listed Stream Reaches on BLM-Administered Lands

Stream Name	Stream Miles Assessed	Proper Functioning Condition (% of assessed miles)	Functional-At Risk, Trend Upward (% of assessed miles)	Functional-At Risk, Trend Not Apparent (% of assessed miles)	Functional-At Risk, Trend Downward (% of assessed miles)	Nonfunctional (% of assessed miles)
Deer Creek	1.6	0	0	48	18	34
Lost Creek	4.2	91	9	0	0	0
Soda Creek	5.4	80	5	0	0	15
South Fork Little Butte Creek	1.1	18	82	0	0	0

Sedimentation TMDL Loading Capacity and Allocations

EPA's current regulation defines loading capacity as "the greatest amount of loading that a water can receive without violating water quality standards" (ODEQ 2004:9). Prior to completion of the Rogue Basin TMDL, the DEQ has estimated the TMDL loading capacity for sedimentation.

For the plan area, loading capacity for sedimentation is defined as (1) the greatest amount of sediment loading that a 303(d)-listed waterway can contain and still attain water quality standards and (2) NPDES permitted point source effluent discharges meet permit requirements for sedimentation (ODEQ 2004:10).

There are no point source discharges on BLM-administered lands within the North and South Forks Little Butte Creek Key Watershed, therefore the second loading capacity statement does not apply to BLM management.

Water quality targets for sedimentation have been determined elsewhere in the Rogue Basin as <33% cobble embeddedness (ODEQ 2003). Thus the sedimentation loading capacity that applies in the Rogue Basin is that amount of sediment coming from all streams upstream of the listed waterbody resulting in <33% cobble embeddedness within the 303(d) listed stream (ODEQ 2004:10).

There is no cobble embeddedness data available for the sedimentation-listed streams in the Key Watershed. It will be necessary for DEQ to develop other appropriate measures, known as surrogate measures, to achieve the loading capacity. Surrogate measures for sedimentation will apply to all designated management agencies and land uses occurring in the South Fork Little Butte Creek watershed. Based on the Applegate TMDL (ODEQ 2003), which is the only Rogue Basin TMDL for sedimentation, it is likely that surrogate measures will be associated with riparian vegetation and roads.

The use of system potential riparian vegetation would likely be included as a surrogate measure to meet the sedimentation TMDL. This surrogate measure would be identical to the targets set in the temperature TMDL. Thus, for this WQRP, it is assumed that measures implemented to meet the temperature TMDL will also meet the likely surrogate measure targets for the sedimentation TMDL.

A wider, intact, mature riparian zone than is necessary to achieve the temperature TMDL may be necessary to filter sediment from upslope sources. On BLM-managed land in the Key Watershed, Riparian Reserves managed for late-successional purposes must be a minimum of 300 feet slope distance on either side of fish-bearing streams, 150 feet slope distance on either side of perennial streams, and 100 feet slope distance on either side of intermittent streams. This may be more than that required to meet the percent effective shade targets but will provide additional protection from sediments.

Until the DEQ identifies surrogate measures associated with roads, the BLM will continue to implement the ACS in the plan area. The ACS for Key Watersheds states that existing system and nonsystem road mileage outside roadless areas should be reduced through road decommissioning (USDA and USDI 1994:B-19). If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds. Watershed restoration is a critical component of the ACS. Recommendations for watershed restoration activities that would reduce erosion from BLM-managed lands are found in the *Little Butte Creek Watershed Analysis* (USDI and USDA 1997:176-199). Decommissioning or upgrading roads is a priority, with the highest priority given to roads that are contributing large amounts of sediment to streams as well as roads in riparian reserves, unstable areas, and midslopes (USDI and USDA 1997:194).

Livestock grazing will be managed in accordance with the *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington* (USDI 1997). The Standards and Guidelines identify five specific standards that address the health, productivity, and sustainability of the BLM-administered public rangelands. The water quality standard requires that agency actions comply with State water quality standards. Evaluation of allotments as part of the Standards and Guidelines implementation will assess the effects of livestock grazing on watershed function (uplands and riparian/wetland areas) and water quality. Grazing will be managed to maintain or restore proper functioning condition in riparian areas.

E. E. Coli

Introduction

Water contact recreation is the most sensitive beneficial use affected by high levels of Esherichia coli for freshwaters (ODEQ 1998:11).

The current Oregon water quality bacteria standard is found in chapter 340, division 41, section 9 of the Oregon Administrative Rules (OAR) (ODEQ 2006). The following is an excerpt from the standard that applies to nonpoint sources in the North and South Forks Little Butte Creek Key Watershed.

> *(1) Numeric Criteria: Organisms of the coliform group commonly associated with fecal sources (MPN or equivalent membrane filtration using a representative number of samples) may not exceed the criteria described in paragraphs (a) and (b) of this paragraph:*
>
> *(a) Freshwaters and Estuarine Waters Other than Shellfish Growing Waters:*
> *(A) A 30-day log mean of 126 E. coli organisms per 100 milliliters, based on a minimum of five (5) samples;*
> *(B) No single sample may exceed 406 E. coli organisms per 100 milliliters.*
>
> *(3) Animal Waste: Runoff contaminated with domesticated animal wastes must be minimized and treated to the maximum extent practicable before it is allowed to enter waters of the State.*
>
> *(4) Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propagation, or otherwise injurious to public health may not be allowed.*
>
> *(10) Water Quality Limited for Bacteria: In those water bodies, or segments of water bodies identified by the Department as exceeding the relevant numeric criteria for bacteria in the basin*

standards and designated as water-quality limited under section 303(d) of the Clean Water Act, the requirements specified in section 11 of this rule and in OAR 340-041-0061 (12) must apply.

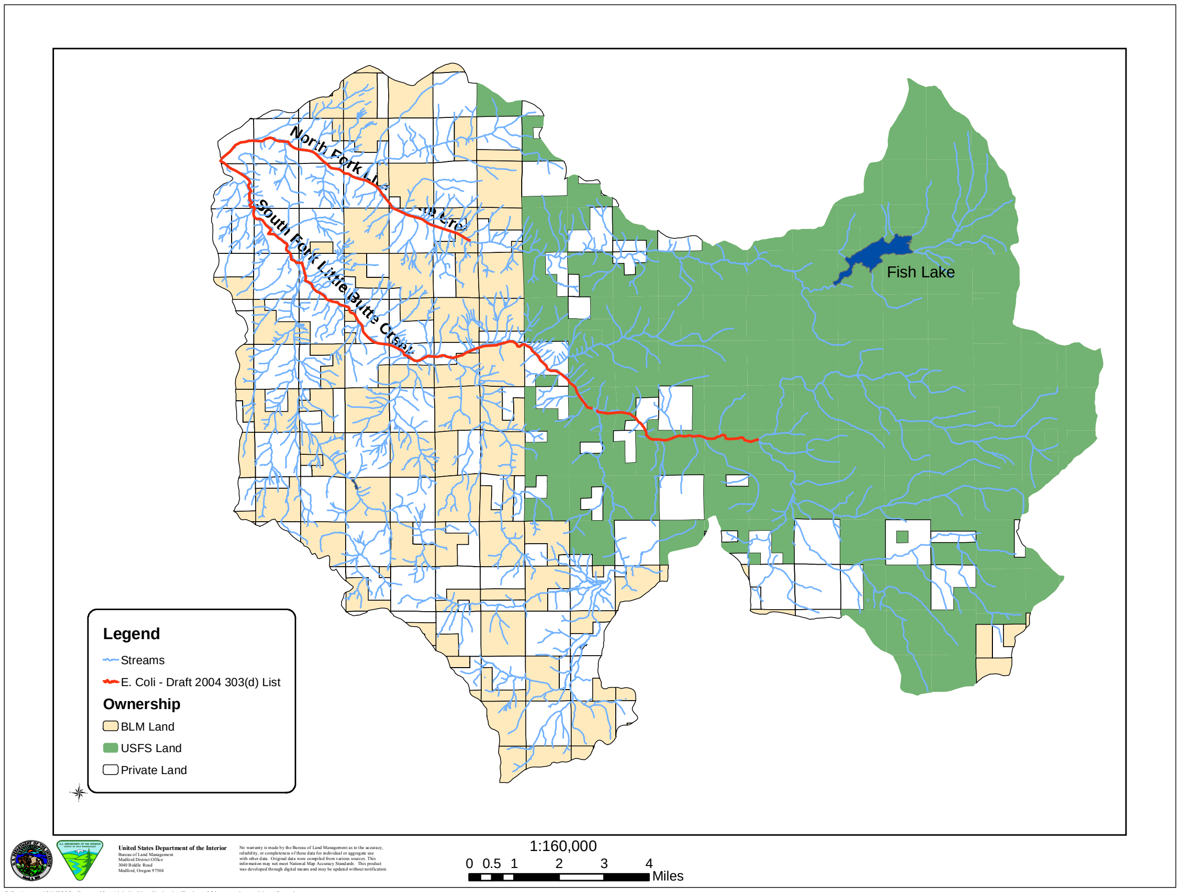
(11) In water bodies designated by the Department as water-quality limited for bacteria, and in accordance with priorities established by the Department, development and implementation of a bacteria management plan may be required of those sources that the Department determines to be contributing to the problem. The Department may determine that a plan is not necessary for a particular stream segment or segments within a water-quality limited basin based on the contribution of the segment(s) to the problem. The bacteria management plans will identify the technologies, best management practices and/or measures and approaches to be implemented by point and nonpoint sources to limit bacterial contamination. For nonpoint sources, the bacteria management plan will be developed by designated management agencies (DMAs) which will identify the appropriate best management practices or measures and approaches.

The draft 2004 303(d) list includes two streams within the Key Watershed that are listed for exceeding E. coli standards: North and South Forks Little Butte Creeks (Table 18 and Figure 11). There are 1.7 miles of E. coli-listed streams on BLM-administered lands within the Key Watershed: 0.4 miles on North Fork Little Butte Creek and 1.3 miles on South Fork Little Butte Creek.

Table 18. 303(d) E. Coli-Listed Reaches in the North and South Forks Little Butte Creek Key Watershed

303(d) List Date	Stream Segment	Season	Applicable Rule (at time of listing)	Total Miles Affected	BLM Miles Affected
2004	North Fork Little Butte Creek	Fall/Winter/ Spring	OAR 340-041-0009(1)(a)(A,B)	6.5	0.4
Total Stream Miles listed for E. Coli Criteria (Fall/Winter/Spring)				**6.5**	**0.4**
1998	North Fork Little Butte Creek	Summer	OAR 340-41-0365 (2)(e,f)	6.5	0.4
2004	South Fork Little Butte Creek	Summer	OAR 340-041-0009(1)(a)(A,B)	16.4	1.3
Total Stream Miles listed for E. Coli Criteria (Summer)				**16.4**	**1.7**

Figure 11. Draft 2004 303(d) E. Coli-Listed Streams for the North and South Forks Little Butte Creek Key Watershed



G.R. Hertz - 12/1/2005 - ilmormd6na1/gis/Ashland/ashmisc/Projects06/wqrp w bear ck/map5.mxd.

E. Coli Sources

Fecal coliform bacteria are produced in the guts of warm-blooded vertebrate animals, and indicate the presence of pathogens that cause illness in humans. E. coli is a species of fecal coliform bacteria. A variety of everyday activities cause bacterial contamination in surface waters (ODEQ 2004:9). The largest sources of contamination include runoff from agricultural, industrial, rural and urban residential activities (ODEQ 2004:9). Sources of bacteria from BLM-administered lands include animal feces (wild and domestic, including livestock such as cattle) and inadequate waste disposal by recreational users.

E. Coli TMDL Loading Capacity and Allocations

Prior to completion of the Rogue Basin TMDL, the DEQ has estimated the TMDL loading capacity for E. Coli.

The loading capacity for E. Coli in the plan area is defined as (1) the greatest amount of E. Coli loading that a 303(d)-listed waterway can contain and still attain water quality standards and (2) NPDES permitted point source effluent discharges meet permit requirements for E. Coli (ODEQ 2004:10).

Management measures used to limit the presence of livestock in stream channels or riparian zones in order to reduce sedimentation (see livestock grazing under the Sedimentation section) will also minimize the amount of bacterial contamination in surface water from BLM-managed lands. These management measures will be applied to all allotments within the plan area.

F. pH

Introduction

Beneficial uses affected by pH values outside the standard include resident fish and aquatic life, and water contact recreation (ODEQ 1998:23).

The current Oregon water quality pH standard for the Rogue Basin is found in chapter 340, division 41, section 275 of the Oregon Administrative Rules (OAR) (ODEQ 2006). The following is an excerpt from the standard that applies to nonpoint sources in the North and South Forks Little Butte Creek Key Watershed.

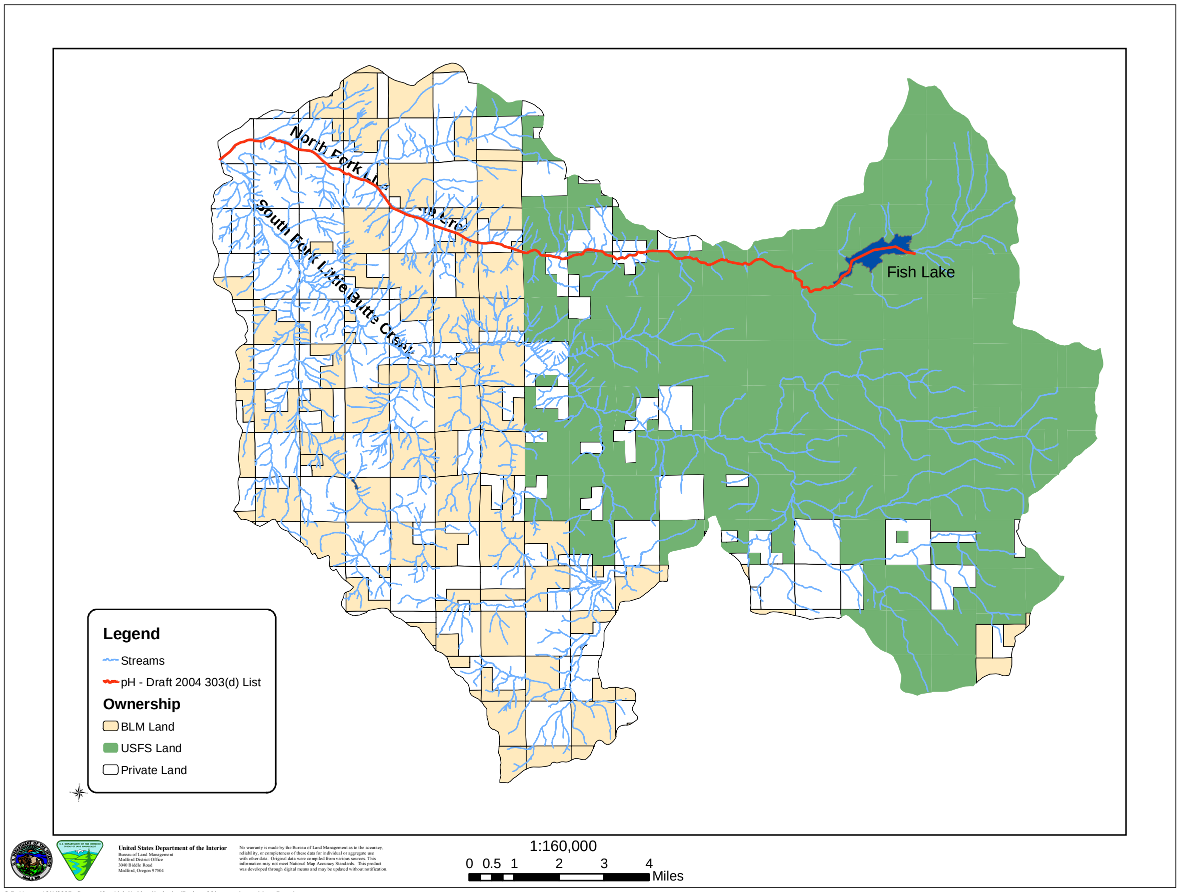
> *(1) pH (hydrogen ion concentration). pH values may not fall outside the following ranges:*
> *(b) Estuarine and fresh waters (except Cascade lakes): 6.5 – 8.5;*
> *(c) Cascade lakes above 3,000 feet altitude: pH values may not fall outside the range of 6.0 to 8.5.*

The North Fork Little Butte Creek is the only stream in the plan area listed for pH on the draft 2004 303(d) list (Table 19 and Figure 12). Only 0.8 miles of the 17.8 miles listed for pH on the North Fork Little Butte Creek are on BLM-administered lands.

Table 19. 303(d) pH-Listed Reaches in the North and South Forks Little Butte Creek Key Watershed (2004 List Date)

303(d) List Date	Stream Segment	Season	Applicable Rule (at time of listing)	Total Miles Affected	BLM Miles Affected
2004	North Fork Little Butte Creek	Summer	OAR 340-041-0021(1)(a)	17.8	0.8
Total Stream Miles listed for pH Criteria (Summer)				**17.8**	**0.8**

Figure 12. Draft 2004 303(d) pH-Listed Streams for the North and South Forks Little Butte Creek Key Watershed



pH Sources
High summertime stream pH values in the North Fork Little Butte Creek probably result from algal growth upstream in Fish Lake. pH generally is not sensitive to forest management activities. Hard rock mining is the management activity which is most likely to affect pH in aquatic systems (MacDonald et al. 1991:78). Forest management activities can indirectly increase pH through the introduction of large amounts organic debris and by increasing light or nutrient loads to streams (MacDonald et al. 1991:77).

pH TMDL Loading Capacity and Allocations
Prior to completion of the Rogue Basin TMDL, the DEQ has estimated the TMDL loading capacity for pH.

The loading capacity for pH in the plan area is defined as (1) the load allocations (both nonpoint and point source) for temperature are met and (2) NPDES permitted point source effluent discharges meet permit requirements for pH (ODEQ 2004:11).

There are no point source discharges on BLM-administered lands within the North and South Forks Little Butte Creek Key Watershed, therefore the second loading capacity statement does not apply to BLM management.

In the absence of modeling, it is anticipated that the achievement of the temperature load allocation will reduce periphyton growth and lead to the attainment of the water quality standards for pH (ODEQ 2004:11). The temperature section of this WQRP addresses how the nonpoint source temperature load allocation will be achieved on BLM-managed lands.

Element 2. Goals and Objectives

The overall long-term goal of this WQRP is to achieve compliance with water quality standards for the 303(d) listed streams in the North and South Forks Little Butte Creek Key Watershed. The WQRP identifies TMDL implementation strategies to achieve this goal. Recovery goals will focus on protecting areas where water quality meets standards and avoiding future impairments of these areas, and restoring areas that do not currently meet water quality standards.

In advance of a TMDL setting specific numeric targets for the plan area, the Oregon statewide narrative criteria found in OAR 340-041-0007(1) (ODEQ 2006) is the water quality criteria that applies to BLM management.

> *(1) Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels.*

The recovery of water quality conditions on BLM-administered land in the North and South Forks Little Butte Creek Key Watershed will be dependent upon implementation of the BLM Medford District and Klamath Falls Resource Area Resource Management Plans (RMPs) (USDI 1995a, USDI 1995b) that incorporate the NWFP (USDA and USDI 1994). The RMPs include best management practices (BMPs) that are intended to prevent or reduce water pollution to meet the goals of the Clean Water Act.

Paramount to recovery is adherence to the Standards and Guidelines of the NWFP (as amended, USDA and USDI 2004) to meet the ACS. This includes protection of riparian areas and necessary silvicultural treatments to achieve vegetative potential as rapidly as possible. The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands. The NWFP requires federal decision makers to ensure that proposed management activities are consistent with ACS objectives. The NWFP amendment in March 2004 clarified provisions relating to the ACS. It explains that the ACS objectives were intended to be applied and achieved at the fifth-field watershed and larger scales, and over a period of decades or longer rather than in the short-term. ACS objectives are listed on page B-11 of the NWFP Record of Decision (ROD) (USDA and USDI 1994). Together these objectives are intended to enhance biodiversity and ecosystem function for fish, wildlife, and vegetation, enhance soil productivity and water quality, and reduce hazardous fuel loads and risk to uncharacteristic disturbance (USDA and USDI 2005:46). ACS objectives 3-8 contain guidance related to maintaining and restoring water quality. In general, the objectives are long range (10 to 100 years) and strive to maintain and restore ecosystem health at the watershed scale.

Watershed restoration is a key component of the ACS and will be an integral part of BLM's program to aid recovery of water quality. The most important elements of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity (USDA and USDI 1994:B-31). BLM management objectives and recommendations for watershed restoration are included in the *Little Butte Creek Watershed Analysis* (USDI and USDA 1997:176-199).

Recovery goals for temperature, sedimentation, E. coli, and pH and restoration techniques for achieving these goals on BLM-administered land are specified in Table 20.

Table 20. Recovery Goals for BLM-Administered Land in the North and South Forks Little Butte Creek Key Watershed

Element	Goal	Passive Restoration	Active Restoration
Temperature ***Shade***	• Achieve coolest water possible through achievement of percent effective shade targets (Table 8).	• Allow riparian vegetation to grow up to reach target values.[1]	• Use prescriptions that ensure long-term riparian vegetation health. • Implement prescriptions that increase growth rate and survival of riparian vegetation. • Plant native species from local genetic stock to create a stand that will result in increased tree height and density.[1]
Temperature ***Channel Morphology***	• Increase the amount of large wood in channels. • Improve riparian rooting strength and streambank roughness. • Decrease bedload contribution to channels during large storm events. • Maintain or improve channel types, focusing on width-to-depth ratios. • Increase the ratio of wood-to-sediment during mass failures.	• Follow NWFP Standards and Guidelines or watershed analysis recommendations for Riparian Reserve widths (including unstable lands). • Allow historic streambank failures to revegetate. • Allow natural channel evolution to continue. (Time required varies with channel type.)	• Promote riparian conifer growth for future large wood recruitment. • Encourage woody riparian vegetation versus annual species. • Stabilize streambanks where indicated. • Maintain and improve road surfacing. • Reduce road densities by decommissioning non-essential roads. • Increase culverts to 100-yr flow size and/or provide for overtopping during floods. • Minimize future slope failures through stability review and land reallocation if necessary. • Ensure that unstable sites retain large wood to increase wood-to-sediment ratio.
Temperature ***Streamflow***	• Maintain optimum flows for fish life. • Maintain minimum flows for fish passage.		• Utilize authorized water storage facilities to avoid diverting streamflows during low flows.

Element	Goal	Passive Restoration	Active Restoration
Sedimentation (South Fork Little Butte Creek and tributaries) ***Riparian Vegetation***	• Stabilize streambanks. • Filter sediment from upslope sources.	• Follow NWFP Standards and Guidelines or watershed analysis recommendations for Riparian Reserve widths (including unstable lands).	• Stabilize streambanks where indicated. • Implement prescriptions that increase growth rate and survival of riparian vegetation. • Use prescriptions that ensure long-term riparian vegetation health.
Sedimentation (South Fork Little Butte Creek and tributaries) ***Roads***	• Decrease sediment production and delivery from roads.	• Allow natural decommissioning to occur on non-essential roads where there is long-term maintenance-free drainage.	• Maintain adequate drainage facilities on all BLM-maintained roads open for administrative access during the wet season. • Maintain a minimum of four inches of rock surfacing on all BLM-maintained roads open for administrative access during the wet season. • Close all natural surface roads during the wet season. • Improve or install new drainage systems and surfacing on non-system roads near Riparian Reserves or unstable terrain. • Decommission or obliterate roads not critical for future management activities. • Provide a vegetative surfacing (native grass and conifers) on natural surface roads that are closed year-round. • Manage for no net increase in the amount of roads in the Key Watershed. • Allow for 100-year runoff events, including associated bedload and debris, when installing new stream crossing structures and for existing stream crossing structures that pose substantial risk to Riparian Reserves. • Stabilize road cuts and fills in Riparian Reserves. • Apply appropriate road BMPs identified in the RMP to minimize soil erosion and water quality degradation.

Element	Goal	Passive Restoration	Active Restoration
Sedimentation (South Fork Little Butte Creek and tributaries) ***Timber Harvest***	• Decrease sediment production and delivery from timber harvest.	• Follow NWFP Standards and Guidelines or watershed analysis recommendations for Riparian Reserve widths (including unstable lands).	• Decommission skid trails and landings located within Riparian Reserves; plant conifers where appropriate. • Stabilize actively eroding landslide areas that are contributing sediment to streams. • Apply appropriate timber harvest BMPs identified in the RMP to minimize soil erosion and water quality degradation.
Sedimentation (South Fork Little Butte Creek and tributaries) ***Livestock Grazing***	• Maintain or improve riparian vegetation in allotments. • Decrease bank degradation and off-site soil erosion caused by livestock.		• Manage livestock to maintain or improve riparian vegetation. • Complete assessment, evaluation, and determination of rangeland health followed by the appropriate level of NEPA analysis for issuing a grazing lease renewal.
E. Coli	• Decrease E. coli contamination caused by livestock.		• Manage livestock to prevent concentrations in streams or riparian zones.
pH	• Minimize nutrient inputs to surface water.	• Follow NWFP Standards and Guidelines or watershed analysis recommendations for Riparian Reserve widths (including unstable lands).	• Apply appropriate BMPs identified in the RMPs to prevent fertilizers and wildfire retardants from entering surface waters.

1/ Passive versus active restoration of riparian areas. If current percent effective shade is greater than or equal to the target shade or 80 percent, the stream is considered recovered in terms of percent effective shade and the riparian area should not be a candidate for active restoration for the purposes of temperature recovery (ODEQ 2004). If current shade does not meet the target shade and is less than 80 percent, the site may benefit from active restoration and should be examined.

Element 3. Proposed Management Measures

The NWFP ACS describes general guidance for managing Riparian Reserves to meet the ACS objectives. The Riparian Reserves, Key Watersheds, watershed analysis, and watershed restoration components of the ACS are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems.

Specific NWFP Standards and Guidelines (USDA and USDI 1994:C-31-C-38) direct the types of activities that may occur within Riparian Reserves and how they will be accomplished. These Standards and Guidelines effectively serve as general BMPs to prevent or reduce water pollution in order to meet the goals of Clean Water Act compliance. As a general rule, the Standards and Guidelines for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the

Aquatic Conservation Strategy objectives. Riparian Reserve widths are determined from the Standards and Guidelines (USDA and USDI 1994, p. C-30). The minimum reserve width for fish-bearing streams, lakes, and natural ponds is 300 feet slope distance on each side of the stream or waterbody. Perennial nonfish-bearing streams, constructed ponds and reservoirs, and wetlands greater than 1 acre receive a minimum reserve width of 150 feet slope distance on each side of the stream or waterbody. Intermittent streams receive a minimum reserve width of 100 feet slope distance on each side of the stream and Riparian Reserves for wetlands less than 1 acre include the wetland and extend to the outer edges of the riparian vegetation.

The Medford District and Klamath Falls Resource Area RMPs include BMPs that are important for preventing and controlling nonpoint source pollution to the "maximum extent practicable" (USDI 1995a:149-177; USDI 1995b:D1-D46). BMPs are developed on a site-specific basis for proposed management actions and presented for public comment during the National Environmental Policy Act (NEPA) process. One element of BMP implementation includes effectiveness monitoring and modification of BMPs when water quality goals are not being achieved.

Although passive restoration will be the primary means to achieving the stream shade goal (Table 20), active restoration measures will be considered for streams with current shade that is less than 80 percent (Table 7). The *Northwest Forest Plan Temperature TMDL Implementation Strategies* (USDA and USDI 2005) provides a tool for analyzing the effect of silvicultural practices within Riparian Reserves on effective shade. Shade nomographs were computed based on stream width, vegetation height, hill slope, and orientation factors and provide no-cut buffer widths to maintain stream shade while applying vegetation treatments to improve and restore riparian conditions.

The primary means to achieving the channel morphology goals (Table 20) on BLM-administered lands will be through passive restoration and protection of unstable areas. Active restoration measures will focus on promoting riparian conifer growth for future large wood recruitment through silvicultural practices, maintaining and improving road surfaces, and reducing road densities. The highest priority areas for road treatments will be in the Riparian Reserves and unstable areas.

Management measures for reducing sediment delivery resulting from roads and timber harvest will occur through standard road maintenance and timber sale implementation. The highest priority work will include maintaining or improving drainage facilities, surfacing natural surface roads, and decommissioning roads and landings, especially where roads are contributing large amounts of sediment to streams.

Grazing allotment assessments and evaluations will identify specific grazing problems that are contributing to sedimentation or bacteria. Corrective management measures will be implemented according to site-specific NEPA analysis.

Minimizing management-caused sunlight and nutrient inputs to streams through appropriate BMPs will be the key measures used to prevent increases in pH.

Element 4. Time Line for Implementation

The major provisions of this plan have already been implemented. Protection of riparian areas along all streams has been ongoing since the NWFP became effective in 1994. Inherent in the NWFP implementation is the passive restoration of riparian areas that ensued as a result of the Riparian Reserves. Implementation of active restoration activities beyond the inherent passive riparian restoration occurs in the context of watershed analysis and through site-specific projects. Restoration projects require analysis under the NEPA. The timing for implementation of those activities is dependent on funding availability.

The problems leading to water quality limitations and 303(d) listing have accumulated over many decades. Natural recovery and restorative management actions to address these problems will occur over an extended period of time. Implementation will continue until the restoration goals, objectives, and management measures as described in this WQRP are achieved. While active restoration may provide immediate, localized improvement, recovery at the watershed scale is long term in nature. The ACS contained in the NWFP (as amended, USDA and USDI 2004) describes restoration timeframes. ACS seeks to "prevent further degradation and restore habitat over broad landscapes as opposed to individual projects or small watersheds. Because it is based on natural disturbance processes, it may take decades, possibly more than a century to achieve objectives."

Stream temperature and habitat recovery is largely dependent on vegetation recovery. Actions implemented now will not begin to show returns in terms of reduced stream temperatures or improved aquatic habitat for a number of years. Full recovery of these conditions will not occur for many decades (Table 8). Stream temperatures will begin to decline and recover before the riparian areas reach their maximum potentials. Growth of the future system potential vegetation was modeled with the assumption that there will be no management activities such as thinning to enhance growth. If silvicultural activities were to occur, the vegetation would grow more quickly and recovery could be accelerated.

It will take a longer time for aquatic habitat recovery than for shade recovery. Instream conditions will recover only after mature conifers begin to enter the waterways through one of several delivery mechanisms, e.g. blowdown, wildfire, debris flows down tributary streams and into fish-bearing reaches, and flooding. Tree growth from the current condition of young conifers to mature age conifers will take approximately 200 to 250 years. This will represent full biological recovery of these stream channels, while temperature recovery and stabilization of streambanks will occur earlier.

Element 5. Responsible Parties

The BLM is recognized by Oregon DEQ as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. The BLM has signed a Memorandum of Agreement (MOA) with the DEQ that defines the process by which the BLM will cooperatively meet State and Federal water quality rules and regulations. The Director of DEQ and the BLM State Director are responsible for ensuring implementation of the agency's MOA.

The BLM's Ashland, Butte Falls, and Klamath Falls Field Managers are responsible for ensuring this WQRP is implemented, reviewed, and amended as needed. These officials are responsible for all WQRPs for lands under their jurisdiction. The field managers will ensure coordination and consistency in plan development, implementation, monitoring, review, and revision. The managers will also ensure priorities are monitored and revised as needed and review and consider funding needs for this and other WQRPs in annual budget planning.

Element 6. Reasonable Assurance of Implementation

This WQRP will be submitted to the DEQ and it will be incorporated in the Rogue Basin WQMP, which is currently scheduled for completion in 2007. The WQMP will cover all land within the North and South Forks Little Butte Creek Key Watershed regardless of jurisdiction or ownership.

The BLM is committed to working cooperatively with all interested parties in the plan area. While partnerships with private, local, and state organizations will be pursued, the BLM can only control the implementation of this WQRP on BLM-administered lands. It must be noted that only 24 percent of the 303(d) listed stream miles in the plan area are located on lands under BLM jurisdiction. Other organizations or groups that are (or will be) involved in partnerships for implementing, monitoring, and maintaining the Rogue Basin WQMP include the Little Butte Creek Watershed Council, Jackson County, Oregon Department of Forestry (ODF), Oregon Department of Agriculture (ODA), Oregon Department of Transportation (ODOT), Oregon Department of Fish and Wildlife (ODFW), Oregon Water Resources Department (WRD), Oregon DEQ, and the U.S. Forest Service. The problems affecting water quality are widespread; coordination and innovative partnerships are key ingredients to successful restoration efforts.

The BLM, Medford District intends to implement this plan within current and future funding constraints. Implementation and adoption of the MOA with the DEQ also provide assurances that water quality protection and restoration on lands administered by the BLM will progress in an effective manner.

Element 7. Monitoring and Evaluation

Monitoring and evaluation have two basic components: 1) monitoring the implementation and effectiveness of this WQRP and 2) monitoring the physical, chemical, and biological parameters for water quality. Monitoring information will provide a check on progress being made toward achieving the TMDL allocations and meeting water quality standards, and will be used as part of the Adaptive Management process.

The objectives of this monitoring effort are to demonstrate long-term recovery, better understand natural variability, track implementation of projects and BMPs, and evaluate effectiveness of TMDL implementation. This monitoring and feedback mechanism is a major component of the "reasonable assurance of implementation" for this WQRP.

The NWFP and the BLM Medford District and Klamath Falls Resource Area RMPs are ongoing federal land management plans. The NWFP, effective in 1994, requires that if results of monitoring indicate management is not achieving ACS objectives, among them water quality, plan amendments may be required. These plan amendments could, in part, redirect management toward attainment of state water quality standards.

The RMPs were implemented in 1995 and the BLM is in the initial stage of revising the RMPs, with an anticipated completion date of spring 2008. The current plan contains requirements for implementation, effectiveness, and validation monitoring of BMPs for water resources. The Medford District and Klamath Falls Resource Area annual program summaries provide feedback and assess the progress of RMP implementation.

RMP monitoring will be conducted as identified in the approved BLM Medford District and Klamath Resource Area plans. Monitoring will be used to ensure that decisions and priorities conveyed by BLM management plans are being implemented, to document progress toward attainment of state water quality standards, to identify whether resource management objectives are being attained, and to document whether mitigating measures and other management direction are effective.

DEQ will evaluate progress of actions to attain water quality standards after TMDLs are developed and implemented. If DEQ determines that implementation is not proceeding or if implementation measures are in place, but water quality standards or load allocations are not or will not be attained, then DEQ will work with the BLM to assess the situation and to take appropriate action. Such action may include additional implementation measures, modifications to the TMDL, and/or placing the water body on the 303(d) list when the list is next submitted to EPA.

WQRP Implementation and Effectiveness Monitoring

Restoration activities that benefit aquatic resources will be provided annually to the Interagency Restoration DAtabase (IRDA). This database was developed by the Regional Ecosystem Office (REO) to track all restoration accomplishments by federal agencies in the areas covered by the NWFP. It is an ArcGIS-based application and is available via the Internet at the REO website (www.reo.gov). It also contains data from the USFS and state of Oregon. The IRDA is intended to provide for consistent and universal reporting and accountability among federal agencies and to provide a common approach to meeting federal agency commitments made in monitoring and reporting restoration efforts in the Oregon Coastal Salmon Restoration Initiative. Activities that are tracked include in-stream structure and passage, riparian treatments, upland treatments, road decommissioning and improvements, and wetland treatments.

In addition, implementation and effectiveness monitoring will be accomplished for restoration projects according to project level specifications and requirements.

Water Quality Monitoring

Water quality monitoring is critical for assessing the success of this WQRP. This data will be used to evaluate the success of plan implementation and effectiveness. Ongoing monitoring will detect improvements in water quality conditions as well as the progress toward attaining water quality standards.

The base water quality monitoring program will include continued stream temperature monitoring on streams that are water quality limited for temperature on BLM-administered land as long as funding is available. Additional core indicators of water quality and stream health including stream temperature for non-303(d)-listed reaches, stream shade, and stream channel condition will be monitored on BLM-administered land if funds and personnel are available.

Monitoring results associated with compliance with this WQRP will be submitted to the DEQ upon request.

Stream Temperature Monitoring

The BLM has collected stream temperature data in the North and South Forks Little Butte Key Watershed since 1994 and will continue to monitor stream temperatures (as long as funding is available) in order to detect any changes in temperature from long-term data sets. Monitoring is conducted to meet a variety of objectives, thus long-term monitoring sites as well as project-specific, short-term sites will be used. Objectives include: monitor long-term temperature recovery; better understand the natural temperature variability; and track potential project effects. If funding is available, annual monitoring will continue on the following temperature-listed stream reaches until such time as they reach the state standard: Conde Creek, Dead Indian Creek, Lost Creek, Soda Creek and South Fork Little Butte Creek.

Sampling methods and quality control for any future temperature monitoring will follow DEQ protocol. Generally, stream temperatures will be monitored from June 1 to September 30 to ensure that critical high temperature periods are covered. Measurements will be made with sensors programmed to record samples at least hourly. Qualified personnel will review raw data and delete erroneous data due to unit malfunction or other factors. Valid data will be processed to compute the 7-day rolling average of daily maximum temperature at each site. The resulting files will be stored in the BLM's database.

Stream Shade Monitoring

Guidelines in the Northwest Forest Plan specify that vegetation management activities that occur within the Riparian Reserves must have a goal of improving riparian conditions. The existing level of stream shade provided by the adjacent riparian stand will be determined prior to Riparian Reserve treatments that have the potential to influence water temperature. Measurement of angular canopy density (the measure of canopy closure as projected in a straight line from the stream surface to the sun) will be made in a manner that can be repeated within the portion of the adjacent stand within one tree height of the streambank at bankfull width. The measurement will occur within the stand, and not be influenced by the opening over the actual stream channel. Immediately after treatment, the shade measurement procedure will be repeated to verify that the treatment met the prescribed goals.

Stream Channel Condition and Sedimentation Monitoring

Restoration activities designed to improve stream channel conditions and reduce sediment delivery (i.e. road surface and drainage improvements, road decommissioning, and unstable area protection) will be included in the IRDA.

Monitoring Data and Adaptive Management

This WQRP is intended to be adaptive in nature. Sampling methodology, timing, frequency, and location will be refined as appropriate based on lessons learned, new information and techniques, and data analysis. A formal review involving BLM and DEQ will take place every five years, starting in 2011, to review the collected data and activity accomplishment. This ensures a formal mechanism for reviewing accomplishments, monitoring results, and new information. The evaluations will be used to determine whether management actions are having the desired effects or if changes in management actions and/or TMDLs are needed.

Element 8. Public Involvement

The Federal Land Policy Management Act (FLPMA) and the NEPA require public participation for any activities proposed for federal lands. The NWFP and the Medford District and Klamath Falls Resource Area RMPs went through an extensive public involvement process. Many of the elements contained in this WQRP are derived from these existing land use planning documents.

Public involvement was also included in the development of the *Little Butte Creek Watershed Analysis*. Additionally, the NEPA process requires public involvement prior to land management actions, providing another opportunity for public participation. During this process, the BLM sends scoping letters and schedules meetings with the public. The public comment period ensures that public participation is incorporated into the decision-making process.

The DEQ has lead responsibility for creating Total Maximum Daily Loads (TMDLs) and WQMPs to address water quality impaired streams for Oregon. This WQRP will be provided to the DEQ for incorporation into the Rogue Basin WQMP. The WQMP development will include public involvement.

Element 9. Costs and Funding

Active restoration can be quite costly, especially for road upgrades and major culvert replacements. The cost varies with the level of restoration. The cost of riparian silvicultural treatments on forested lands is generally covered with appropriated funds and will vary depending on treatment type. The cost of WQRP monitoring will depend on the level of water quality monitoring. The maximum that would be expended is estimated to be $15,000 per year and would include data collection, database management, data analysis, and report preparation.

Funding for project implementation and monitoring is derived from a number of sources. Implementation of the proposed actions discussed in this document will be contingent on securing adequate funding. Funds for project implementation originate from grants, cost-share projects, specific budget requests, appropriated funds, revenue generating activities (such as timber sales), or other sources. Potential sources of funding to implement restoration projects on federal lands include BLM Clean Water and Watershed Restoration funds and Title 2 funds from the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393).

The Title 2 program began in FY 2000 and will continue through FY 2007. Projects funded by the Title 2 program must meet certain criteria and be approved by the appropriate resource advisory committee. At least 50 percent of all project funds must be used for projects that are primarily dedicated to: road maintenance, decommissioning, or obliteration; or restoration of streams and watersheds. The available funds are based on County payments.

It is important to note that many of the specific management practices contained in this WQRP are the implementation of BMPs during ongoing management activities such as timber harvest, silvicultural treatments, fuels management, etc. These practices are not dependent on specific restoration funding.

Work on federal lands will be accomplished to improve water quality as quickly as possible by addressing the highest existing and at-risk management-related contributors to water quality problems. Every attempt will be made to secure funding for restoration activity accomplishment but it must be recognized that the federal agencies are subject to political and economic realities. Currently, timber harvest is minimal due to lawsuits and the requirements of the clearances needed to proceed. If this situation continues, a major source of funding is lost. Historically, budget line items for restoration are a fraction of the total requirement. Therefore, it must be recognized that restoration actions are subject to the availability of funding.

Another important factor for implementation time lines and funding is that managers must consider the North and South Forks Little Butte Creek Key Watershed along with all other watersheds under their jurisdiction when determining budget allocations.

Element 10. Citation to Legal Authorities

The Endangered Species Act (ESA) and the Clean Water Act (CWA) are two federal laws which guide public land management. These laws are meant to provide for the recovery and preservation of endangered and threatened species and the quality of the nation's waters. The BLM is required to assist in implementing these two laws. The NWFP and RMP are mechanisms for the BLM to implement the ESA and CWA. They provide the overall planning framework for the development and implementation of this WQRP.

Clean Water Act Section 303(d)

Section 303(d) of the 1972 federal CWA as amended requires states to develop a list of rivers, streams, and lakes that cannot meet water quality standards without application of additional pollution controls beyond the existing requirements on industrial sources and sewage treatment plants. Waters that need this additional help are referred to as "water quality limited" (WQL). Water quality limited waterbodies must be identified by the Environmental Protection Agency (EPA) or by a delegated state agency. In Oregon, this responsibility rests with the DEQ. The DEQ updates the list of water quality limited waters every two years. The list is referred to as the 303(d) list. Section 303 of the CWA further requires that TMDLs be developed for all waters on the 303(d) list. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. A WQMP is developed to describe a strategy for reducing water pollution to the level of the load allocations and waste load allocations prescribed in the TMDL, which is designed to restore the water quality and result in compliance with the water quality standards. In this way, the designated beneficial uses of the water will be protected for all citizens.

Northwest Forest Plan

In response to environmental concerns and litigation related to timber harvest and other operations on federal lands, the BLM commissioned the Forest Ecosystem Management Assessment Team (FEMAT 1993) to formulate and assess the consequences of management options. The assessment emphasizes producing management alternatives that comply with existing laws and maintaining the highest contribution of economic and social well being. The "backbone" of ecosystem management is recognized as constructing a network of late-successional forests and an interim and long-term scheme that protects aquatic and associated riparian habitats adequate to provide for threatened and at-risk species. Biological objectives of the Northwest Forest Plan include assuring adequate habitat on federal lands to aid the "recovery" of late-successional forest habitat-associated species listed as threatened under the ESA and preventing species from being listed under the ESA.

The RMP for the BLM Medford District provides for water quality and riparian management and is written to ensure attainment of ACS objectives and compliance with the CWA.

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