Water Quality Restoration Plan

Southern Oregon Coastal Basin

West Bear Creek Analysis Area

Bureau of Land Management (BLM), Medford District
Ashland Resource Area

August 2006

West Bear Creek Analysis Area at a Glance	
Hydrologic Unit Code Number (Bear Creek)	**1710030801**
WQRP Area/Ownership	Total: 59,566 acres BLM: 8,799 acres (15%) USFS: 2,821 acres (5%) State of Oregon: 640 acres (1%) Private: 47,306 acres (79%)
303(d) Stream Miles Assessed	Total: 41.3 miles BLM Ownership: 3.5 miles
303(d) Listed Parameters	Temperature, Bacteria (Fecal Coliform)
Key Resources and Uses	Salmonids, domestic, aesthetic
Known Human Activities	Agriculture, forestry, mining, roads, urban and rural residential development, recreation
Natural Factors	Geology: metamorphic and granitic uplands with sedimentary deposits on lower slopes 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.

Table of Contents **Page**

List of Tables Page

List of Figures — Page

Element 1. Condition Assessment and Problem Description

A. Introduction

This document describes how the Bureau of Land Management (BLM) will implement and achieve the Oregon Department of Environmental Quality's (DEQ's) *Bear Creek Watershed Total Maximum Daily Load (TMDL)* (ODEQ 2006b) for 303(d) listed streams on BLM-administered lands. Its organization is designed to be consistent with the DEQ's *Bear Creek Watershed Water Quality Management Plan (WQMP)* (ODEQ 2006c). The area covered by this Water Quality Restoration Plan (WQRP) includes all lands managed by the BLM, Medford District within the West Bear Creek Analysis Area, but does not include Bear Creek. This area is referred to as the analysis 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). Seasonal standards may be applied for uses that do not occur year round.

Table 1. Beneficial Uses in the West Bear Creek Analysis Area (OAR 340-41-271 (ODEQ 2005a))

Beneficial Use	*Occurring*	*Beneficial Use*	*Occurring*
Public Domestic Water Supply[1]	✓	Commercial Navigation & Trans.	
Private Domestic Water Supply[1]	✓	Fish and Aquatic Life[2]	✓
Industrial Water Supply	✓	Wildlife and Hunting	✓
Irrigation	✓	Fishing	✓
Livestock Watering	✓	Water Contact Recreation	✓
Boating	✓	Hydro Power	✓
Aesthetic Quality	✓		✓

1/ With adequate pre-treament (filtration and disinfection) and natural quality to meet drinking water standards.
2/ See Figures 271A and 271B for fish use designations for this watershed (http://www.deq.state.or.us/wq/standards/WQStdsFinalFishUseMaps.htm).

Table 2. Sensitive Beneficial Uses in the West Bear Creek Analysis Area

Sensitive Beneficial Use	*Species[1]*
Salmonid Fish Spawning & Rearing	Summer steelhead trout (c), fall chinook
Resident Fish & Aquatic Life	<u>Resident Fish:</u> Rainbow trout, cutthroat trout (c), sculpin <u>Other Aquatic Life</u>: Foothill yellow-legged frog (a), Pacific giant salamander, western pond turtle (s), beaver, and other species of frogs, salamanders, and snakes

1/ Status: (c) = candidate; (s) = sensitive; and (a) = assessment.

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 is responsible for designating streams that do not meet established water quality criteria for one or more beneficial uses. These streams are included 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 2004/2006 303(d) list has been released. Changes from the 2002 303(d) list for streams in the plan area include the delisting of Coleman Creek for dissolved oxygen and Griffin Creek for dissolved oxygen and temperature. The approved Bear Creek TMDL (ODEQ 1990) covered dissolved oxygen and Griffin Creek meets the 2004 criteria for temperature data. This WQRP address all listings on the 2004/2006 303(d) list for the plan area: three streams listed for exceeding the bacteria (fecal coliform) criterion, three streams listed for exceeding the summer (rearing) temperature criterion, and one stream listed for exceeding the spawning temperature criterion (Table 3). Within the plan area, there are a total of 41.3 stream miles on the 2004/2006 303(d) list (Table 3), of which 3.5 miles cross BLM-managed lands (Figures 1 and 2). The water quality limited stream reaches on BLM-managed lands are: Coleman Creek, 0.7 miles listed for year-around fecal coliform and summer temperature; Griffin Creek, 1.4 miles listed for summer and winter/spring/fall fecal coliform; and Wagner Creek, 1.4 miles listed for summer temperature.

Table 3. 2004/2006 303(d) Listings in the West Bear Creek Analysis Area (ODEQ 2006a)

303(d) List Date	Stream Segment	Listed Parameter	Season	Applicable Rule (at time of listing)	Miles Affected
1998	Coleman Creek	Fecal Coliform	Year around	OAR 340-041-0365(2)(e, f)	6.9
1998	Coleman Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	6.9
1998	Griffin Creek	Fecal Coliform	Summer	OAR 340-041-0365(2)(e, f)	14.4
1998	Griffin Creek	Fecal Coliform	Winter/spring/fall	OAR 340-041-0365(2)(e, f)	14.4
1998	Jackson Creek	Fecal Coliform	Year around	OAR 340-041-0365(2)(e, f)	12.6
1998	Jackson Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	12.6
2002	Jackson Creek	Temperature	Oct. 1 – May 31	OAR 340-041-0365(2)(b)(A)	12.6
1998	Wagner Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	1.4
2002	Wagner Creek	Temperature	Summer	OAR 340-041-0365(2)(b)(A)	6.0
Total Stream Miles listed for Fecal Coliform Criteria (Summer)					14.4
Total Stream Miles listed for Fecal Coliform Criteria (Winter/spring/fall)					14.4
Total Stream Miles listed for Fecal Coliform Criteria (Year around)					19.5

303(d) List Date	Stream Segment	Listed Parameter	Season	Applicable Rule (at time of listing)	Miles Affected
Total Stream Miles listed for Temperature Criteria (Summer)					26.9
Total Stream Miles listed for Temperature Criteria (Oct. 1 to May 31)					12.6

Figure 1. West Bear Creek Analysis Area 2004/2006 303(d) Temperature Listed Streams

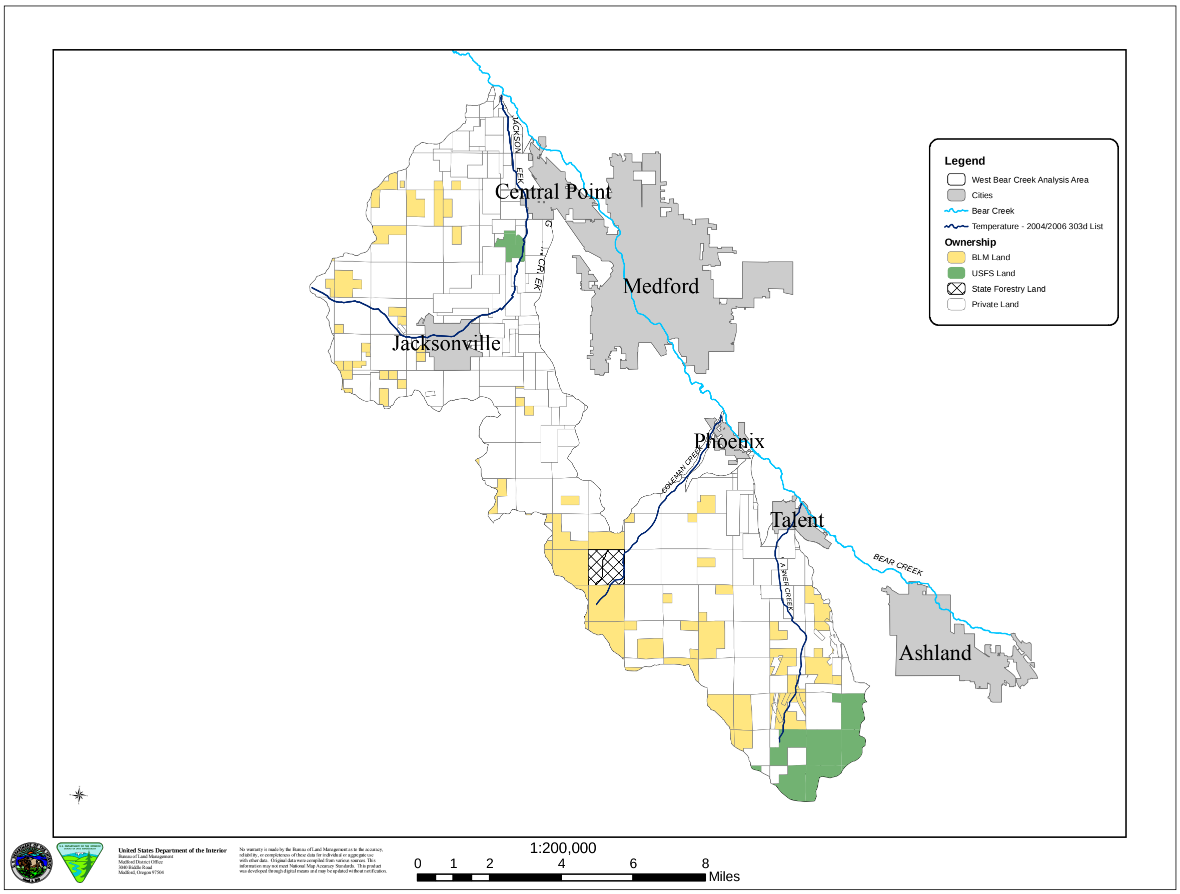
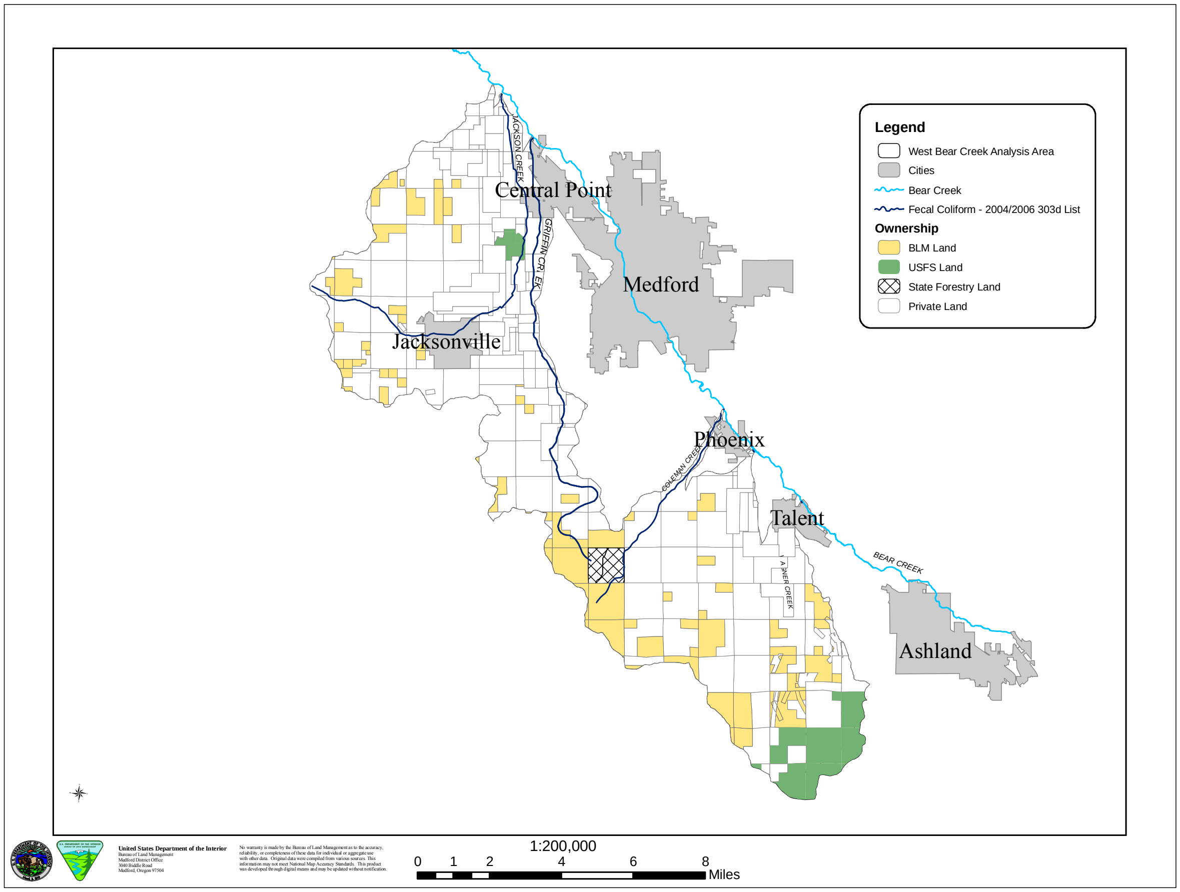


Figure 2. West Bear Creek Analysis Area 2004/2006 303(d) Fecal Coliform Listed Streams



B. Watershed Characterization

The West Bear Creek Analysis Area covers approximately 93-square miles (59,566 acres) in the Klamath Mountains in southwestern Oregon (Figure 3). The plan area lies within the Middle Rogue Subbasin (Figure 4), which is subdivided into four watersheds: Bear Creek, Rogue River-Gold Hill, Evans Creek, and Rogue River-Grants Pass (Figure 5). The plan area is in the western reaches of the Bear Creek Watershed and the western ridges form the divide between the Middle Rogue and Applegate River Subbasins. Peaks that define the western edge of the plan area include Bald Mountain, Anderson Butte, and Miller Mountain. Major streams within the plan area include Wagner, Anderson, Coleman, Griffin, Jackson, and Willow Creeks. These streams are tributaries to Bear Creek; however, Bear Creek is not covered by this plan.

The West Bear Creek Analysis Area is within Jackson County and covers lands west of Bear Creek from Wagner Butte to just north of the city of Central Point. The plan area is just west of the cities of Medford and Phoenix. It includes small portions of the cities of Talent and Central Point, and all of Jacksonville. Elevation in the plan area ranges from approximately 1,180 feet at the mouth of Willow Creek to 7,140 feet at the top of Wagner Butte.

Figure 3. Location of the West Bear Creek Analysis Area

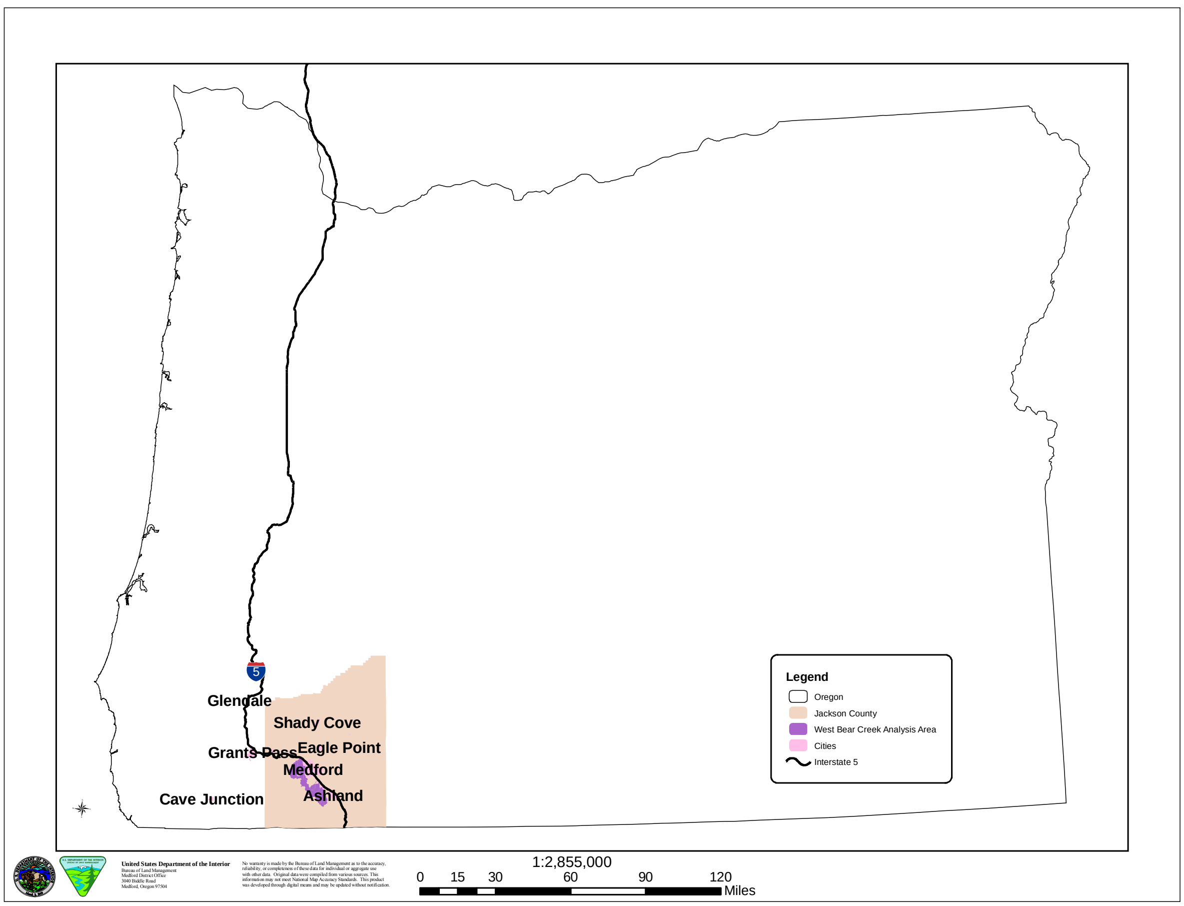


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Figure 4. Rogue Basin and the Middle Rogue Subbasin

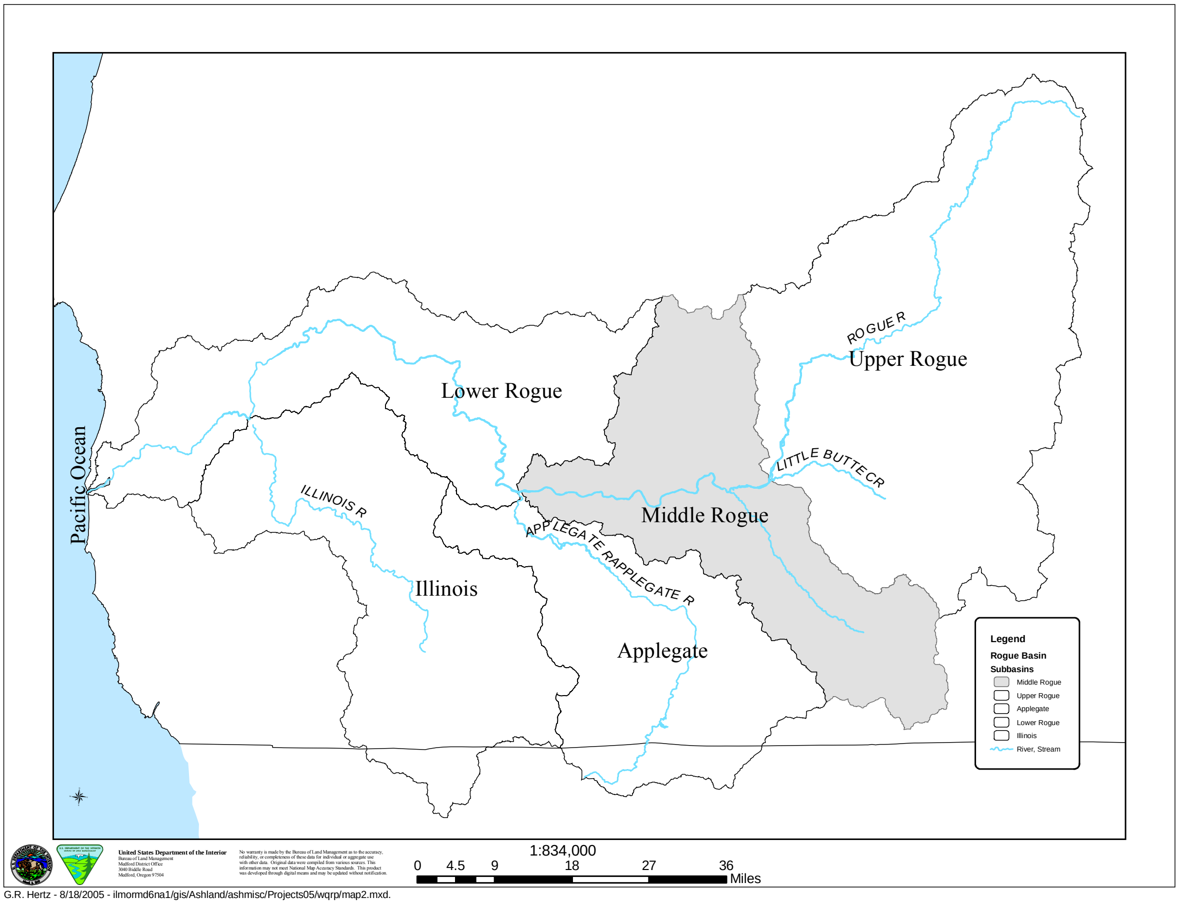
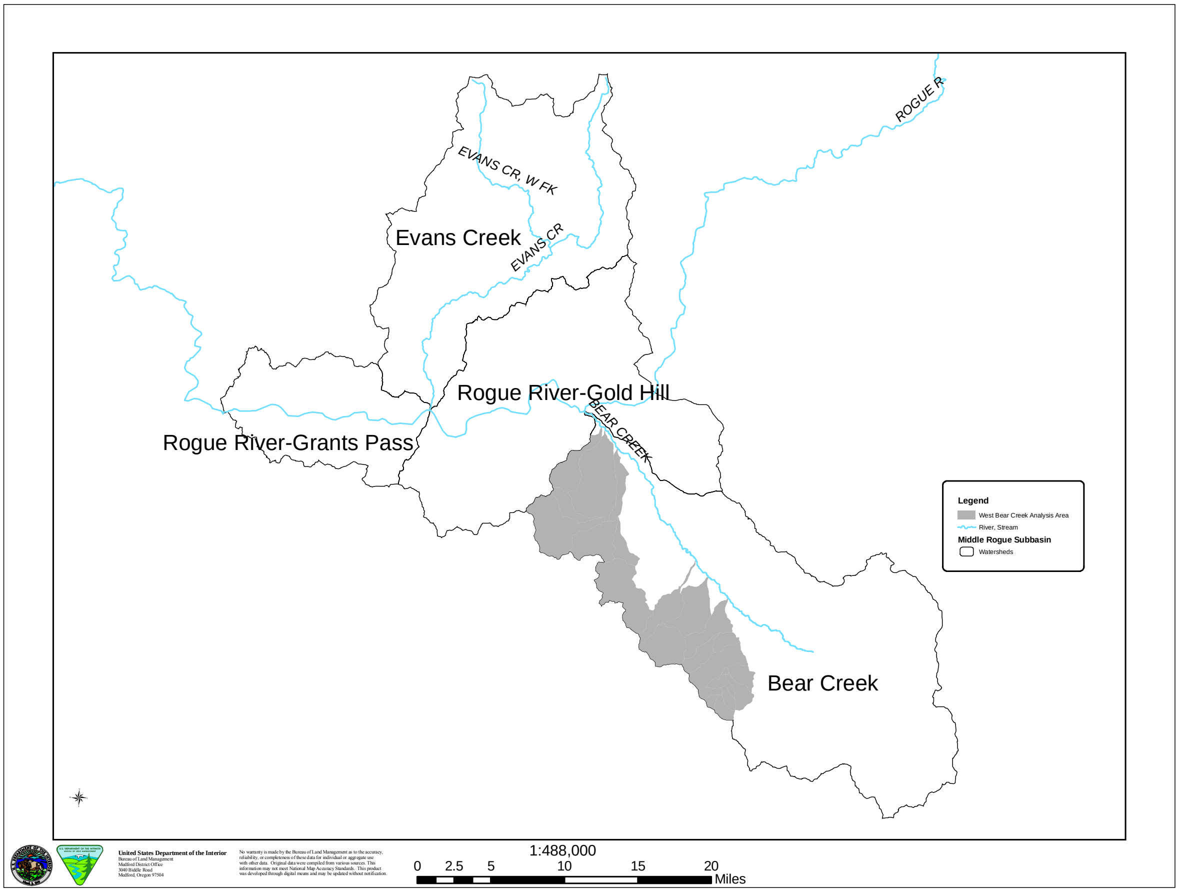


Figure 5. Watersheds within the Middle Rogue Subbasin



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Land Ownership and Use

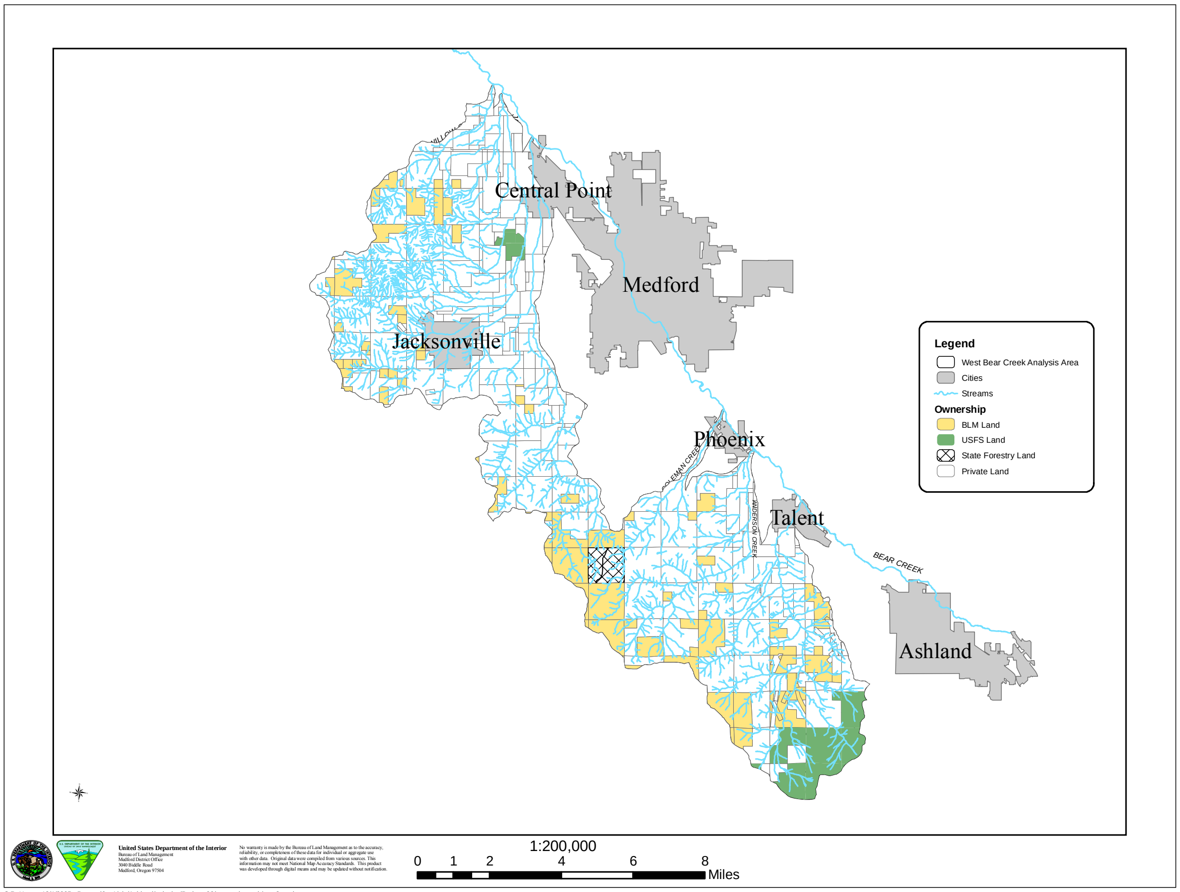
The BLM administers 15 percent of the lands within the West Bear Creek Analysis Area (Table 4 and Figure 6). The United States Forest Service (USFS), Rogue River National Forest, manages 2,821 acres within the analysis area, including the J. Herbert Stone Nursery located on Jackson Creek. The State of Oregon manages 640 acres that falls between Coleman and Griffin Creeks. The remaining 79 percent of the plan area consists of private lands.

BLM parcels are scattered throughout the foothills and along the crest of the mountains on the western boundary of the analysis area. The highest concentration of federal lands is in the southwestern portion of the analysis area. Some of the large blocks of private lands are managed as industrial forest, while ownership of the remaining privately-held land in the watershed is typically held in relatively small parcel holdings. Bear Creek Corporation owns and manages orchards in the lower elevations.

Table 4. Ownership within the West Bear Creek Analysis Area

Ownership	Acres	Percent
BLM – Ashland Resource Area	8,799	15%
USFS	2,821	5%
State of Oregon	640	1%
Private	47,306	79%
Total	59,566	100%

Figure 6. BLM Land Ownership in the West Bear Creek Analysis Area



BLM land allocations within the plan area include matrix, late-successional reserves, and Riparian Reserves. The plan area includes one special area, the Holton Creek Research Natural Area, and a portion of one special recreation management area, John's Peak/Timber Mountain Off-Highway Vehicle (OHV) Area. 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 1995:24-40; 56-68).

Major land uses in the West Bear Creek Analysis Area include agriculture, timber, mining, and recreation. Cattle operations are the largest non-forestry agricultural venture. Livestock grazing is currently concentrated in privately owned range lands consisting of flat and open terrain with adequate forage. The BLM manages portions of three grazing allotments and they have been vacant for 20 or more years (Hackett 2005). The non-use status of these allotments can primarily be attributed to intermingled private land making it difficult to graze within an allotment, lack of fencing to control livestock on public land, and the poor quality of these areas for livestock grazing. The allotments are characterized by steep hills and brushy vegetation with little desirable forage. Other agriculture in the plan area is varied and mostly small acreage, domestic farms and gardens. There may be some orchards still in production, although most operations are found at lower elevations and outside of the plan area.

Logging has occurred in the plan area since the 1850s when timber was used by miners and settlers. It wasn't until the second half of the twentieth century that timber became a major commodity and logging occurred throughout the plan area. Approximately 3,500 acres of BLM-administered land have been entered for some type of timber harvest in the plan area since 1950.

Historically, mineral production played a significant role in the development of this area and had a tremendous impact on the resources and the landscape. According to the *West Bear Creek Watershed Analysis*, there were 15 mining claims on public lands as of 2001 (USDI 2001:44).

Due to the close proximity to the cities of Medford, Central Point, Jacksonville, Phoenix, Talent, and Ashland, the area receives a high degree of recreation use for hiking, fishing, dispersed camping, hunting, mountain biking, horseback riding, off-highway vehicle (OHV) use, and pleasure driving. There are no developed facilities managed by BLM within the plan area, however, developed private facilities include the Wagner Creek interpretive trail, the Jacksonville Woodlands trail system, and an OHV staging area. A portion of the Timber Mountain/John's Peak OHV area is within the plan area. This OHV area was designated in the *Medford District Record of Decision and Resource Management Plan* (USDI 1995) to be managed to provide for OHV use. Off-highway vehicle enthusiasts have used this area for about 40 years and there has been a large increase in use over recent years. The *Draft Timber Mountain/John's Peak Off-Highway Vehicle Management Plan and Environmental Impact Statement* is currently being developed and scheduled for distribution in 2007.

Roads distributed throughout the plan area provide vehicle access to managed forestlands, residences, and recreational areas. There are approximately 580 road miles within the analysis area, of which nine percent are controlled by the BLM and U.S. Forest Service (USDI 2001:40).

Geology

The West Bear Creek Analysis Area straddles the contact between the eastern edge of the Klamath Mountains Geologic Province (also called the Siskiyou Mountains), and the Western Oregon Interior Valleys (physiographic) Province. The geology of the plan area can be briefly described as eroding metamorphic and granitic uplands with minor amounts of sedimentary deposits draping the lower slopes.

The geologic materials have been subject to weathering, mass wasting and erosion processes controlled by past and present climatic conditions. Landforms in the plan area visible today are the result of continual interactions between climate and regional geology over eons of time. The various types of rock distributed throughout the watershed affect soils. Different mineralogy, structures, inherent strength of the bedrock, and resistance to erosion and mass wasting influence the landforms. Metamorphic and granitic rock and their associated soils are the predominant rock and soil types found in the analysis area.

Metamorphic rock types make up over 55 percent of the West Bear Creek Analysis Area. Metasedimentary and metavolcanic rocks found in the plan area are relatively resistant to erosion, and for this reason they are often found on steep slopes. Soils on these types of rock are shallow, composed of silts and clays with variable amounts of rock fragments. Generally, the upper fractured bedrock has only a thin weathering zone.

Granitic rocks constitute 20 percent of the plan area and are the most erosive and unstable rock type found in the plan area. Soils formed from granitic rock are generally moderately deep over decomposed bedrock and are highly erosive because of low cohesive coarse textured particles. Rapid erosion on steep slopes keeps fresh granite near the surface, while transported decomposed granite increases embeddedness of streams by filling interstices (space between stream gravels) with coarse sand.
In the plan area, granite is found as two disconnected pods (each approximately ten square miles in extent) in the northwest (John's Peak) and southwest (foothills of Wagner Butte).

Climate

Mild, wet winters and hot, dry summers characterize the West Bear Creek Analysis Area. During the winter months, the moist, westerly flow of air from the Pacific Ocean results in frequent storms of varied intensities. Average annual precipitation in the analysis area ranges from approximately 21 inches at lower elevations to 48 inches at Wagner Butte (elevation 7,140 feet). Winter precipitation in the higher elevations (above 5,000 feet) usually occurs as snow, which ordinarily melts during the spring runoff season from April through June. The snow dominated zone comprises approximately two percent of the plan area. Rain predominates in the lower elevations (below 3,500 feet) with the majority occurring in the late fall, winter, and early spring. The rain dominated zone comprises approximately 82 percent of the plan area. A mixture of snow and rain occurs between approximately 3,500 feet and 5,000 feet (approximately 16 percent of the plan area) 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.

During the summer months, the 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 the Medford Experiment Station and Ashland (located southeast of the analysis area). The highest average maximum monthly temperatures occur in July and August, where they reach 88.8°F and 88.3°F at the Medford Experiment Station and 86.8°F and 85.7°F at the Ashland NOAA station (USDI 2001:17).

Streamflows

No streamflow data exists for the Bear Creek tributaries within the analysis area. Summer streamflows in the analysis area are highly influenced by human-caused factors such as water withdrawals, creeks used as conveyance channels, and irrigation return flows and do not follow a natural, predictable pattern (RVCOG 1999). Low summer rainfall and sustained high evapotranspiration are the natural factors that affect summer streamflows in the analysis area.

The Bear Creek Flow Study by the Rogue Valley Council of Governments (RVCOG 1999) examined the correlation between Bear Creek flows and 13 tributaries. Four of the tributaries evaluated are in the West Bear Creek Analysis Area: Wagner, Coleman, Griffin, and Jackson Creeks. The study concluded that during the non-irrigation season (November 1-May 30) the flows in the tributaries appear to be highly influenced by natural physical processes. However, during the irrigation season (April 1-October 31) the study found that flows do not follow a natural flow regime and are not able to be predicted from a relationship between the tributaries and Bear Creek.

The RVCOG study also determined the relative monthly water discharges separated by irrigation/non-irrigation seasons for the 13 Bear Creek tributaries. Jackson and Griffin Creeks were identified as being two of the top three influential creeks contributing flows to Bear Creek during the irrigation season.

During the irrigation season water, the Talent Irrigation District (TID) diverts water from McDonald Creek in the Applegate River Subbasin to Wagner Creek via the McDonald ditch. Average monthly diversions during 1994-1998 ranged from 0.26 cfs in September to 6.15 cfs in June.

Aquatic Wildlife Species

Fall chinook (*Oncorhynchus tshawytscha*) spawn in Bear Creek during September and October, and utilize tributaries in the analysis area for additional habitat if there is adequate flow during this time period. An adult fall Chinook was observed in Jackson Creek by Oregon Department of Fish and Wildlife (ODFW) staff in 1997, downstream from the Interstate 5 culvert. No Chinook have been observed in any of the other tributaries in the analysis area (USDI 2001:35).

Summer steelhead (*O. mykiss*) use almost 24 miles of habitat in streams throughout the analysis area (USDI 2001:35). Of the 24 miles, 1.9 miles cross BLM-managed lands. Summer steelhead adults enter the tributaries as soon as winter flow levels are sufficient and spawn between January and March. Fry emerge in April and May, with most fry migrating out in May and June (USDI 2001). Habitat available to summer steelhead is primarily located in Wagner Creek and tributaries (9.86 miles) and Jackson Creek and tributaries (8.2 miles), with additional habitat in Griffin Creek (3.2 miles), and Willow Creek (2.5 miles) (Table 5 and Figure 7). It is unknown how much habitat is available in Anderson Creek, and there is no habitat available in Coleman Creek.

Non-anadromous fish species in the West Bear Creek Analysis Area include cutthroat trout (*O. clarki*), rainbow trout (*O. mykiss*), and sculpin (*Cottus* sp.) (Table 5 and Figure 8). ODFW has determined upstream limits for cutthroat and rainbow trout, but not for sculpin, which are assumed to have a distribution similar to that of cutthroat. Cutthroat are found almost exclusively in Wagner Creek and tributaries (10.86 miles), with a very small section of stream available in a tributary to Anderson Creek (0.06 miles) (USDI 2001:35-36). There are 35.5 miles of habitat available to rainbow trout in the analysis area, most of which is found in Wagner Creek and tributaries (10.86 miles) (USDI 2001:35-36). Additional habitat is found in Anderson Creek and tributaries (5.63 miles), Griffin Creek (8.5 miles), Jackson Creek (7.0 miles), and Willow Creek (3.5 miles).

Table 5. Approximate Stream Miles of Salmonid Use (USDI 2001)

Mainstem Stream Name	Stream Name	Summer Steelhead (miles)	Rainbow Trout (miles)	Cutthroat Trout (miles)
Wagner Creek	Wagner Creek	6.8	7.6	7.6
	Arrastra Creek	0	1.0	1.0
	Arrastra Creek Tributary	0	0.4	0.4
	Holton Creek	0.3	0.3	0.3
	Yank Gulch	0	0.6	0.6
	Bear Gulch	0	0.3	0.3
	Horn Gulch	2.7	0	0
	Unnamed Tributary	0	0.6	0.6
	Rail Gulch	0.06	0.06	0.06
Anderson Creek	Anderson Creek	unknown	5.5	0
	Unnamed Tributary	0	0.06	0.06
	North Fork Anderson Creek	0	0.07	0
Coleman Creek	Coleman Creek	0	0	0
Griffin Creek	Griffin Creek	3.2	8.5	0
Jackson Creek	Jackson Creek	4.4	7.0	0
	Unnamed Tributary	1.4	0	0
	Dean Creek	2.0	0	0
	Unnamed Tributary to Dean Creek	0.3	0	0
	Unnamed Tributary to Dean Creek	0.1	0	0
Willow Creek	Willow Creek	2.5	3.5	0

Crayfish and Pacific giant salamanders are also known to reside in the analysis area, although little is known about their status.

The lower reaches of the major tributaries are in a highly developed valley of diverse land use including agriculture, small farms, rural residential, residential and commercial development, road crossings, railroad crossings, urban runoff drainage structures, and irrigation diversions (USDI 2001:37). In many cases, this development encroaches on the riparian corridor, resulting in channelized streams, changes in the natural flow regimes, inadequate shading of the stream, inadequate large woody debris (LWD), no recruitment potential for future LWD, and high sediment.

Throughout the analysis area, barriers to fish migration such as dams, irrigation diversions, push-up dams, and culverts block anadromous fish from additional spawning habitat. There are 11 known fish barriers in the analysis area (USDI 2001:37).

Figure 7.   Summer Steelhead Distribution in the West Bear Creek Analysis Area

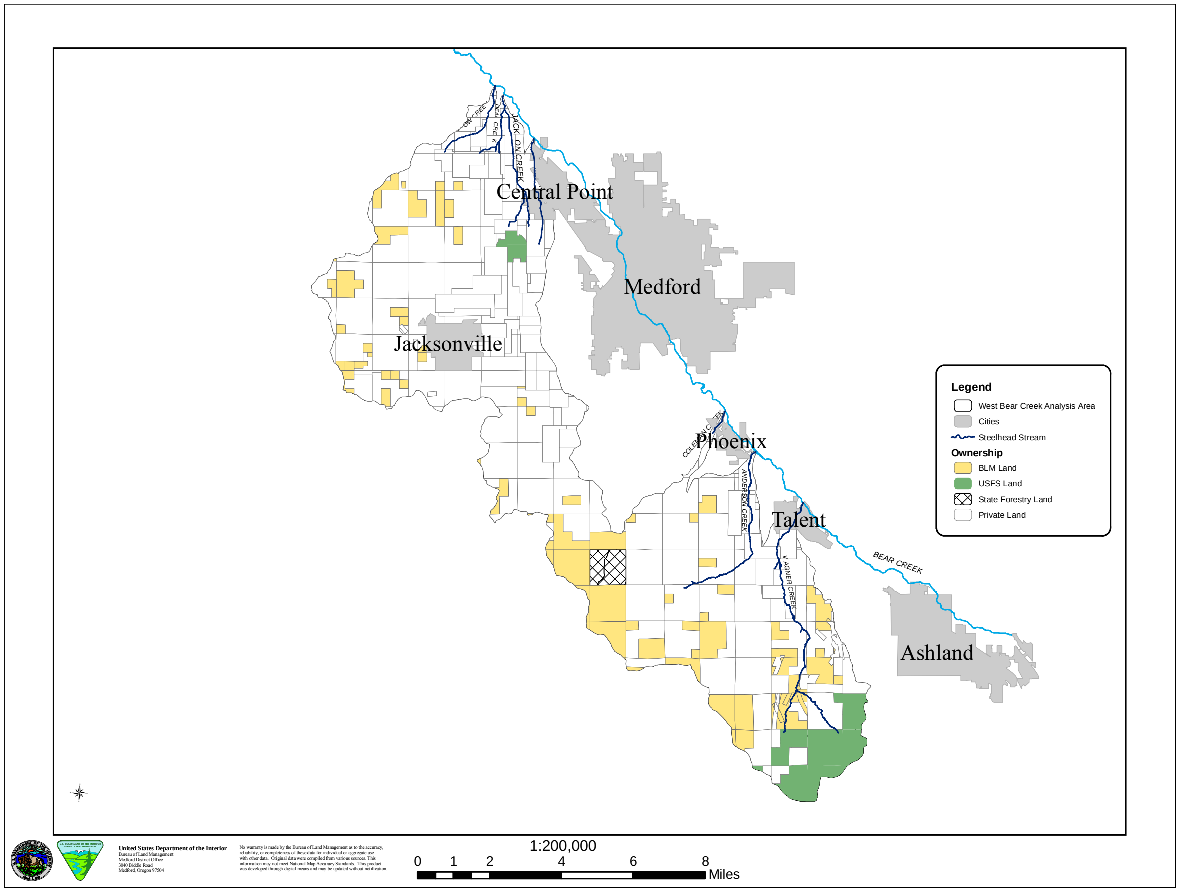


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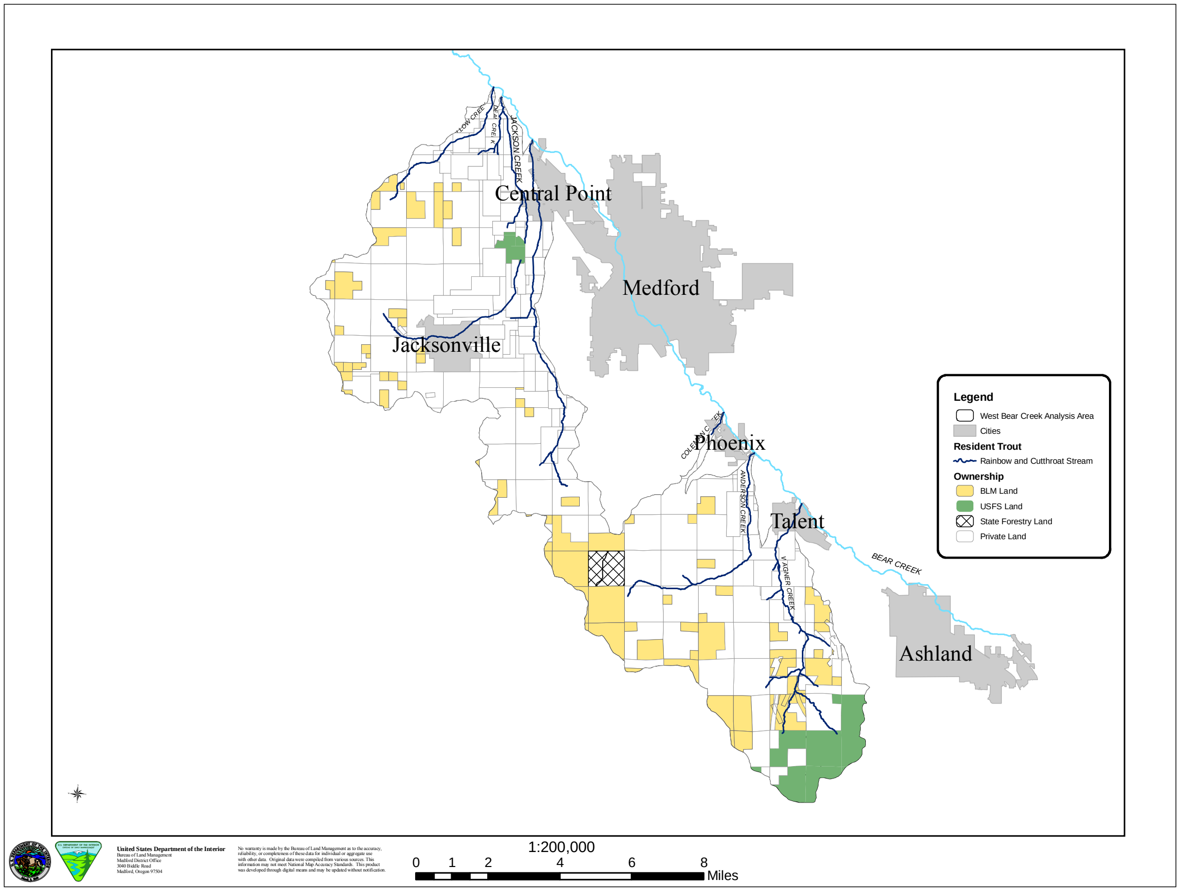
Figure 8. Resident Trout Distribution in the West Bear Creek Analysis Area



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 *West Bear Creek Watershed Analysis* was completed for the West Bear Creek Analysis Area in August 2001 (USDI 2001). This WQRP tiers to and appends the watershed analysis. A summary of historical and present watershed conditions in the West Bear Creek Analysis Area has been compiled from the watershed analysis (Table 6). 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 6. Summary of Watershed Conditions on BLM-Administered Lands in the West Bear Creek Analysis Area

Riparian Vegetation	
Historical Condition	• Late seral vegetation dominant. • Diverse mix of species and age classes.
Present Condition	• Mature hardwoods and conifers with dense understory.
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 black 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.

C. Temperature

Introduction

The sensitive beneficial uses affected by excessive temperatures include resident fish and aquatic life, salmonid fish spawning, and rearing (ODEQ 2000).

The Oregon water quality temperature standard that applies to the West Bear Creek Analysis Area was approved by EPA on March 2, 2004 and is found in OAR 340-041-0028 (4) (a-c) (ODEQ 2005a). 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 West Bear Creek Analysis Area temperature water quality standards can be found at: http://www.deq.state.or.us/wq/standards/WQStdsFinalFishUseMaps.htm. Perennial streams in the West Bear Creek Analysis Area are designated as salmon and trout rearing and migration use on fish use map 271A, therefore the seven-day-average maximum for these streams may not exceed 18.0°C (64.4°F) from May 16 through October 14. Map 271B shows salmon and steelhead spawning use designations for Wagner Creek, Horn Gulch, Griffin Creek, Jackson Creek, Dean Creek, Willow Creek, and the lowest reaches of Anderson and Coleman Creeks. The seven-day average maximum temperature for these streams may not exceed 13.0°C (55.4°F) from October 15 through May 15.

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.

The 2004/2006 303(d) temperature listings for the West Bear Creek Analysis Area are based on list dates from 1998 and 2002 (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 West Bear Creek Analysis Area, Coleman Creek (6.9 miles), Jackson Creek (12.6 miles), and Wagner Creek (7.4 miles) are on the 2004/2006 303(d) list for exceeding the 64.0°F 7-day statistic for rearing salmonids (Table 3). Jackson Creek (12.6 miles) is also listed for exceeding the 55.0°F 7-day statistic for spawning salmonids (Table 3). There are 2.1 miles (0.7 miles on Coleman Creek and 1.4 miles on Wagner Creek) of temperature listed reaches on BLM-administered lands (Figure 1).

The BLM collected summertime stream temperature data at several locations within West Bear Creek Analysis Area between 1994 and 2003 (Table 7). The 7-day statistics for the Coleman Creek and Wagner Creek sites exceed both the 1996 and 2004 temperature criteria.

Table 7. West Bear Creek Analysis Area Temperature Summary

Stream Name	Data Source	Period of Record[1]	7-day Statistic (ave. for all years) (°F)	Range of 7-day Statistic (for all years)		Average # of times/yr 7-Day Statistic > 64 °F
				Minimum (°F)	Maximum (°F)	
Arrastra Creek (section 14)	BLM	1999	61.5	61.5	61.5	0
Coleman Creek (abv. T.I.D. west lateral)	BLM	1997-2000, 2003	65.9	64.9	67.0	21
Griffin Creek (section 26)	BLM	1999	55.6	55.6	55.9	0
Horn Gulch (mouth)	BLM	1994-2001	60.0	58.1	61.7	0
Wagner Creek (abv. Yank Gulch)	BLM	1998-2001	68.0	66.0	71.4	36
Wagner Creek (abv. Horn Gulch)	BLM	1994-2001	65.6	59.8	68.7	19
Wagner Creek (below McDonald Ditch, below Wagner Gap)	BLM	2001	64.9	64.9	64.9	6

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 human land use. Human activities that contribute to degraded thermal water quality conditions in the West Bear Creek Analysis Area include: urbanization and urban infrastructures; agricultural activity; suburban and rural residential developments; water withdrawals; timber harvests; active and legacy aggregate mines; local and forest access roads; and federal, state, and county highways (ODEQ 2000). Timber harvest and roads, mining activity; and a few remnant homesteads or residential inholdings are the primary impacts specific to federally managed lands that have the potential to affect water quality conditions. For the Bear Creek 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 2006b).

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 (ODEQ 2006b). Activities in riparian areas such as timber harvest, residential and agricultural clearing, placer mining, and road construction, have reduced the amount of riparian vegetation in the West Bear Creek Analysis Area. 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 2001). Large fir, pine, and white fir that existed along higher elevation streams historically are often absent, especially in the lower reaches. 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 (USDI 2001). 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). 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).

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 West Bear Creek Analysis Area 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 and contribute to channel widening and stream temperature increases. Natural erosion processes occurring in the analysis area such as landslides, surface erosion, and flood events contribute to increased sedimentation (USDI 2001:81). 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; urban, residential, and agricultural clearing of riparian zones; maintenance of irrigation diversions; irrigation return flows; irrigation ditch blowouts; and mining (USDI 2001:81). Roads appear to be the primary human-caused sediment source from BLM-administered lands in the West Bear Creek Analysis Area (USDI 2001:81).

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 West Bear Creek Analysis Area 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.

Total quantities of water are not sufficient to satisfy all existing water uses in the plan area (USDI 2001:66). The majority of valid water rights issued by the Oregon Water Resources Department are for irrigation. New water diversions are only being approved for stored water.

Water withdrawals and irrigation return flows have the potential and likely result in increased thermal loads within the West Bear Creek Analysis Area (USDI 2001:77). The management of water withdrawals is within the jurisdiction of the Oregon Water Resources Department and as such the BLM has no authority in this area. There are three small (0.7 acre feet or less) BLM reservoirs within the analysis area that are used for wildlife, 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). 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 2004/2006 303(d) list identifies that the numeric water quality criteria from the 1996 and 2004 standards (64°F and 64.4°F, respectively) are exceeded in three streams (Coleman, Jackson, and Wagner Creeks). 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).

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). Therefore, 100 percent of the load allocation for the West Bear Creek Analysis Area 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 Bear Creek 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 capacity 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 nine streams on BLM-administered lands within the West Bear Creek Analysis Area: Arrastra, Basin, Griffin, Holton, North Fork Anderson, South Fork Jackson, and Wagner Creeks and Horn and Miller Gulches (Table 8). The data analysis method used for the shade assessment was the Shadow model (USDA 1993). 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 Arrastra and Holton Creeks meet the target shade. For the assessed reaches of Basin Creek, Horn Gulch, North Fork Anderson Creek, South Fork Jackson Creek, and Wagner Creek, the current shade on BLM-administered lands is greater than 80 percent and those stream reaches are considered recovered. The BLM-administered lands on the assessed reaches of Griffin Creek and Miller Gulch need 87 and 72 years, respectively, to reach the target shade.

A BLM stream survey of Miller Gulch was conducted in June 2001. According to the survey results, Miller Gulch is an intermittent stream, thus there is no surface water during the summer.

Table 8. Percent-Effective Shade Targets for BLM-Managed Lands in the West Bear Creek Analysis Area (ODEQ 2000: Appendix E)

Stream	Tributary to	Stream Miles on BLM	Current Shade[1]	Target Shade[1]	Additional Shade Needed[2]	Time to Recovery[3] (years)
Arrastra Creek	Wagner Creek	0.2	88	88	0	0
Basin Creek	Wagner Creek	0.3	83	98	15	0
Griffin Creek	Bear Creek	0.5	62	92	30	87
Holton Creek	Wagner Creek	1.0	88	88	0	0
Horn Gulch	Wagner Creek	0.4	85	90	5	0
Miller Gulch	South Fork Jackson Creek	0.2	65	97	32	72
North Fork Anderson Creek	Anderson Creek	1.1	93	98	5	0
South Fork Jackson Creek	Jackson Creek	0.2	83	88	5	0
Wagner Creek	Bear Creek	1.6	87	88	1	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.
2/ Additional shade needed is the increase in percent-effective shade required to meet the target shade.
3/ If current shade is ≥80%, the time to recovery is listed as 0 years. If current shade is <80%, the time to recovery is listed as the number of years needed to reach full system potential percent-effective shade. Any increase over 80% effective shade is considered a margin of safety. At a value of ≥80% 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. Years to recovery are a weighted average of recovery time for individual stream reaches.

D. Bacteria (Fecal Coliform)

Introduction

Water contact recreation is the most sensitive beneficial use affected by high levels of fecal coliform 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 2005a). The following is an excerpt from the standard that applies to nonpoint sources in the West Bear Creek Analysis Area.

> *(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 bacteria (fecal coliform) listings for the West Bear Creek Analysis Area were listed in 1998 and based on the State of Oregon water quality standards in effect prior to January 11, 1996 (ODEQ 1998:11). Fecal coliform data was used to develop the 1998 303(d) list as it was the most commonly measured indicator of organisms of the coliform group commonly associated with fecal sources.

The Oregon water quality standard used for the 1998 fecal coliform 303(d) listings stated (ODEQ 1998:11):

> *Freshwaters and Estuarine Waters other than shellfish growing waters: A log mean of 200 fecal coliform per 100 milliliters based on a minimum of five samples in a 30 day period with no more than ten percent of the samples in the 30 day period exceeding 400 per 100 ml.*

The 2004/2006 303(d) list includes three streams within the West Bear Creek Analysis Area that are listed for exceeding bacteria (fecal coliform) standards: Coleman, Griffin, and Jackson Creeks (Table 9). There are 2.1 miles of fecal coliform listed streams on BLM-administered lands within the West Bear Creek Analysis Area: 0.7 miles on Coleman Creek and 1.4 miles on Griffin Creek. The listed segments on BLM-administered lands are located in the upper reaches of Coleman and Griffin Creeks. There is no fecal coliform data for the stream segments on BLM-administered lands; the listings are based on data collected from the lower reaches of these streams, located in the developed valley.

Table 9. Stream Segments Listed for Bacteria (Fecal Coliform) in the West Bear Creek Analysis Area (1998 List Date)

Stream Segment	Miles Affected	Season	
		Summer	Fall/Winter/ Spring
Coleman Creek	6.9	X	X
Griffin Creek	14.4	X	X
Jackson Creek	12.6	X	X
Total Miles	**33.9**		

Bacteria (Fecal Coliform) 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. Sources of high bacterial levels in the analysis area include animal feces (wild and domestic, including livestock such as cattle), failing septic systems, runoff from urban areas, leaking or cross connected municipal sewer systems, and irrigation return flows (USDI 2001:80).

The only source of fecal coliform bacteria that potentially occurs on BLM-administered lands within the analysis area is wild animal feces, since there has not been any livestock grazing for over 20 years. The Oregon Department of Fish and Wildlife is responsible for controlling wildlife populations, therefore the BLM does not have any control over fecal coliform sources within the analysis area.

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 West Bear Creek Analysis Area. 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.

The recovery of water quality conditions on BLM-administered land in the West Bear Creek Analysis Area will be dependent upon implementation of the BLM Medford District Resource Management Plan (RMP) (USDI 1995) that incorporates the NWFP (USDA and USDI 1994). The RMP includes 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.

Recovery goals for temperature on federal land are specified in Table 10.

Table 10. Recovery Goals for BLM-Administered Land in the West Bear Creek Analysis Area

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.

1/ Passive versus active restoration of riparian areas. If current percent effective shade is greater than or equal to 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 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 RMP includes BMPs that are important for preventing and controlling nonpoint source pollution to the "maximum extent practicable" (USDI 1995:149-177). BMPs are developed on a site-specific basis 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 10), active restoration measures will be considered for streams with current shade that is less than 80 percent (Table 8). 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 10) 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.

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 modification 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 Ashland Field Manager is responsible for ensuring this WQRP is implemented, reviewed, and amended as needed. This official is responsible for all WQRPs for lands under their jurisdiction. The field manager will ensure coordination and consistency in plan development, implementation, monitoring, review, and revision. The manager 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 encompassed in the Bear Creek WQMP, which is currently being prepared and scheduled for completion in 2006. The WQMP will cover all land within the Bear Creek Watershed regardless of jurisdiction or ownership. A WQRP for the remaining BLM-administered lands within the Bear Creek Watershed will be prepared prior to 2009.

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 public lands. It must be noted that only eight 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 Bear Creek Watershed WQMP include the Bear 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), and Oregon DEQ. 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 RMP 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 RMP was implemented in 1995 and the BLM is in the initial stage of revising the RMP, 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 annual program summary provides feedback and tracks how management actions are being implemented.

RMP monitoring will be conducted as identified in the approved BLM Medford District plan. 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 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.

Core indicators of water quality and stream health including stream temperature, 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

Due to the scattered pattern and limited amount (15 percent) of BLM-managed lands within the West Bear Creek Analysis Area, the BLM has not established a long-term monitoring site in the analysis area. Future stream temperature monitoring will be conducted as needed to track potential project effects.

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 Monitoring

Restoration activities designed to improve stream channel conditions (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 RMP each 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 *West Bear 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 Bear Creek 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 $5,000 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 2006. 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 West Bear Creek Analysis Area 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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