Water Quality Restoration Plan

Southern Oregon Coastal Basin

Gold Hill-Rogue River Watershed North

Bureau of Land Management (BLM), Medford District

Butte Falls Resource Area

February 2011

Hydrologic Unit Code Number	**1710030802**
WQRP Area/Ownership	BLM Ownership: 16,599 acres (26%) Private: 46,272 acres (73%) State: 669 acres (1%) Total: 63,540 acres
303(d) Stream Miles Assessed	Total: 13.9 miles BLM Ownership: 1.1 miles
303(d) Listed Parameters	Temperature
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 sedimentary uplands with some alluvial deposits near the Rogue River 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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Element 1 Condition Assessment and Problem Description

A. Introduction

This document describes how the Bureau of Land Management (BLM) will meet Oregon water quality standards for 303(d) listed streams on federal lands. In July 2003, the Bureau of Land Management (BLM) signed a memorandum of agreement (MOA) with DEQ defining how water quality rules and regulations regarding TMDLs will be met. BLM agreed to develop or revise existing Water Quality Restoration Plans (WQRPs) as described in MOA, and that they would be the TMDL Implementation Plans for BLM (ODEQ 2008). Its organization is designed to be consistent with the DEQ's Water Quality Management Plan (WQMP) completed 12/22/08. The area covered by this Water Quality Restoration Plan (WQRP) includes all lands managed by the BLM, Medford District within the Gold Hill-Rogue River Watershed north of and including the Rogue River. This area is referred to as the plan area or Gold Hill-Rogue River Watershed North.

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 use, fish and aquatic life. Seasonal standards may be applied for uses that do not occur year round.

Table 1. Beneficial Uses in the Gold Hill-Rogue River Watershed North (OAR 340-41-271 (ODEQ 2008))

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

Table 2. Sensitive Beneficial Uses in the Gold Hill-Rogue River Watershed North

Sensitive Beneficial Use	***Species[1]***
Salmonid Fish Spawning & Rearing	Coho[1], summer steelhead, winter steelhead
Resident Fish & Aquatic Life	Resident Fish: Rainbow trout, cutthroat trout, sculpin, dace Other Aquatic Life: foothill yellow-legged frog, Pacific giant salamander, western pond turtle, beaver, and other species of frogs, salamanders, and snakes

[1] threatened under Federal Endangered Species Act (ESA)

Listing Status

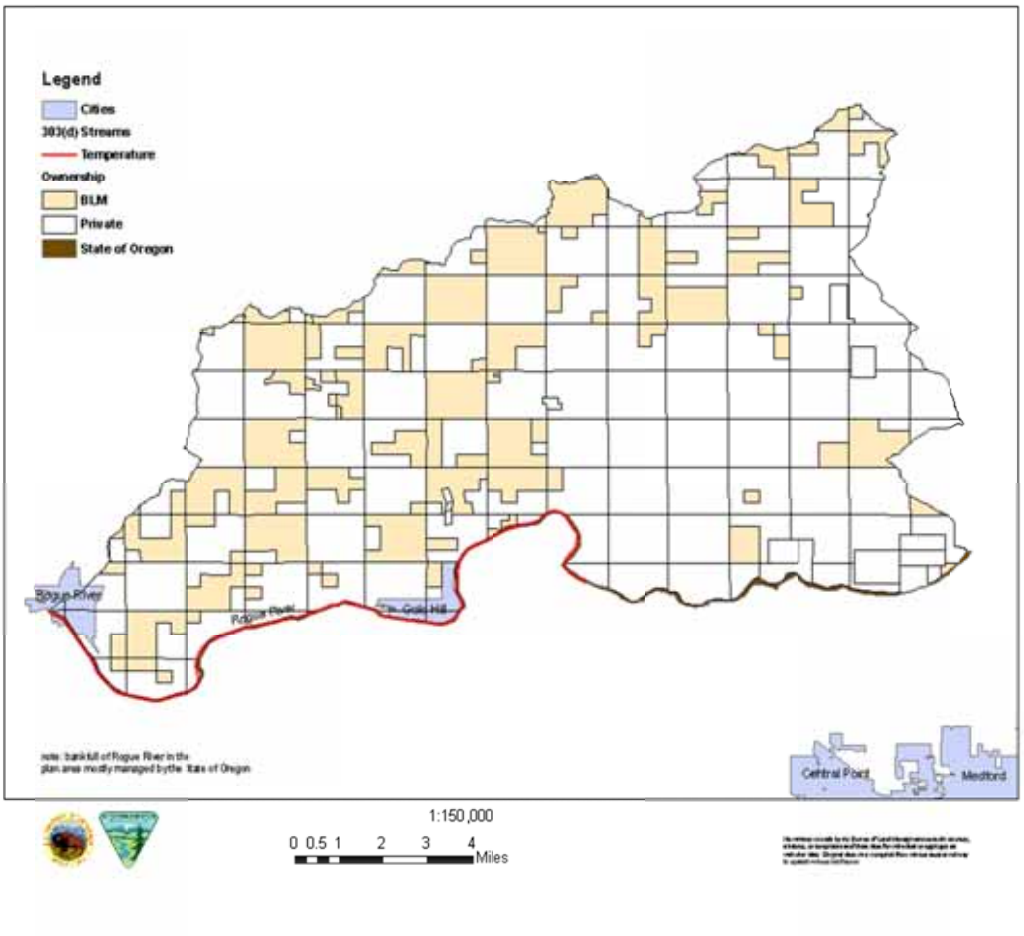
Section 303 of the Clean Water Act of 1972, as amended by the Water Quality Act of 1987, provides direction for designation of beneficial uses and limiting discharge of pollutants to waters of the state. The DEQ is responsible for designating streams that do not meet established water quality criteria 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 TMDL for the Rogue River Basin (ODEQ 2008) has the most recent 303(d) listings for the basin. This WQRP address all listings on the 303(d) list for the plan area: one stream is listed for exceeding the summer temperature criterion (Table 3). There are a total of 13.9 stream miles on the 2002 303(d) list (Table 3), of which 1.1 miles cross federal lands (Figure 1). These lands are not commercial timberlands but are low elevation hardwood and brush stands.

Table 3. 2004/2006 303(d) Temperature Listings in the Gold Hill-Rogue River Watershed North (ODEQ 2008)

303(d) List	Stream Segment	Listed Parameter	Applicable Rule (at time of listing)	Miles Affected
2002	Rogue River	Temperature	**OAR 340-041-0028(4)(b)**	13.9
Total Stream Miles listed for Temperature				**13.9**

Figure 1. Gold Hill-Rogue River Watershed North 303(d) Temperature Listed Streams



B. Watershed Characterization

The Gold Hill-Rogue River Watershed North covers approximately 99-square miles (41,029 acres) in the Klamath Mountains in southwestern Oregon (Figure 2). The plan area lies north of and includes the Rogue River, between the confluences of the Rogue River with Evans Creek and Little Butte Creek. The Gold Hill-Rogue River Watershed North is located in the Middle Rogue River Subbasin (Figure 3). The northern ridges form the divide between the Gold Hill-Rogue River and Evans Creek Watersheds. The Middle Rogue Subbasin is subdivided into four watersheds: Bear Creek, Gold Hill-Rogue River, Evans Creek, and Rogue River-Grants Pass (Figure 4). The plan area is within the Gold Hill-Rogue River Watershed and the major streams are: Sam's Creek, Sardine Creek, Snider Creek, and Ward Creek.

The Gold Hill-Rogue River Watershed North is within Jackson County and covers lands northeast of the towns of Rogue River and Gold Hill. Some of the peaks that define the northern edge of the plan area include Hillis Peak, Elkhorne Butte, Chimney Rock Butte, and Cinnabar Mountain. The plan area includes a large portion of the town of Rogue River and the entire town of Gold Hill. Elevation in the plan area ranges from approximately 1,000 feet where the west edge of the analysis area intersects the Rogue River to 3,480 near Elkhorne Butte.

Figure 2. Location of the Gold Hill-Rogue River Watershed North

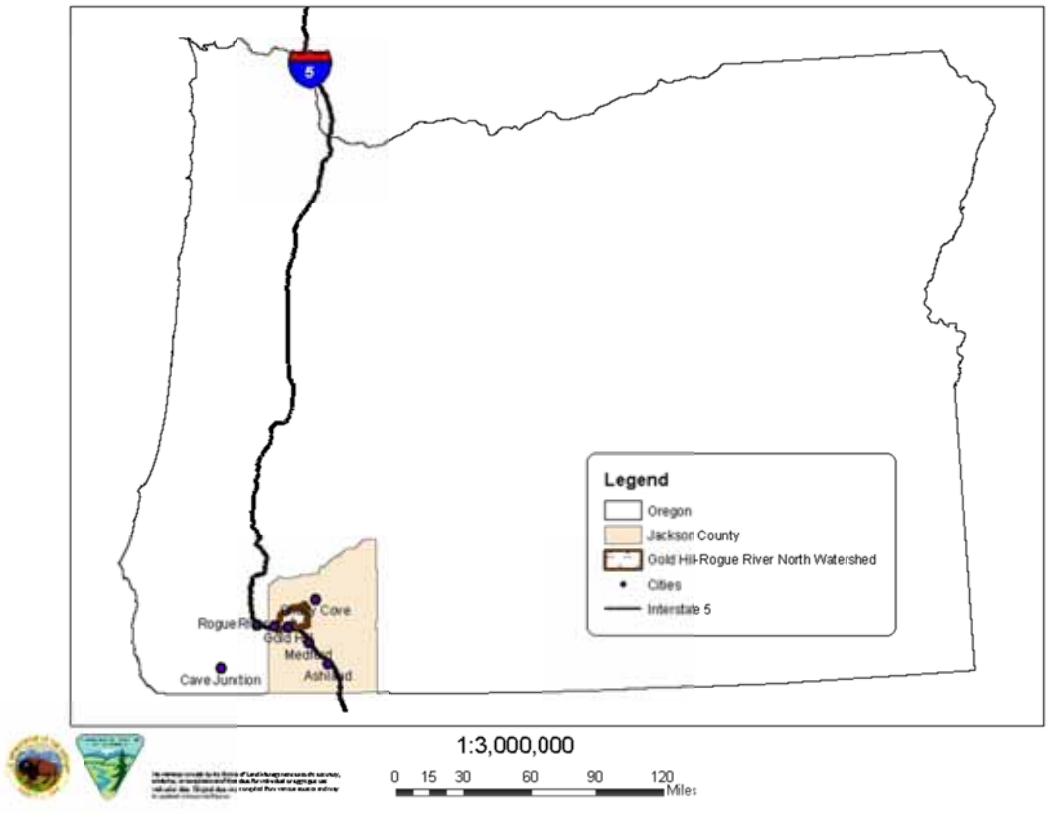


Figure 3. Rogue Basin and the Middle Rogue Subbasin

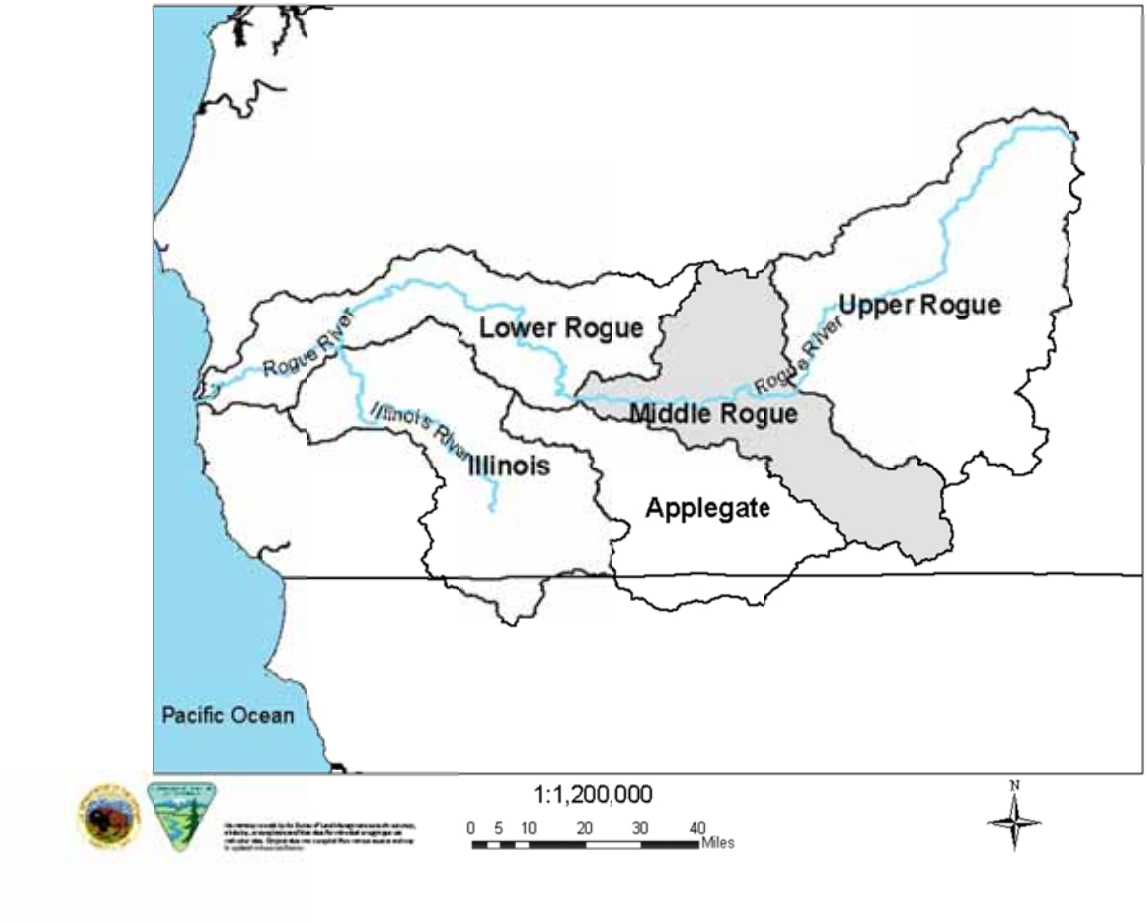
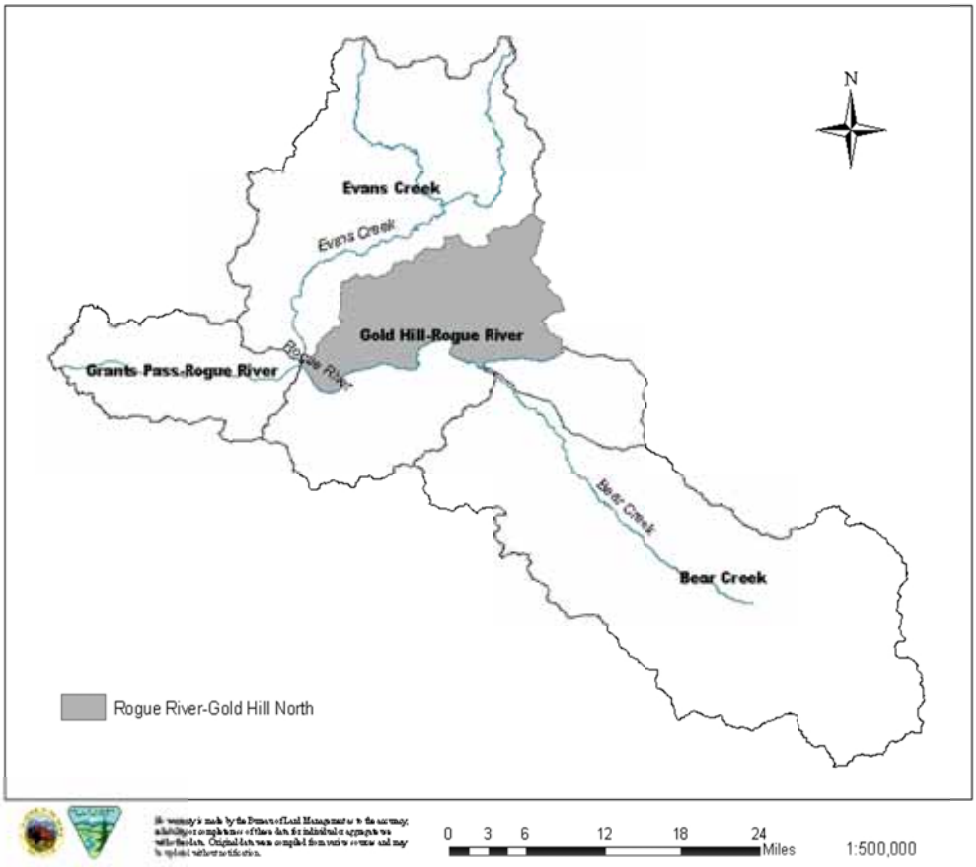


Figure 4. Watersheds within the Middle Rogue Subbasin



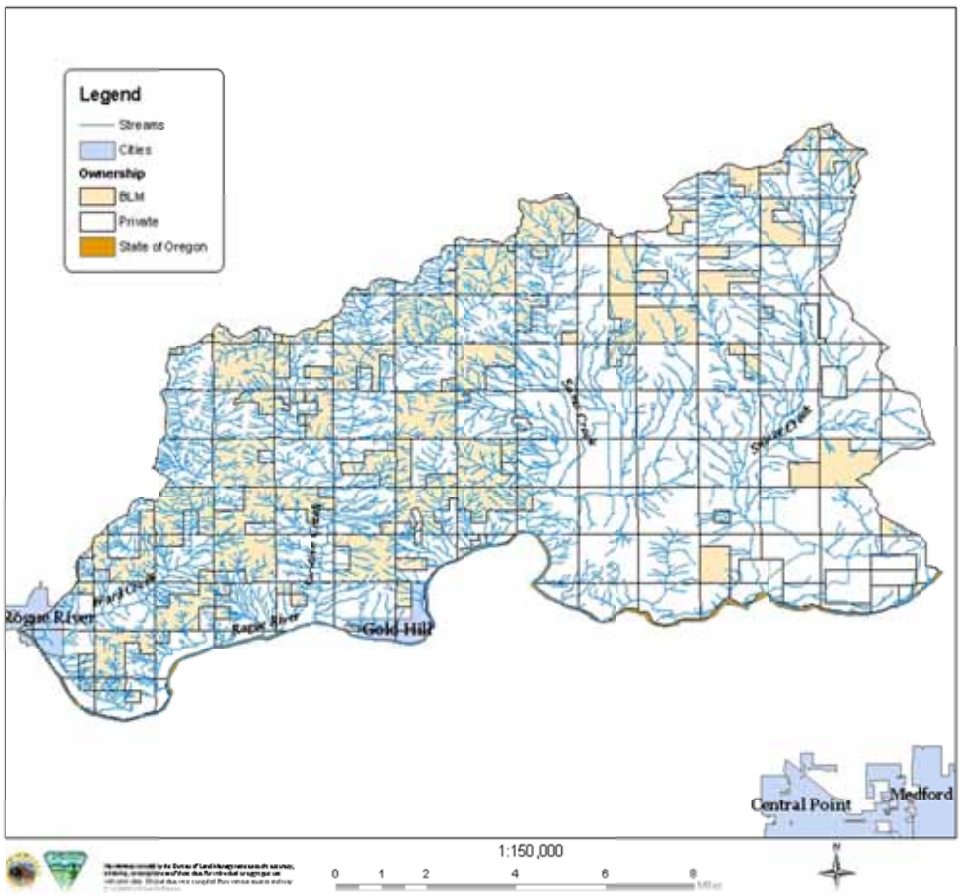
Land Ownership and Use

The BLM administers 26 percent of the lands within the Gold Hill-Rogue River Watershed North (Table 4 and Figure 5). BLM lands are intermingled with private lands. One percent of lands that composes most of the bankfull area along the Rogue River in the plan area, is managed by the State of Oregon. The remaining 73 percent of the plan area consists of private lands, of which approximately 12 percent are managed as industrial forest. Ownership of the remaining privately-held land in the watershed is typically held in relatively small parcel holdings along the major streams.

Table 4. Ownership within the Gold Hill-Rogue River Watershed North Ownership

	Acres	Percent
BLM – Butte Falls Resource Area	16,599	26%
Private	46,272	73%
State of Oregon	669	1%
Total	63,540	100%

Figure 5. BLM Land Ownership in the Gold Hill-Rogue River Watershed North



Major land uses in the Gold Hill-Rogue River Watershed North include agriculture, timber, mining, and recreation.

Cattle operations are the largest non-forestry agricultural venture. The BLM manages seven grazing allotments, of which only three (approximately 1,350 acres) are currently active. The active grazing allotments, North Sam's Valley, Upper Table Rock, and Meadows, are concentrated in the eastern half of the plan area and spill over into the Rogue River-Shady Cove Watershed. The three allotments support 55 animal unit months (aums) in the plan area per year (BLM 2010). Other agriculture in the plan area is varied and mostly small acreage, domestic farms and gardens located along the major streams.

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. In the last 30 years, 48% of BLM lands in the plan area have had timber harvested to some degree. The Douglas fir forest suitable for commercial harvest is prevalent at higher elevations, along the northern and western portions of the plan area.

Historically, mineral production played a significant role in the development of this area. There is still considerable interest in mineral exploration and development as evidenced by the large number of mining claims on file. According to the BLM GeoCommunicator Website (BLM 2010), there are 21 active claims in the Gold Hill-Rogue River Watershed North plan area[2] . Due to the close proximity to the towns

[2] Two of the claims straddle both sides of the Rogue River.

of Rogue River and Gold Hill as well as the cities of Grants Pass and Medford, 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.

Geology

The Gold Hill-Rogue River Watershed North straddles the contact between the eastern edge of the Klamath Mountains Geologic Province (also called the Siskiyou Mountains), and the Western West Cascades Province. The geology of the plan area can be characterized by Paleozoic metamorphics in the west half with some extruded volcanics, and younger, Eocene non-marine sediments in the east half of the plan area, with alluvial deposits near the river. The metamorphics of the western plan area comprised of the May Creek Schist in the uplands, and younger, partly metamorphosed sediments and volcanic rock in the lower elevations.

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 Upper and Lower Table Rocks in the eastern portion of the plan area are made up of Eocene age basalts that flowed into ancient valleys and then proved more resistant to weathering than the surrounding rock. These features are known as inverted valleys.

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 non-marine sedimentary rock and their associated soils are the predominant rock and soil types found in the analysis area.

Non-marine sediments make up 42 percent of the plan area. These sedimentary rocks comprising the western portion of Sam's Valley in the eastern portion of the plan area are highly erosive and generally result in loamy soils from 40 to 70 inches in depth, and which are characterized to by moderate drainage.

Metamorphic rock types make up over 27 percent of the Gold Hill-Rogue River Watershed North. 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 less than three 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.

Climate

Mild, wet winters and hot, dry summers characterize the Gold Hill-Rogue River Watershed North. 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 24 inches at the lower elevations to 36 inches at the higher elevations in the western portion of the plan area. Winter precipitation is predominately in the form of rain, 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 entire plan area is in the rain zone.

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 Grants Pass. 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 90.1°F and 89.8°F at the Grants Pass NOAA station (USDI 2001).

Streamflows

Although no streamflow data exists for the unregulated Rogue River tributaries within the plan area, it can be assumed based on flow information from other unregulated streams in the Rogue Basin that flows generally follow the seasonal precipitation pattern. Moderate to high flows generally occur from mid-November through April. Low flows normally coincide with the period of low precipitation from July through September or October.

Flow data for the Rogue River is collected 10 miles downstream from the confluence with Evans Creek in Grants Pass. Gage data shows a record high flow of 152,000 cfs in December 1964 and a record low flow of 195 cfs in January 1961. Flow along the Rogue River can vary with release from Lost Creek Dam, and because of withdrawals for agricultural and other uses.

Table 5. Approximate Stream Miles of Salmonid Use

Stream	Coho	Spring Chinook	Fall Chinook	Summer Steelhead	Winter Steelhead	Rainbow Trout	Cutthroat Trout
Rock Creek (Sam's Creek Tributary)	none	none	none	5.1	5.1	5.1	5.2
Rogue River	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Sam's Creek	1.3	none	none	3.6	3.6	3.6	3.8
Sardine Creek (including tributaries)	2.0	none	none	4.2	4.2	4.2	11.1
Snyder Creek	none	none	none	9.5	9.5	9.5	9.5
Ward Creek	none	none	none	4.8	4.8	4.8	4.8
Watershed Totals	25.3	22	22	49.2	49.2	49.2	56.4

Several other species of introduced game fish also inhabit the Gold Hill-Rogue River Watershed North, as do native non-game species. Various species of amphibians and reptiles occur in the subbasin including sensitive species such as the foothill yellow-legged frog, Pacific giant salamander, and western pond turtle.

Figure 6. Coho Salmon Distribution in the Gold Hill-Rogue River Watershed North

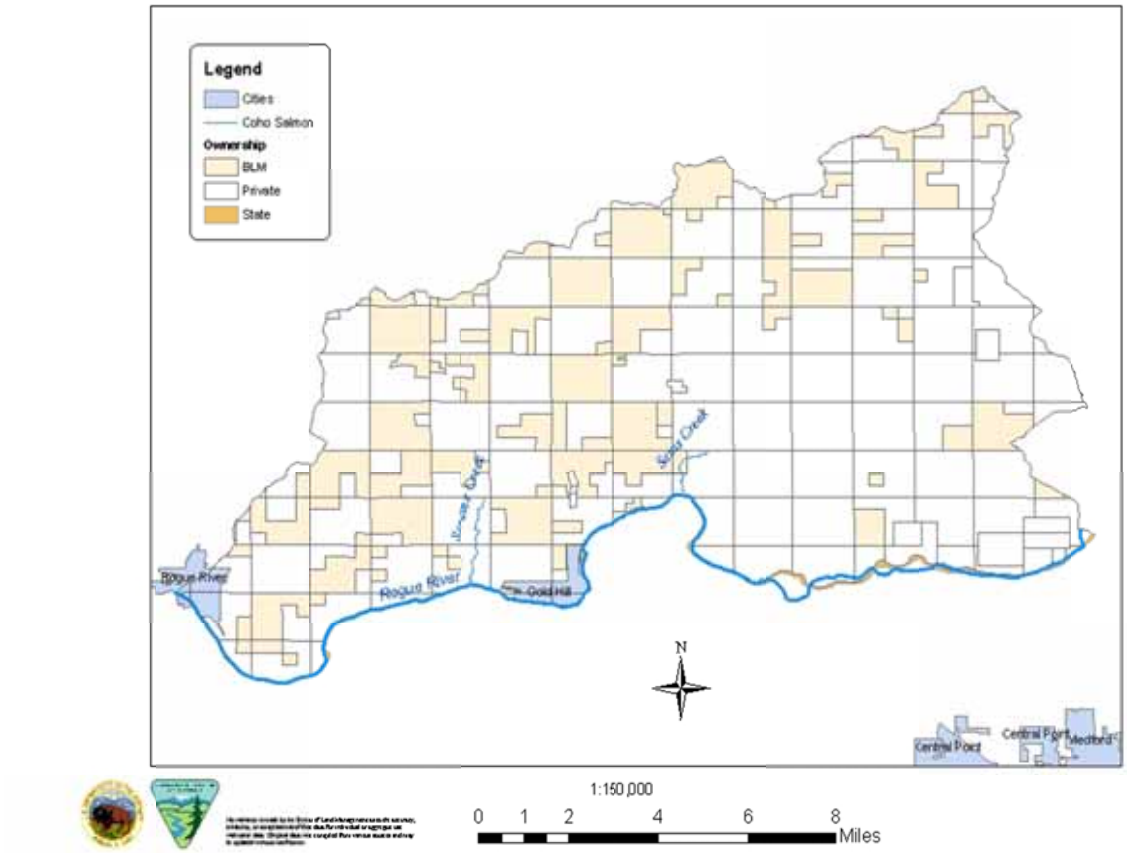


Figure 7. Summer and Winter Steelhead Distribution in the Gold Hill-Rogue River Watershed North

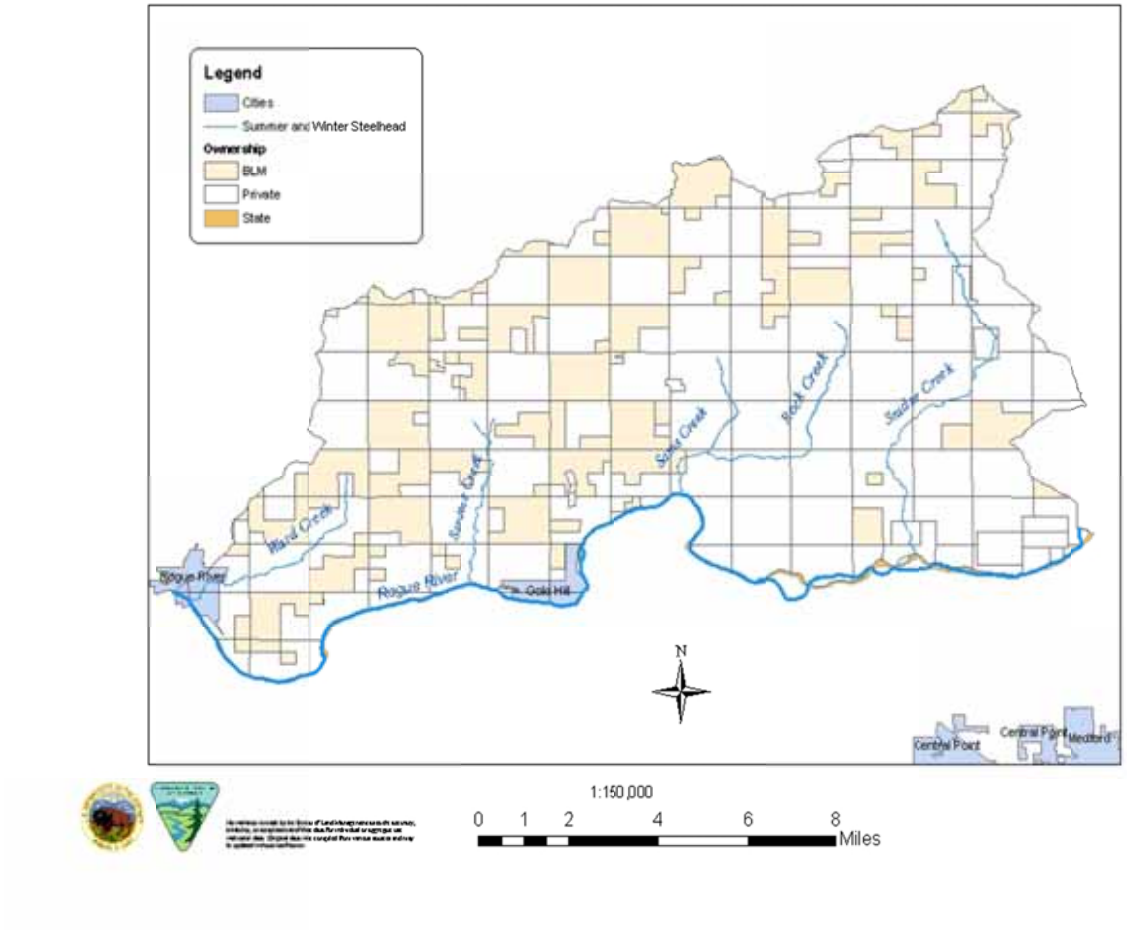


Figure 8. Resident Trout Distribution in the Gold Hill-Rogue River Watershed North

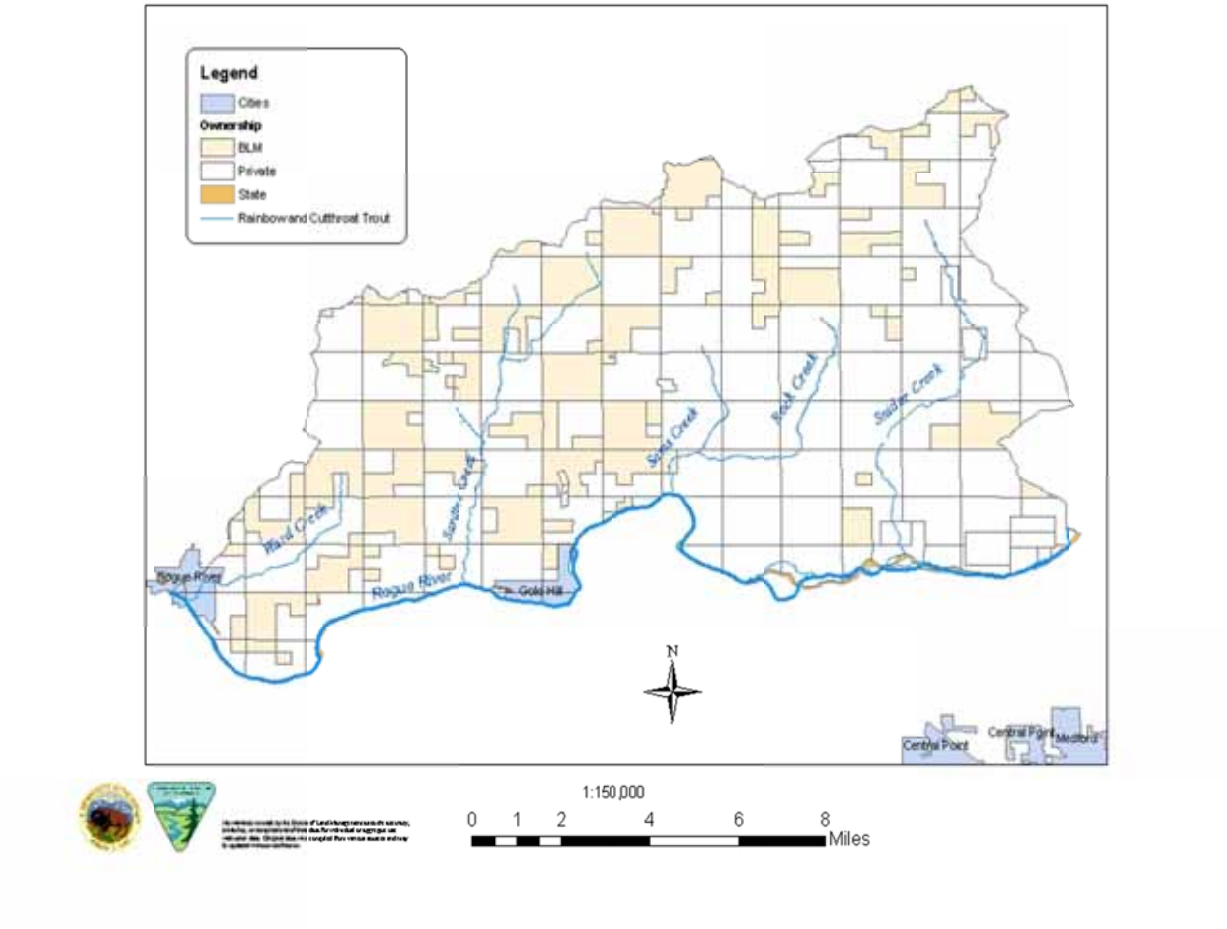


Table 6. Summary of Watershed Conditions on BLM-Administered Lands in the Gold Hill-Rogue River Watershed North

Riparian Vegetation	
Historical Condition Present Condition	• Late seral vegetation dominant. • Diverse mix of species and age classes. • Mature hardwoods and conifers with dense understory.
Forest Health & Productivity	
Historical Condition Present 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. • Areas of open mature black oak forest. • 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 Present Condition	• Probably an abundant supply of large wood in the stream channels. • Some stream reaches lack adequate large wood. • Road stream crossings disrupt transport of wood and sediment.
Roads	
Historic Condition Present Condition	• Few roads before industrial timber harvesting began in the early 1950s. • 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 Present 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. • Winter peak flows possibly increased by roads and harvest. • Summer low flows reduced by water withdrawals.

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 Gold Hill-Rogue River Watershed North 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 on the DEQ website www.deq.state.or.us. Salmon and steelhead spawning use designations (map 271B) vary by stream. 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 Gold Hill-Rogue River Watershed North are designated as salmon and trout rearing and migration on fish use map 271A, therefore the seven-day-average maximum for these streams may not exceed 18.0°C (64.4°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.

There are a total of 13.9 Rogue River stream miles listed for temperature in the Gold Hill-Rogue River Watershed North of which 1.1 miles are on BLM-administered lands (Table 7 and Figure 1).

Table 7. 2004 303(d) Temperature Listings in the Gold Hill-Rogue River Watershed North (ODEQ 2008)

303(d) List	Stream Segment	Listed Parameter	Applicable Rule (at time of listing)	Miles Affected	BLM Miles Affected
2004	Rogue River	Temperature	**OAR 340-041-0028(4)(b)**	13.9	1.1
Total Stream Miles listed for Temperature				**13.9**	**1.1**

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 Gold Hill-Rogue River Watershed North include: agricultural activity; rural residential developments; water withdrawals; timber harvests; local and forest access roads; and state highways. 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 Gold Hill-Rogue River Watershed North. 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. 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 Gold Hill-Rogue River Watershed North 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 equal.

The Gold Hill-Rogue River Watershed North 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.

Water withdrawals and irrigation return flows likely result in increased thermal loads within the Gold Hill-Rogue River Watershed North. The management of water withdrawals is within the jurisdiction of the Oregon Water Resources Department (OWRD).

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 2004/2006 303(d) list identifies the Rogue River within the plan area that exceeds the numeric water quality criteria from the 2004 standard (64.4°F).

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 meet waste load allocation (2) non-point source solar loading is reduced to that of system potential to meet the load allocation set in the TMDL (ODEQ 2008).

The Rogue River Basin Temperature TMDL incorporates other measures in addition to "*daily loads*" to fulfill requirements of the Clean Water Act §303(d). Although a loading capacity for heat energy is derived (e.g. kilocalories), it is of limited value in guiding management activities needed to solve identified water quality problems. In addition to heat energy loads, this TMDL allocates "*other appropriate measures*" (or surrogate measures) as provided under EPA regulations (40 CFR 130.2(i)).

Effective shade is the surrogate measure that translates easily into solar heat load. It is simple to measure effective shade at the stream surface using a relatively inexpensive instrument called a Solar Pathfinder™.

The term 'shade' has been used in several contexts, including its components such as shade angle or shade density. For purposes of this TMDL, effective shade is defined as the percent reduction of potential daily solar radiation load delivered to the water surface. The role of effective shade in this TMDL is to prevent or reduce heating by solar radiation and serve as a linear translator to the loading capacities.

Unless otherwise stated within this chapter, the applicable nonpoint source load allocations for Rogue River Basin streams are based upon potential effective shade values presented in this section and the human use allowance (0.04^{o}C cumulative increase at the point of maximum impact).

Most streams simulated have no assimilative capacity, which translates into a zero heat load allocation for nonpoint sources. When a stream has assimilative capacity, nonpoint and point sources may receive allocations greater than background (ODEQ 2008).

Element 2. Goals and Objectives

The long-term goal of this WQRP is to achieve compliance with water quality standards for the 303(d) listed streams in the Gold Hill-Rogue River Watershed North. 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 Gold Hill-Rogue River Watershed North 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 8.

Table 8. Recovery Goals for BLM-Administered Land in the Gold Hill-Rogue River Watershed North

Element	Goal	Passive Restoration	Active Restoration
Temperature ***Shade***	• Achieve coolest water possible through achievement of percent effective shade targets.	• Allow riparian vegetation to grow up to reach target values.	• 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.
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 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 nonessential 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 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 non-fish 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, pp. 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.

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

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. 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 Butte Falls Field Manager is 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 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 incorporated in the Rogue Basin WQMP, which was completed in December 2008. The WQMP will cover all land within the Gold Hill-Rogue River 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 approximately 8 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 in the Gold Hill-Rogue River watershed include the Upper Rogue Watershed Association, 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 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 current plan contains requirements for implementation, effectiveness, and validation monitoring of BMPs for water resources. The Medford District 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 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 ArcView-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.

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. 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 collected stream temperature data in the Gold Hill-Rogue River Watershed at two sites between 1997 and 1999 between the months of June and October. If stream temperature data collection were to occur, monitoring would be conducted to meet a variety of objectives, thus long-term monitoring sites as well as project-specific, short-term sites will be used. If funding were available, annual monitoring data would be collected on these sites on BLM lands. These streams are not currently 303(d) listed for temperature, so would be considered low priority for temperature monitoring.

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 2013, 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 went through an extensive public involvement process. Many of the elements contained in this WQRP are derived from these existing land use planning documents.

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 completed Rogue Basin WQMP.

Element 9. Costs and Funding

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 special BLM restoration funds.

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.

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 Gold Hill-Rogue River 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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