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Department of
Agriculture

Forest
Service

Pacific
Northwest
Region



Supplement to the Marys River Watershed Preliminary Analysis

Siuslaw National Forest Fiscal Year 2005



Marys Peak from Fitton Green

Supplement to the Marys River Watershed Preliminary Analysis

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INTRODUCTION

This report documents an analysis of a portion of the Marys River Watershed. The purpose of the analysis is to develop a scientifically-based understanding of the processes and interactions occurring within the watershed area and the effects of management practices. The analysis focuses on issues concerning values and uses specific to the area. This document supplements the information found in the Marys River Watershed Preliminary Analysis written for Marys River Watershed Council (Ecosystems Northwest, 1999). It refers to, and takes guidance from several larger scale assessments, including the Assessment Report for Federal Lands in and Adjacent to the Oregon Coast Province (USDA-USDI 1995), the Late-Successional Reserve Assessment for the Oregon Coast Province - Southern Portion (R0267 and R0268) (USDA - USDI 1997), and the North Fork Alsea Watershed Analysis (USDI-1996) which have been completed.

This watershed analysis supplement follows the outline described in the updated federal **Guide for Watershed Analysis – Ecosystem Analysis at the Watershed Scale** (Version 2.2, August 1995).

CHARACTERIZATION OF THE WATERSHED

LOCATION AND SIZE

The portion of the Marys River Watershed that this supplement covers lies in the central and eastern portion of the Oregon Coast Province. It is about 15 miles west of Corvallis, Oregon (Map 1: Vicinity Map). Portions of Benton and Lincoln Counties are found within the analysis area. It focuses on the National Forest lands within the Marys River Watershed. The analysis area includes the entire City of Corvallis Rock Creek Municipal Watershed. (Map 2 - Marys Peak and Rock Creek Watershed) The analysis area occupies 12,030 acres of land. Ownership within the analysis area includes: National Forest System (8,846 acres), City of Corvallis (2,375 acres), Bureau of Land Management (372 acres), Oregon State University (245 acres) and other ownership (192 acres). The analysis area covers a portion of Greasy Creek (10,284 acres), a portion of Tumtum River (1,075 acres) and a portion of Middle Marys River (669 acres) 6th field watersheds.

OWNERSHIP

Approximately seventy-six percent of the analysis area is managed under federal ownership; seventy-three percent by the USDA - Forest Service and three percent by the USDI - Bureau of Land Management. About twenty percent of the land is owned and managed by the City of Corvallis. Around two percent is owned and managed by Oregon State University. The remaining two percent is in private ownership.

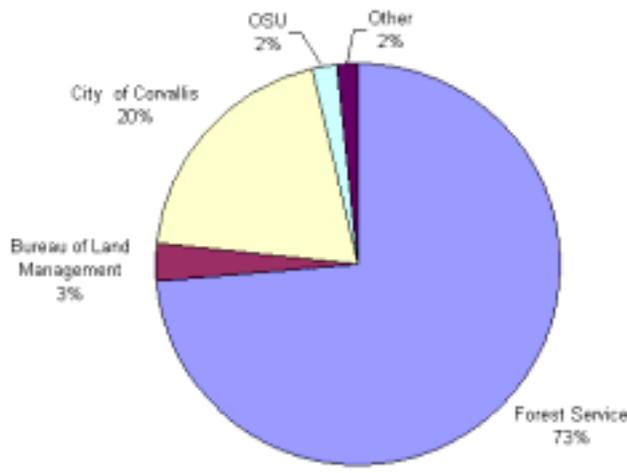
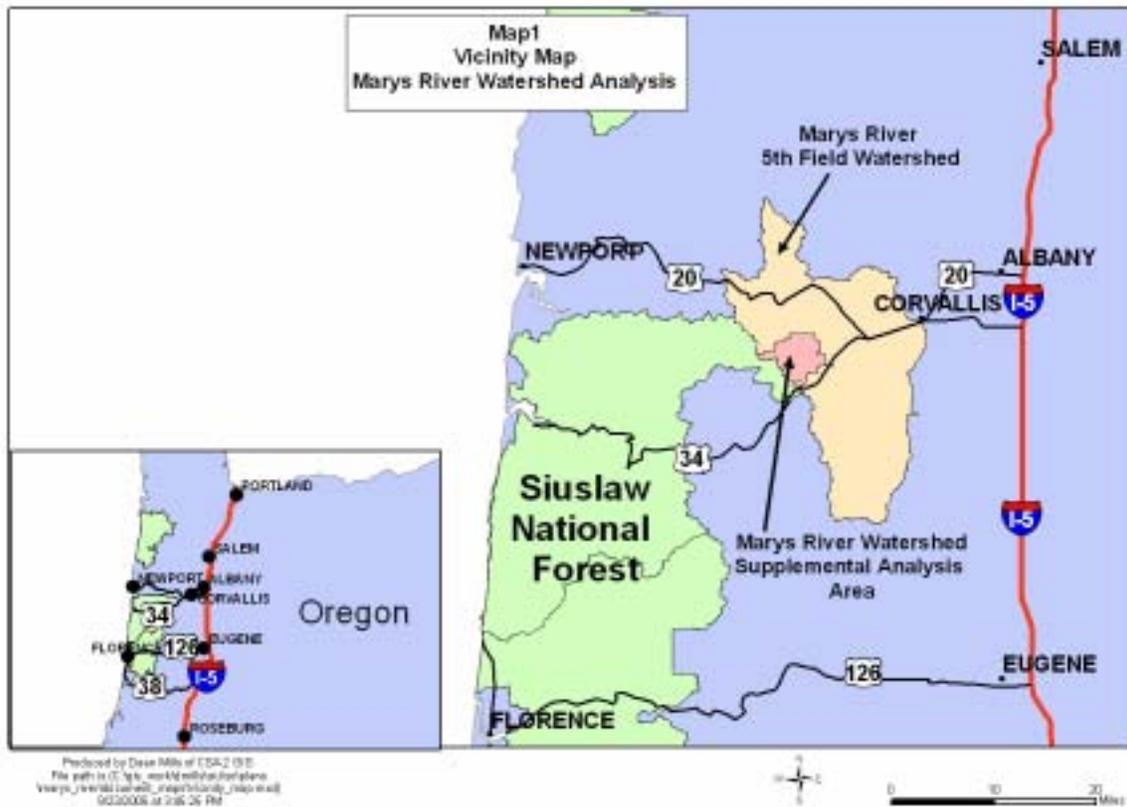


Figure 1: Ownership within the Study Area



FOREST SERVICE LAND ALLOCATIONS - CURRENT MANAGEMENT DIRECTION

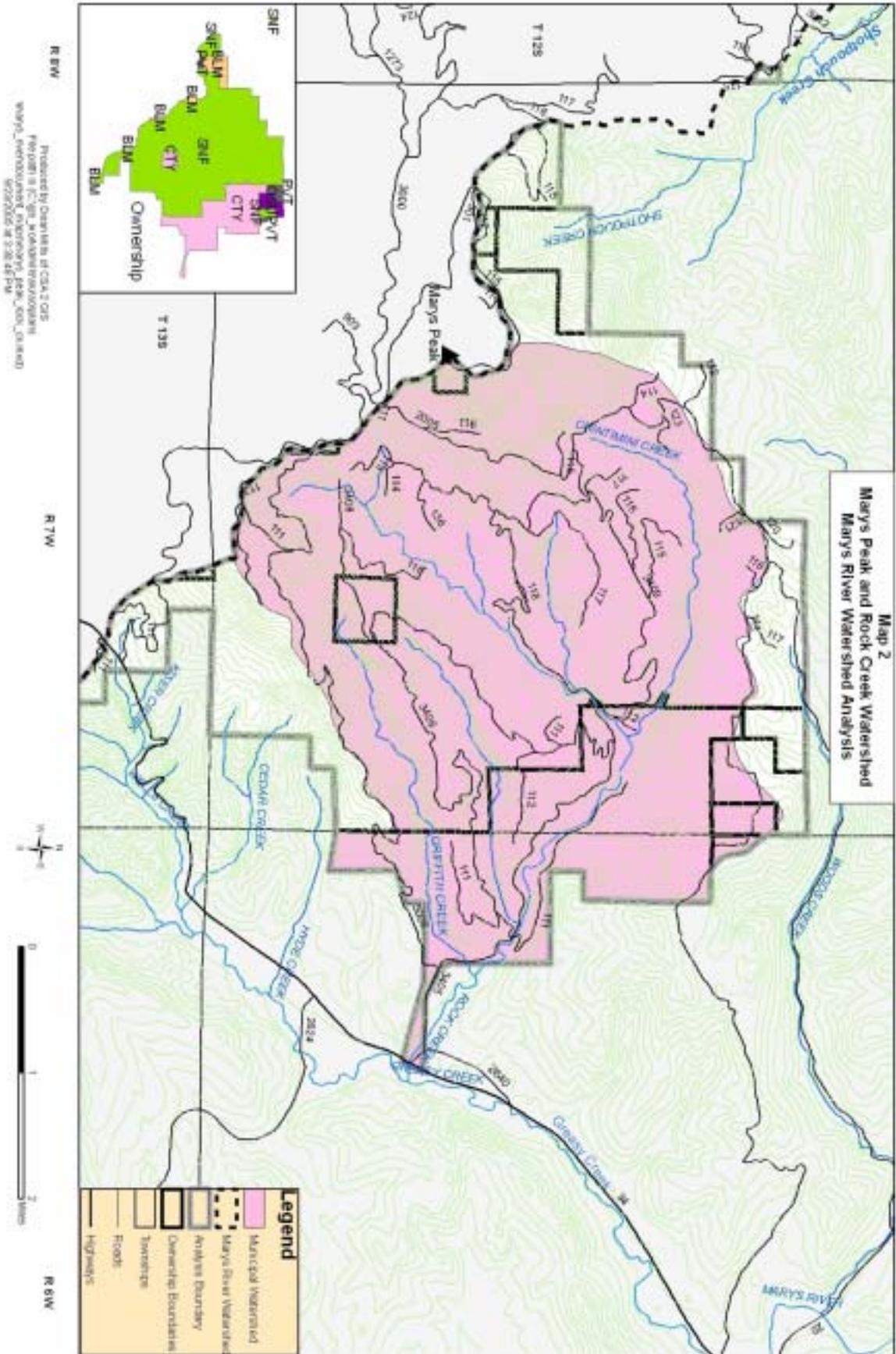
The following summarizes the major resource programs and management direction for Forest Service administered land in the analysis area (Map 3: Land Management Allocations). The Siuslaw National Forest Plan (USFS 1990) as amended by the Northwest Forest Plan (USDA, USDI 1994) contains additional details.

Late Successional Reserves

Ninety-nine percent of the federally managed land in the watershed is allocated to Late-Successional Reserve (LSR) based on the Northwest Forest Plan. The objective of this land use is to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth related species including the northern spotted owl, bald eagle, and the marbled murrelet.

Riparian Reserves

Approximately 53 percent of Siuslaw N.F. lands in the watershed area are within Riparian Reserve boundaries. Riparian Reserves overlie all other land allocations and are not shown in Map 3. Riparian Reserves include those portions of a watershed directly coupled to streams, rivers, and lakes that are the portions of a watershed required for maintaining hydrologic, geomorphic, and ecological processes that directly affect standing and flowing waterbodies. In addition to aquatic resources, Riparian Reserves were established to benefit other riparian-dependent species and to retain adequate habitat conditions for dispersal of late-successional forest species throughout the LSR network.



Matrix

In this analysis area, 80 acres or one percent of the federal lands in the watershed have been allocated to matrix by the Northwest Forest Plan. Matrix consists of those federal lands outside other land use allocations. Timber harvest and other silvicultural activities would be allowed in that portion of the matrix within suitable forest lands, according to standards and guidelines.

FOREST SERVICE MANAGEMENT DIRECTION

Habitat for Threatened and Endangered species will be managed in a manner that protects species that are federally listed or proposed for federal listing. Further, all lands will be managed in a manner that avoids contributing to the need to formally list federal candidate species, Regional Forester Sensitive species, or Oregon Department of Fish and Wildlife (ODFW) listed species.

Special areas will be managed to maintain, protect, or restore their relevant and important values. Such special areas include the Special Interest Area (SIA) on top of Marys Peak.

Visual areas will be managed in accordance with objectives in the Siuslaw National Forest Plan.

Streams, riparian reserves, water quality, and fish habitat will be managed so that activities that retard or prevent attainment of the Aquatic Conservation Strategy objectives will be prohibited or regulated. Through watershed analysis, watershed restoration projects will be planned and implemented to aid in the recovery of fish habitat, riparian habitat and water quality.

Recreation sites, trails, and special recreation areas will be managed to enhance visitor recreation experiences and produce satisfied public land users.

OTHER OWNERSHIP MANAGEMENT DIRECTION

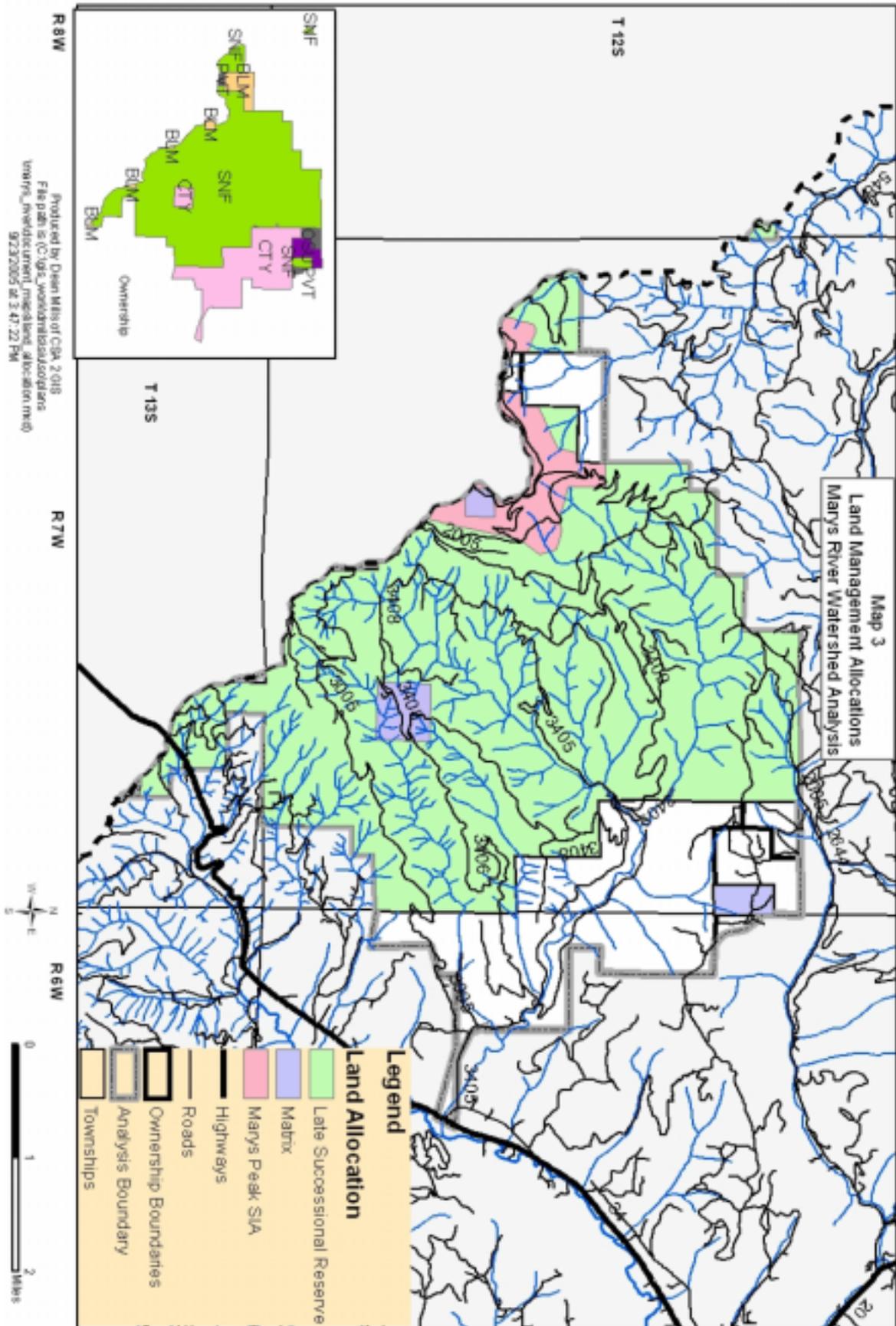
The Bureau of Land Management is guided by the Salem District Resource Management Plan, May 1995. The lands are allocated to Late-Successional Reserve and Riparian Reserve. Additionally, a portion is identified as the Marys Peak Area of Critical Environmental Concern (ACEC).

Oregon State University land is guided by the McDonald-Dunn Forest Plan, 2005.

The City of Corvallis is currently developing a Stewardship Plan for the City owned lands within the Rock Creek Watershed.

TOPOGRAPHY

The terrain is generally mountainous, with steeply incised valleys and sharp ridges. The highest point is Marys Peak (4,097 feet above sea level) and the lowest elevation is 360 feet at the junction of Rock Creek and Highway 34 (Map 2: Marys Peak and Rock Creek Watershed).



GEOLOGY AND GEOMORPHOLOGY

Most of the National Forest lands within the analysis area are underlain by the Siletz River Volcanics (Map 4: Geology and Land Type). This formation is the oldest rock formation in the Coast Range. It was formed in an ancient chain of islands, similar to the modern-day Hawaiian Islands that were accreted to the west coast of North America 55 million years ago. The Siletz River Volcanics consists of pillow basalts, basaltic ash, and lava flows. Beds of basaltic siltstone, sandstone and cobbles were deposited in between the layers of basaltic lava and ash (Orr et al., 1992).

The top of Marys Peak, above 2,000 to 3,000 feet, depending on location, is capped by a massive sill (or horizontal layer) of gabbro, a rock type similar to basalt, but with larger crystals. It is more resistant to erosion than the surrounding sedimentary rocks and the Siletz River Volcanics. As a result, Marys Peak, at 4,097 feet, is the highest peak in the Coast Range (Orr, et al., 1992).

Siltstones and sandstones, which are mapped as Tyee Formation on the State of Oregon 1:500,000 map, but which have been identified as Flournoy Formation by others, are found to the northwest and southeast of the analysis area.

The analysis area is similar to the rest of the Coast Range, with narrow valley bottoms and steep slopes. Scattered areas within the analysis area are underlain by slumps and earthflows. For example, Road 3405-113 is a mid-slope road on the east face of Marys Peak, and crosses several earthflows and slumps.

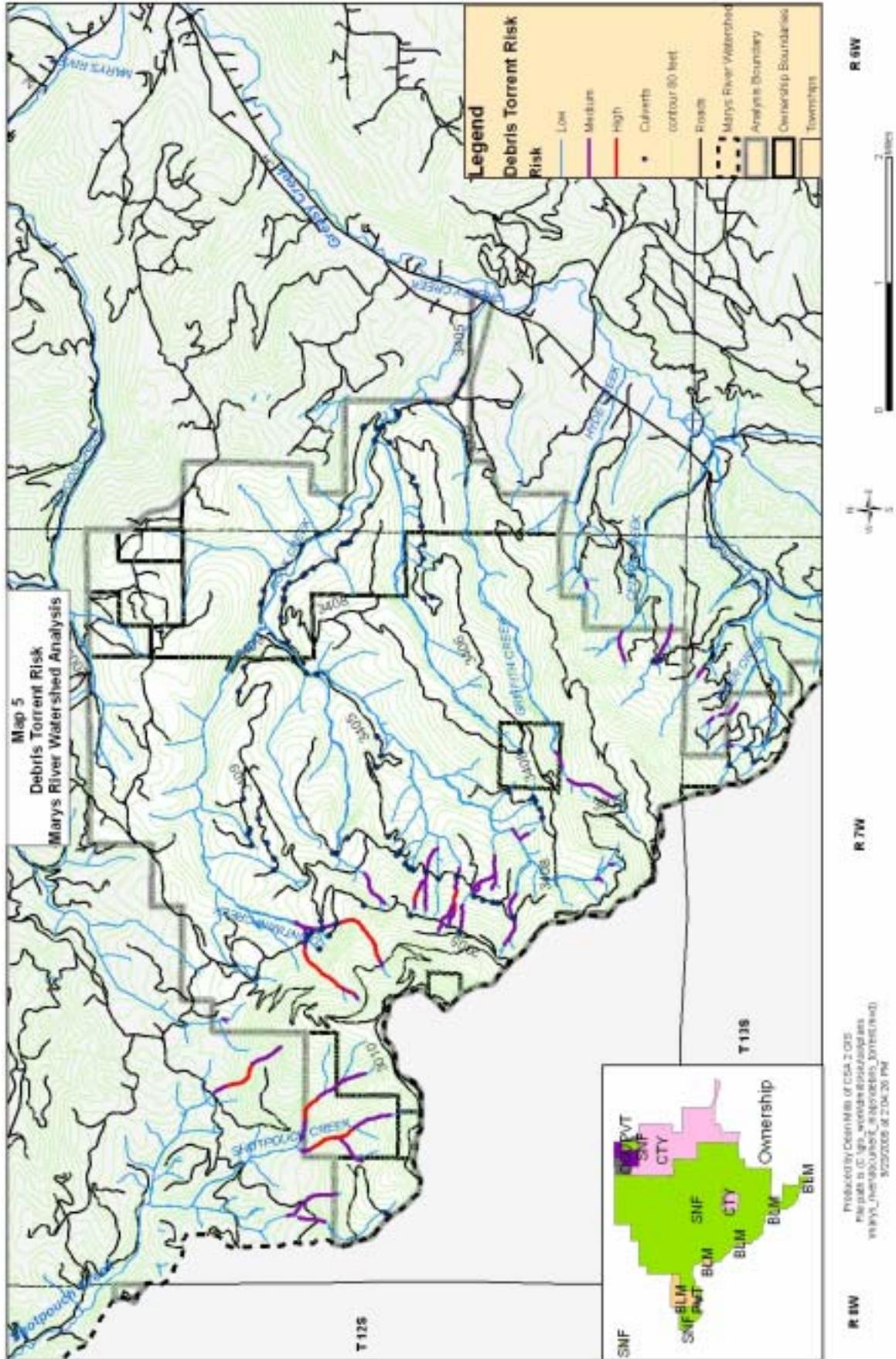
The debris torrent model developed by Daniel Miller (2003) and applied to the Coast Range by Kelly Burnett and Kelly Christianson of the CLAMS (Coastal Landscape and Modeling Study) project, shows that the first and second order streams draining the slopes of Marys Peak and those draining the south slope of Franklin Ridge have the highest probability for debris torrent occurrences. (Maps 4 & 5).

LAND TYPE ASSOCIATIONS

Land Type Associations were developed to characterize similarities and differences in the landscape at the scale of the Coast Range. The polygons were drawn based primarily on geology and geomorphology. These two variables influence topography, landforms, stream density, and soils. All of these variables influence the type of vegetation that is present. The analysis area contains several different Landtype Associations.

Landtype Association 3Q, Igneous Uplands

LTA 3Q is an area of high relief due to igneous intrusions that are more resistant to erosion than the surrounding sedimentary rocks. Marys Peak is within this landtype association, and is the highest point in the Coast Range. Both earthflows and debris torrents can occur in this landtype association. The soils are deep to very deep on hummocky, incised ancient earthflows, and moderately deep on remnant bedrock ridge systems. Soils range from gravelly clay loams on steep slopes to gravelly clay where soils are very deep, and are moderately productive. They have high to very high water holding capabilities. Soil moisture is rarely limiting. This landtype association is characterized by wet winters and



moist summers. There are significant differences (more than 5°C) in soil temperatures from summer to winter over all areas below 3,000 feet in elevation (mesic). Above 3,000 feet, winter soil temperatures can be very cold (mesic to cryic). There are occasional high winds in the winter. High biological activity is accompanied by high decomposition rates and moderate accumulations of soil organic matter. The Marys peak area is predominately in the western hemlock zone. Marys Peak itself rises into the noble-fir series at about 3,400 feet on cool aspects. The top of the peak is in open meadows. The moist peak communities (noble fir with Oregon oxalis and starry false solomon's seal) show a cloud forest effect. Below the highest elevations, the western hemlock/salal group is dominant (50 percent of the area) on long upper slopes and mid slopes, with mesic hemlock types on gentle lower slopes and near creeks. Wet hemlock types are generally minor to absent beyond creek banks. The grand fir series is found on the footslopes of Marys Peak below 800 feet.

Landtype Association 3H, Sedimentary Valley Borderlands

Two very small areas within the analysis area are classified as Sedimentary Valley Borderlands (LTA 3H). One area is located near the junction of Highway 34 and Forest Road 3405. The other area is located southeast of the junction of Highway 34 and Forest Road 30. These areas have gently rolling to moderately steep hills and broad valleys adjacent to the Willamette Valley. Unstable areas are not common, but may occur on lower midslopes above incised channels and upper convex sideslopes. Earthflow terrain is not common. Slumps and fluvial channel erosion are the primary hillslope erosion processes. Soils are moderately deep. Soils range from gravelly clay loams on steeper slopes to gravelly clays on lower slope positions. These soils are moderately productive. They have moderately high to high water holding capabilities. Soil moisture limits plant growth on south facing upper sideslopes most years. The plant association is dominantly western hemlock forest, with about 10 percent in the grand fir series. Valley floor vegetation (5 percent), now mainly converted to agricultural use, follows Greasy Creek up to the east of Marys peak. The mesic western hemlock and hemlock/salal group each cover 40 percent of the area. Since the landtype association is mainly in the rain shadow of the Coast Range, the salmonberry community is found mainly in the extreme western end of the landtype association, and to the east is replaced by the mesic hemlock types in valley bottoms, toe slopes, and lower slopes. Upper slopes, mid slopes, and dry lower slopes are generally in the hemlock/salal group. Immediately adjacent to the valley, the grand fir series appears on low elevation slopes up to about 800 feet. The grand fir series is sandwiched between the valley floor vegetation and western hemlock series on the slopes and ridges.

Landtype Association 3S, Igneous Valley Borderlands

The northeast portion of the analysis area is in the Igneous Valley Borderlands (LTA 3S). This area is similar to the Sedimentary Valley Borderlands (LTA 3H), but has slightly more relief because it is underlain by more resistant volcanic bedrock. Slumps and small earthflows are the primary hillslope erosion process. Soils are deep to very deep on hummocky, incised ancient earthflows and moderately deep on remnant bedrock ridge systems. Soils range from gravelly clay loams on steep slopes to gravelly clay where deeper soils occur. These soils are very productive. They have high to very high water holding capacity. Soil moisture is limiting only on upper south facing bedrock sideslopes. This area has moist winters and dry summers. The grand fir series is generally found on low elevation hills and lower slopes bordering the Willamette Valley with valley bottom vegetation, such as oak woodlands, in broad valleys. The western hemlock/salal group is found along ridges. Mesic western hemlock is found in narrower valleys, on toe slopes and on cool lower slopes. Hemlock/salomberry types are very minor, occurring on moist sites or creek banks.

Low-Relief Fluvial Lands (LTA 3W)

A small area in the northwest corner of the analysis area, and north of Marys Peak, is in Low-Relief Fluvial Lands (LTA 3W). This area has low, gentle relief with broad valleys. There is no soil description, productivity or stability data available. The low relief of this inland landtype association is expressed in the dominance of the mesic western hemlock plant association groups (60 percent of the area). The hemlock/salal group (30 percent of the area) is found on warmer mid slopes, upper slopes and ridges, while a scattering of grand fir series (5 percent) is on very low elevation warmer lower slopes near the valley margin. Hemlock/salmonberry is fairly restricted to moist sites and creek banks. This area has moist winters and dry summers.

CLIMATE AND PRECIPITATION

Marys Peak and other high elevations are characterized by wet winters and moist summers, while the lower elevations have moist winters and dry summers. Normal temperature extremes during the summer months vary from 40°F. to 90°F. Occasionally the temperature will drop below freezing, but seldom will it rise above 90°F. During the winter, the temperature range is approximately 20°F. to 50°F.

Winds during the summer months are generally gentle, usually not exceeding 20 miles per hour. During the winter, winds up to 100 miles per hour occasionally blow across Marys Peak.

From 60 to 110 inches of water in the form of rain and snow will fall on the watershed in an average year. About 21 inches of the 75-inch annual average is lost by evaporation or transpiration. This leaves 54 inches for stream flow, of which less than 1/10, or about 4 inches, is used by the city of Corvallis. The annual distribution pattern will explain why so little water is used by the city. Over 55 percent of the runoff is produced in the winter months (December, January, and February). Only 1 percent is produced during July, August and September. Recognizing this situation, the City of Corvallis organized its water system to meet conditions of the low flow period.

HYDROLOGY

Like the rest of western Oregon, the streams in the headwaters of the Marys River watershed are fed by winter rainfall. From 60 to 110 inches of water in the form of rain and snow will fall on the watershed in an average year. The watershed has a pattern of low summer flows during the dry months, and a series of peak flows during the winter wet months. A closer look at the annual distribution pattern explains why so little water is used by the city.

Stream discharge records are available for Rock Creek (USGS 1946-1952, 1975-1980). Rock Creek is a small sub-basin of Greasy Creek on mostly steep, forested lands. Average monthly runoff values for 11 years show runoff peaks in February, which correspond with the onset of snow melt. The importance of snow melt in the Rock Creek sub-basin also may explain the increased discharge for the Marys River in February and March, which reflects drainage of high-elevation areas of the watershed. Low flow in Rock Creek may occur as early as May and extend well into the fall.

Rock Creek had a USGS stream gage in place just upstream of Highway 34 from 1945 to 1952 and again from 1974 to 1979. Average daily summer flows are less than 1 cfs; winter daily peak flows can be between 700 and 800 cfs.

There are 4 main low-gradient tributaries to the mainstem of Rock Creek. All of the tributaries are gravel/cobble bottom streams that are moderately confined with some

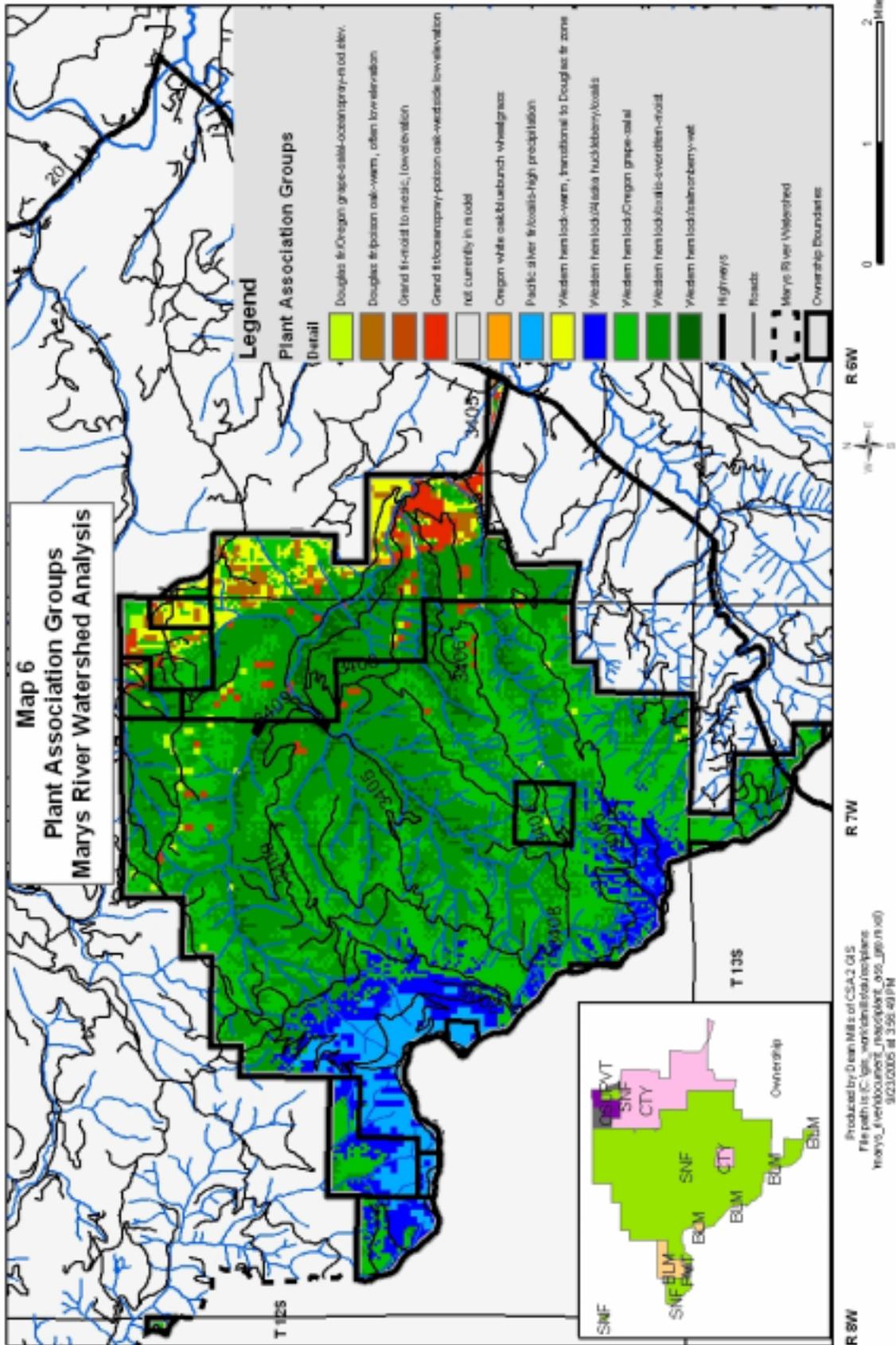
floodplain development. For the most part, the riparian areas are mature conifer and deciduous trees that offer good shade and a source of woody debris.

VEGETATION

The analysis area lies mostly within the Western Hemlock plant series (89 percent), but also contains the Pacific silver fir/Noble fir series (5 percent), the Grand Fir series (3 percent) and the Douglas-fir series (3 percent). These series are named for the climax species which eventually dominates the forested plant community (Map 6: Plant Association Groups). Douglas-fir is currently the dominant tree species within the watershed because it is long-lived species which regenerated after historic wildfires. Major disturbances such as wildfires, windstorms, landslides, floods, insects, pathogens and human activity determine the successional pathways within a landscape. As a result of these disturbances, each plant community within the watershed has vegetation that occurs over a range of successional stages.

Marys Peak meadow complex

In addition to the vegetation groups in Marys River Watershed, there are extensive grassy balds atop Marys Peak. These are rare special habitats in the Coast Range, nearly as rare as the nearly pure noble fir stands on the north and east border of the meadows. The meadow complex occupies approximately 185 acres of which 47 acres within the watershed. Rocky outcrops occupy a small area within the meadow complex, which otherwise is suitable for tree growth. There are three main plant communities in the deeper soil meadow complex: red fescue-bent grass-sedge community, arrow-leafed groundsel community, and iris community (Snow 1984). The size of the meadow complex, the presence of the higher elevation noble firs, and the rock garden species make Marys Peak a unique site in the Coast Range. More details about the meadow and vegetation are in Appendix A.



PLANT SPECIES OF CONCERN

Plant species of concern include those listed as endangered, threatened, or are proposed for listing as such under the Endangered Species Act, and species designated as Sensitive by the Forest Service in Region 6. The group includes vascular plants, mosses and liverworts and fungi.

A site for noble polypore (*Bridgeoporus nobilissimus*) is documented to occur in Township 12 South, Range 7 West, Section 28, on the southwest border of the Watershed (ONHIC 2005). Based on the reported location, the site is outside the Watershed boundary by approximately 100 meters, however, this distance may be within the error of accuracy and for the purpose of this Watershed Analysis, the site will be considered inside the Watershed boundary.

Noble polypore was first given management consideration on federal lands in 1994 when it was included in Table C-3 of the Northwest Forest Plan Standards and Guidelines as a "survey and manage" species (USDA/USDI 1994). With the removal of those Standards and Guidelines (USDA/USDI 2004) noble polypore was added to the Region 6 Forest Service list of Sensitive species.

The noble polypore is a large perennial shelf fungus, or conk, measuring up to 3 feet in diameter. The shaggy upper surface is often covered with moss, algae, lichens and litter from which it gets its other name, the "fuzzy green pizza". Endemic to Oregon and Washington, there are a total of 48 known sites for the species, making it one of the rarer known organisms that occur on National Forest. Conks grow on large noble fir (*Abies procera*) and Pacific silver fir (*Abies amabilis*) snags at elevations of 1,000 to 4,000 feet, essentially where its host can be found in Oregon and Washington. The Marys Peak *B. nobilissimus* site is quite unique in that it is the only site known from the Oregon Coast Range, likely due to the limited availability of noble fir and Pacific silver fir there.

Potential threats to the long-term persistence of the species include actions which cause the removal of noble fir host trees, modify stand characteristics or cause mechanical damage to individual conks. The level of threat to *B. nobilissimus* in the Watershed is probably low, but the species should be given consideration whenever management actions have the potential to affect its habitat.

No other documented plant species of concern occur within the Watershed. Because there are large gaps in our knowledge of where these species may occur and survey efforts are often not systematic or well documented, the possibility remains that species of concern will be located within the Watershed in the future, particularly in the rarer communities found there. For this reason, efforts should be made to maintain and enhance all plant communities represented in the Watershed.

ROADS

There are approximately 67 miles of National Forest System (NFS) roads administered by the Forest Service that provide access to and within the watershed. This includes a segment of the Marys Peak Road that lies outside the boundary but brings visitors to the access point for trails within the upper western portions of the watershed. With the exception of the Marys Peak and Woods Creek roads the NFS roads within the watershed are closed to public traffic, primarily to protect the City of Corvallis municipal watershed. The Marys Peak Road to the current upper parking area was completed in 1941, providing recreation access to the upper elevation of Marys Peak. The majority of the road system within the boundaries of the municipal watershed was constructed in the 1950's for logging access to salvage insect-killed timber.

WILDLIFE

Wildlife diversity within the watershed is quite typical for this region of the Coast Range. There are at least a few hundred vertebrate species and perhaps several thousand invertebrate species which utilize this analysis area. Threatened and Endangered species including northern spotted owl, marbled murrelet, and bald eagle, are known to occur in the watershed for at least some portions of the year.

FISH

Streams of the analysis area, from their headwaters on the northeast slopes of Marys Peak to the edge of the valley floor, are cool water habitat for a limited number of native and introduced fish species. Resident cutthroat trout *Oncorhynchus clarki* are found throughout the analysis area. The cutthroat fluvial life history form, in which individuals leave the small headwater streams to rear in downstream portions of larger rivers and return to spawn in headwater areas, may be present but has not been documented in the analysis area. Sculpin, dace, and brook lamprey are native fish species that could be found in the analysis area. Four species of sculpin *Cottus sp.* are known in the Marys River watershed and could be found in association with resident cutthroat trout. Leopard dace *Rhinichthys falcatus*, a native cyprinid or minnow like fish could be present. Western brook lamprey *Lampetra richardsoni* are widely distributed throughout western Oregon and are undoubtedly present.

Coho salmon *Oncorhynchus kisutch*, summer steelhead trout *Oncorhynchus mykiss*, and Fall Chinook *Oncorhynchus tshawytscha* were unable to pass above Willamette Falls and did not establish populations in the Willamette basin before the late 1800's. These species are not native to the analysis area but steelhead trout have been found spawning and rearing in the Rock Creek system where fish passage is unobstructed.