

# *Middle North Umpqua*

## WATERSHED ANALYSIS



Version 1.0  
January 2001



North Umpqua  
Ranger District

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## North Umpqua Ranger District Umpqua National Forest



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# CHAPTER 1 - WATERSHED INTRODUCTION

The Middle North Umpqua watershed analysis area is located within the larger Umpqua River Basin of Douglas County, Oregon (Fig. 1). It includes a 17.5 mile stretch of the North Umpqua River, extending from Swamp Creek to Horseshoe Bend, and covers an area of approximately 52,973 acres on the western slopes of the southern Cascade Mountains. It accounts for approximately 43% of the Middle North Umpqua River fifth-field watershed's land area. Elevations range from 950 feet above sea level at its lowest point to 5,000 feet along its southern ridges.

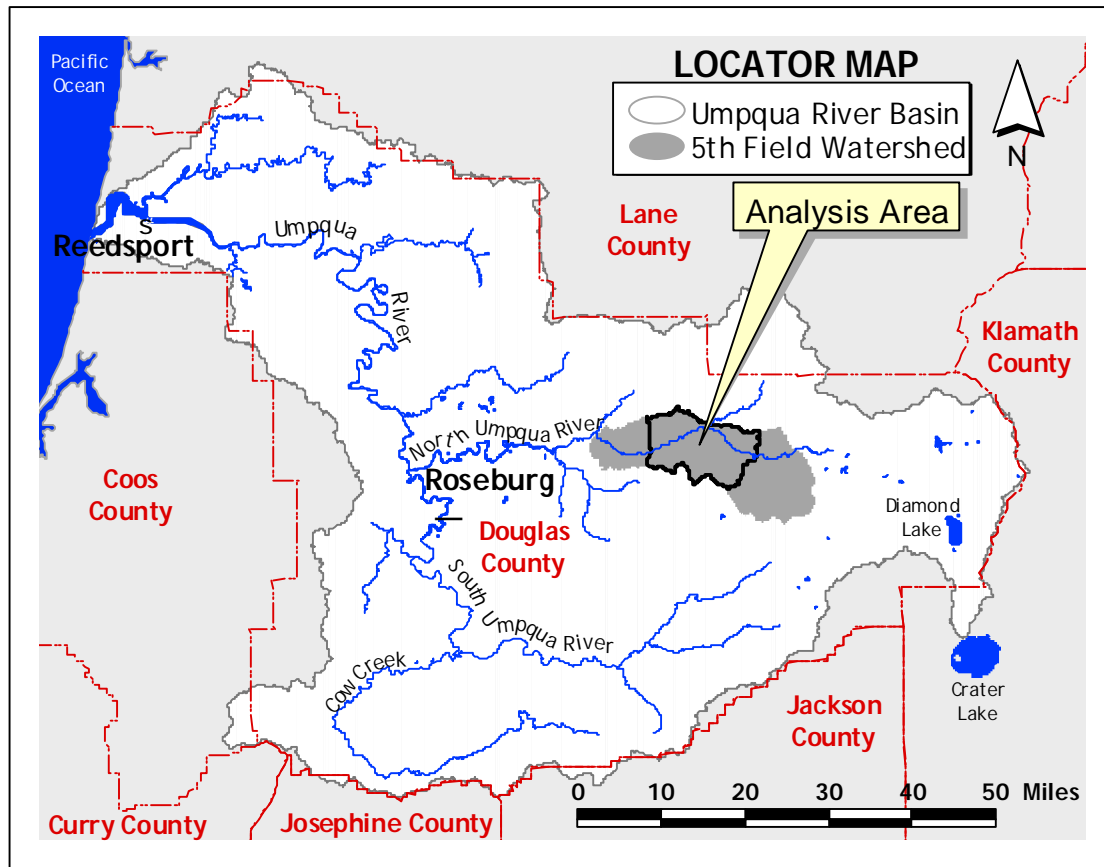


Figure 1. Location of the watershed analysis area showing its relationship to the Umpqua River basin and Middle North Umpqua fifth-field watershed.

## GEOLOGIC HISTORY

Volcanism, tectonism (large-scale vertical movement of the earth's crust), and mass wasting (erosion) are the key geologic processes that shaped the present day physical appearance of the Middle North Umpqua watershed. Volcanic activity ended about 17 million years ago (Peck et al. 1964, Priest et al. 1983, Duncan and Kulm 1989). Since then, mass wasting has become the dominant geomorphic process driving the appearance of the Western Cascade Range (Swanston et al. 1987). Erosional processes intensified dramatically with the onset of regional uplift of the Cascade Range sometime between 3.3- 6 million years ago. Rapid rise of the landmass provided existing stream systems with the energy to erode deeply into the volcanic terrain forming a highly dissected landscape (Sherrod 1986).

The Middle North Umpqua watershed is situated along the deeply eroded western flank of the Cascade Mountain Range. Bedrock within the watershed is composed of a layered sequence of volcanic and related sedimentary rocks deposited between roughly 17-35 million years before present (Peck et al. 1964). Most of the strata in the watershed consist of tuffaceous<sup>1</sup> rocks deposited by volcanic, mass wasting, and fluvial (stream related) processes. Lava flows and minor intrusive masses comprise the remaining rock types (lithologies) present in the watershed (Walker and MacLeod 1991).

The tuffaceous strata in the watershed are variably altered as a result of certain geologic processes (*regional burial metamorphism and localized hydrothermal activity*) that occurred following their deposition. Rock alteration is manifested by distinct mineralogical changes noted mainly by the development of shrink-swell clay minerals (Paeth et al. 1971). Relative to other rock types exposed in the watershed the tuffaceous strata respond very rapidly to chemical weathering processes in the present day climate.

Rapid down cutting by stream systems over the past several million years ultimately caused some mountain slopes in the watershed to become unstable. Infrequent, but very strong seismic events are thought to have triggered localized slope failures resulting in the formation of massive landslide and earthflow deposits. Deep-seated landslides involving bedrock are noted to occur more frequently in areas underlain by altered tuffaceous rocks (Walker and MacLeod 1991).

Pervasive chemical weathering of the underlying substrate over the eons has formed a wide variety of soils. These soils support a broad spectrum of vegetative ecosystems that in turn provide diverse habitats for many species.

## CLIMATE

The rise of the Cascade Range over the past several million years has had a profound influence on the area's climate. The conifer forest that drapes the western flank of the Cascade Range owes its existence to the abundant precipitation intercepted when warm, moist Pacific air masses are forced up and over the mountain range. Climate changes over the last several thousands of years have allowed for migrations of plants and animals from both the southern and northern climates. The last glacial period was from 10-32,000 years ago, during which portions of the river were under glaciers. Approximately 9,000 years ago, after the retreat of the glaciers, the climate became hotter and dryer than today, and the region was greatly affected by fire. Climate conditions have changed little over the last 5,000 years, interrupted once by a period of colder/wetter weather lasting approximately 550 years called the "Little Ice Age" from

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<sup>1</sup> Tuffaceous is a term that describes any volcanic or sedimentary rock that is composed of greater than 50% volcanic ash.



about 1300 to 1850 A.D. (Atzet and Wheeler 1982, Agee 1993). Once again, the end of this period was marked by an increase in wildfire activity.

Today, the climate is characterized by cool, wet winters and warm, dry summers. Average annual precipitation ranges from 50-65 inches, a majority of which falls between October and March. More rain falls in the higher elevations than in low elevations and snow packs accumulate above 2,000 feet elevation over the winter. Average temperatures range from between 30-40°F in the winter, to 80-90°F in the summer.

## NATURAL RESOURCES

Natural resources within the analysis area include clean water, timber, minerals, fish and wildlife to botanical and special forest products. The area has long been known for its scenic and aesthetic values as noted by A.G. Walling (author of *History of Southern Oregon*), who in 1884 described the area as:

*"...a region of trees, of rocks and of waterfalls. Here nature is seen at her grandest. The precipitous sides of the lofty mountains are clothed with evergreens. In the shade of the mighty forest the streams flow from slope to slope, tracing their lovely way over rock and through chasm, laving the mossy boulder and bearing away minute fragments to the land below. In summer it is an enchanting land."*

The North Umpqua River, which runs from east to west through the center of the watershed, was designated as a Wild and Scenic River under the National Wild and Scenic Rivers Act of 1988. Some of the noted Outstandingly Remarkable Values (ORVs) of the river are fisheries, water quality and quantity, recreation, scenic and cultural values. The biodiversity within the analysis area is greatly enhanced by the presence of this large river corridor, as it provides a unique connection and ecotone between the deciduous foothills and the coniferous mountains.

Timber resources within the area were identified as a valuable resource as far back as the 1880s (Walling 1884). The river corridor was noted for its wealth of large sugar pine in 1897 (Bakken 1970). The forest types range from Douglas-fir and western hemlock to white and silver fir in the higher elevations. Forested landscape patterns were influenced by wildfire that occurred with regular frequency within the analysis area, and were strongly influenced by the topography of this river canyon. Small dry, rocky openings with white oak, and occasionally ponderosa pine, punctuate the forest canopy, especially along the steep slopes and ridge tops.

Several federally listed and sensitive plant and animal species exist within the watershed including the Umpqua kalmiopsis, Thompson's mistmaiden, northern spotted owls, southern torrent salamanders and the Coho Salmon.

## LAND OWNERSHIP

In relationship to the Umpqua River basin, the analysis area takes up only 1.8% of the land area. However, it is almost entirely public land with very few private in-holdings. Ninety-seven percent of the analysis area is publicly owned and managed by the US Forest Service (Umpqua National Forest), with a small portion (1% the analysis area) managed by the Bureau of Land Management (Swift Water Resource Area). The remaining three percent of the watershed is privately owned (Fig. 3). The majority of private land is managed as commercial timberlands. However, there are several private residences located along the river corridor within the analysis area.

To accelerate the settlement of Oregon, in 1869 Congress granted the Oregon and California (O & C) Railroad twenty square miles (odd-numbered sections) of public land for every mile of track laid. However, in 1916, after accusations of fraud and extensive litigation, Congress amended the Act and returned 2.3

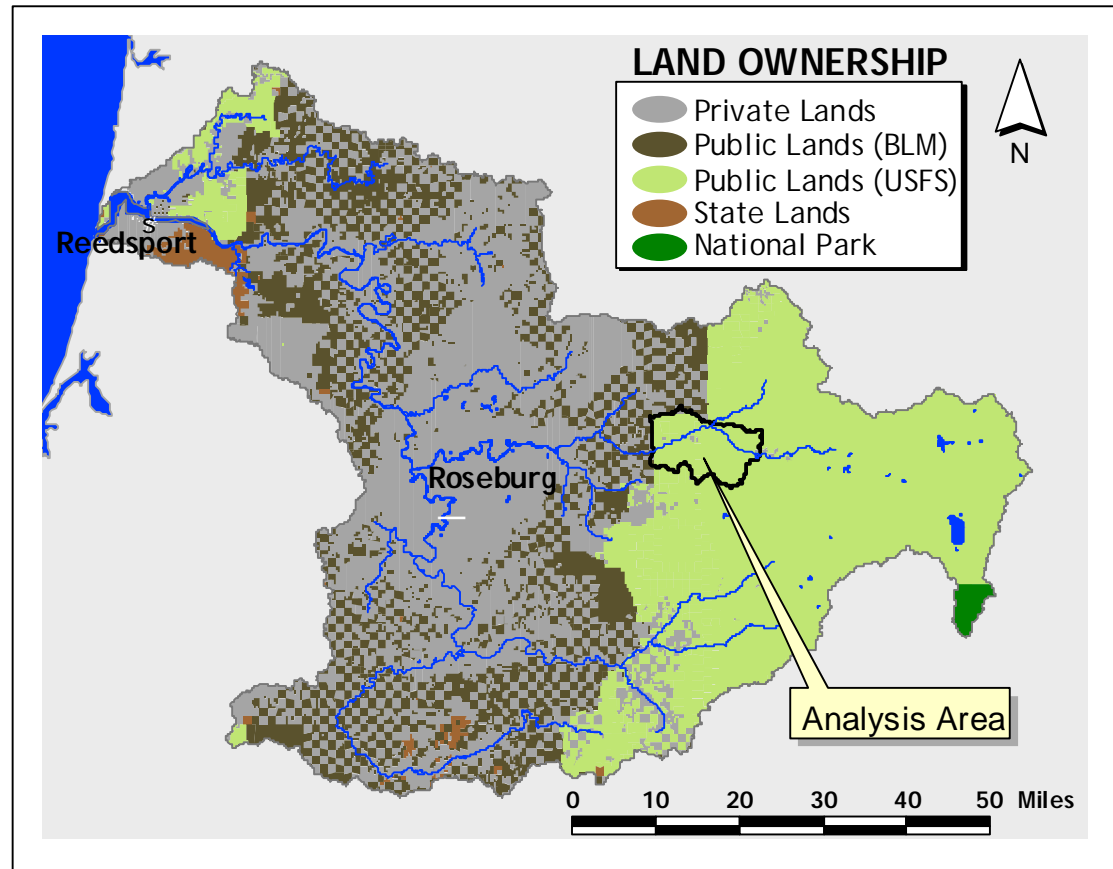


Figure 2. A river basin perspective of land ownership patterns which emphasizes the spatial/ecological importance of the analysis area and public lands managed by the US Forest Service situated in the headwaters of the Umpqua River. Only in these areas can large landscape forest patterns be restored.

million acres back to public ownership. A share of timber sale revenues from the "O & C lands" are distributed to the counties by a formula in the Act, as amended. There are 10,514 acres of O & C lands within the analysis area, 7,060 acres of which are in the Matrix land allocation.

As figure 2 shows, the analysis area and public lands managed by the Forest Service are especially important to the ecological health of the river basin because they represent the only large, intact block in which restoration of landscape-scale ecological features is currently feasible. It would be difficult to restore landscape-scale features of a healthy forest in the checkerboard of land ownerships found in the lower elevations of the river basin.

## LAND MANAGEMENT ALLOCATIONS

Under current federal land management plans, the public land within the analysis area is divided into four broad land allocations which are summarized in Table 1 and shown in Figure 4 (USDA/USDI 1994).

**Table 1. Summary of land allocations within the analysis area as designated by the Northwest Forest Plan\*.**

LAND ALLOCATION	ACRES	% AREA	EMPHASIS
Matrix	30,307	57	Forest products
Administratively Withdrawn	1,855	3	Limpy Research Natural Area
Congressionally Withdrawn	6,209	12	North Umpqua Wild and Scenic River Corridor
Late-Successional Reserve	15,071	28	Protection of late-succession and old growth forest

\* Protection buffers for streams, rivers and wetlands (Riparian Reserves) are not shown in this table or in figure 4. Riparian Reserves overlap all land allocations and cover approximately 31% of the analysis area.

The northwest portion of the watershed analysis area is designated as a Tier 1 (aquatic conservation emphasis) Key Watershed (Fig. 4). Key watersheds are designed to contribute to the conservation of at-risk anadromous salmonids and other resident fish species. This Key Watershed is one of 143 watersheds identified throughout the Pacific Northwest Region to ensure that aquatic refugia are widely distributed across the landscape. Other areas within the analysis area are managed as roadless. These include the Williams Creek, Cougar Creek and Limpy Rock designated Roadless Areas (see Fig. 55, Page 103). In addition, there are ten unmapped Late-Successional Reserves (approximately 100 acres each) scattered across the Matrix land allocation (not shown in Fig. 4).

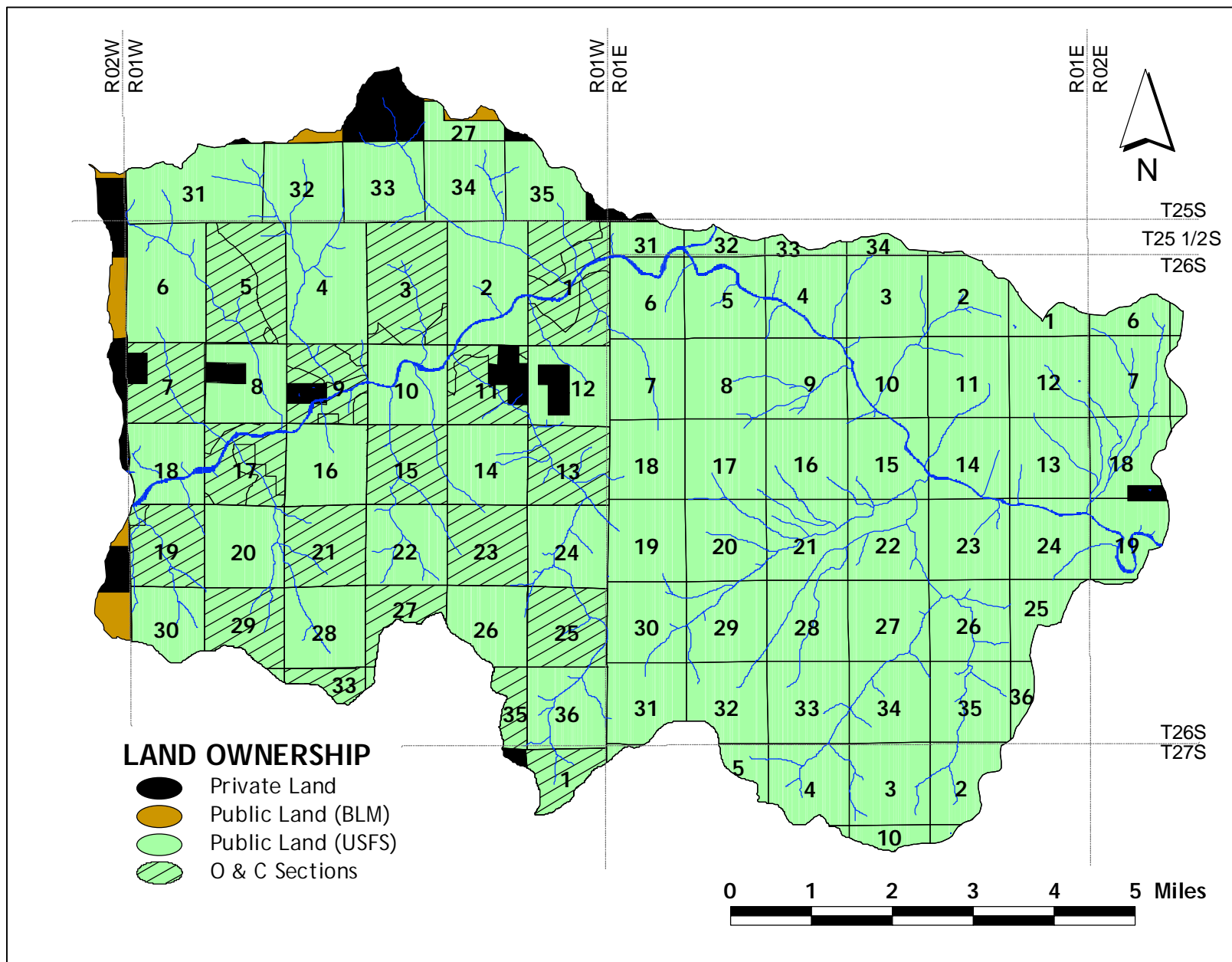


Figure 3. Land ownership patterns within the analysis area and location of O&C sections.

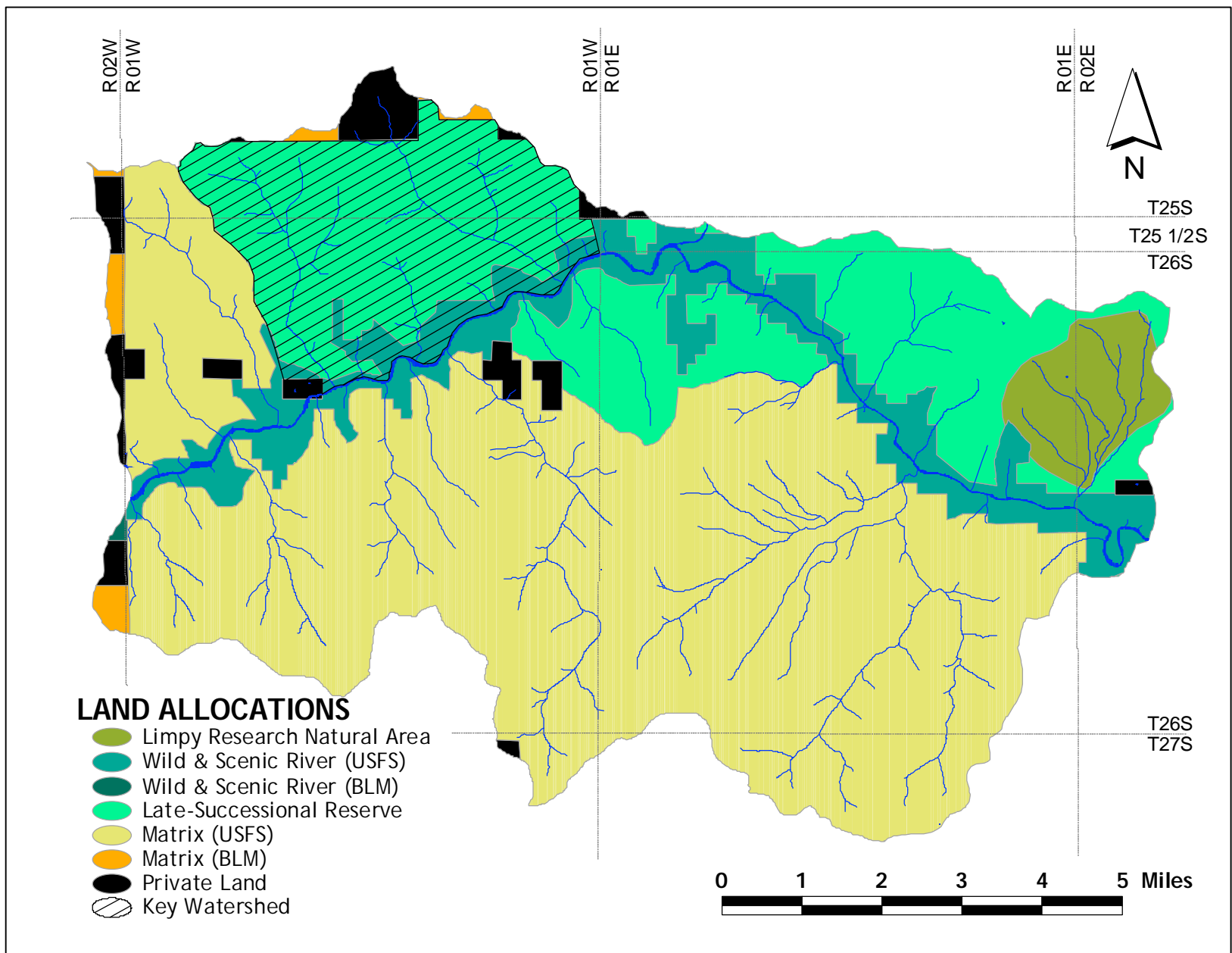


Figure 4. Land allocations within the analysis area as designated under the Northwest Forest Plan.

## HUMAN USES

Human use of the natural resources within the analysis area dates back to around 8,000 years B.C. (D. Barner pers. comm.). The 1820s witnessed the beginnings of the Euro-American utilization of the area with the arrival of fur-traders who established forts and trading centers along the lower stretches of the Umpqua River. Euro-American settlement of the lower river valleys began to increase in the 1850s as a result of the Donation Act of 1850, and land formerly used by the indigenous population was put into private and public ownerships. By 1856, the pre-existing American Indian inhabitants were essentially displaced.

Douglas County had over 3,000 settlers in 1860 and by the 1880s there were almost 10,000 (Beckham 1986). However, the watershed remained remote and uninhabited with the exception of some miners and homesteaders. Homesteaders raised small crops, livestock and trapped wolf and cougar for bounties. Some small amount of tree harvesting occurred to supply building materials and firewood for these inhabitants. The nearest commercial lumber mill was approximately 12 miles down the river at Glide in 1870. In 1886, sugar pine (common along the river corridor) brought \$25 per thousand board feet and was highly sought after.

In the late 1800s, the federal government saw a need to conserve public land rather than transferring it to private landowners. In 1886, it set aside land to protect Crater Lake (National Park) located in the headwaters of the river basin. In 1891, the Forest Reserve Act was enacted and two years later President Grover Cleveland set aside the Cascade Forest Reserve, which included what would become the Umpqua National Forest in 1907. The Forest Service began managing the Umpqua National Forest with the mission to protect its natural resources for the public good in a sustainable manner. Up through the late 1940s, fire prevention and suppression were its foremost tasks, until after World War II, when increasing lumber demands and new technologies facilitated logging and reforestation. In the last five decades, 830 million board feet of timber has been harvested from the analysis area and almost 300 miles of road constructed. This land use, coupled with fire suppression and other human activities has resulted in dramatic changes to the forest ecosystem creating a much different forest than occurred here before.

Today, the population of Douglas County is slightly over 102,000 people with over 17,000 residing in Roseburg, Oregon. Dependence upon the timber industry has dropped from 75 to 48 percent over the last half century. Recreation is now the most common human activity within the analysis area. The Wild and Scenic River Corridor provides whitewater rafting and a world-renowned steelhead fishery. Highway 138, constructed in 1940, provides a widely used corridor for travel between the valley and the mountain forests, which provide a variety of recreational activities.