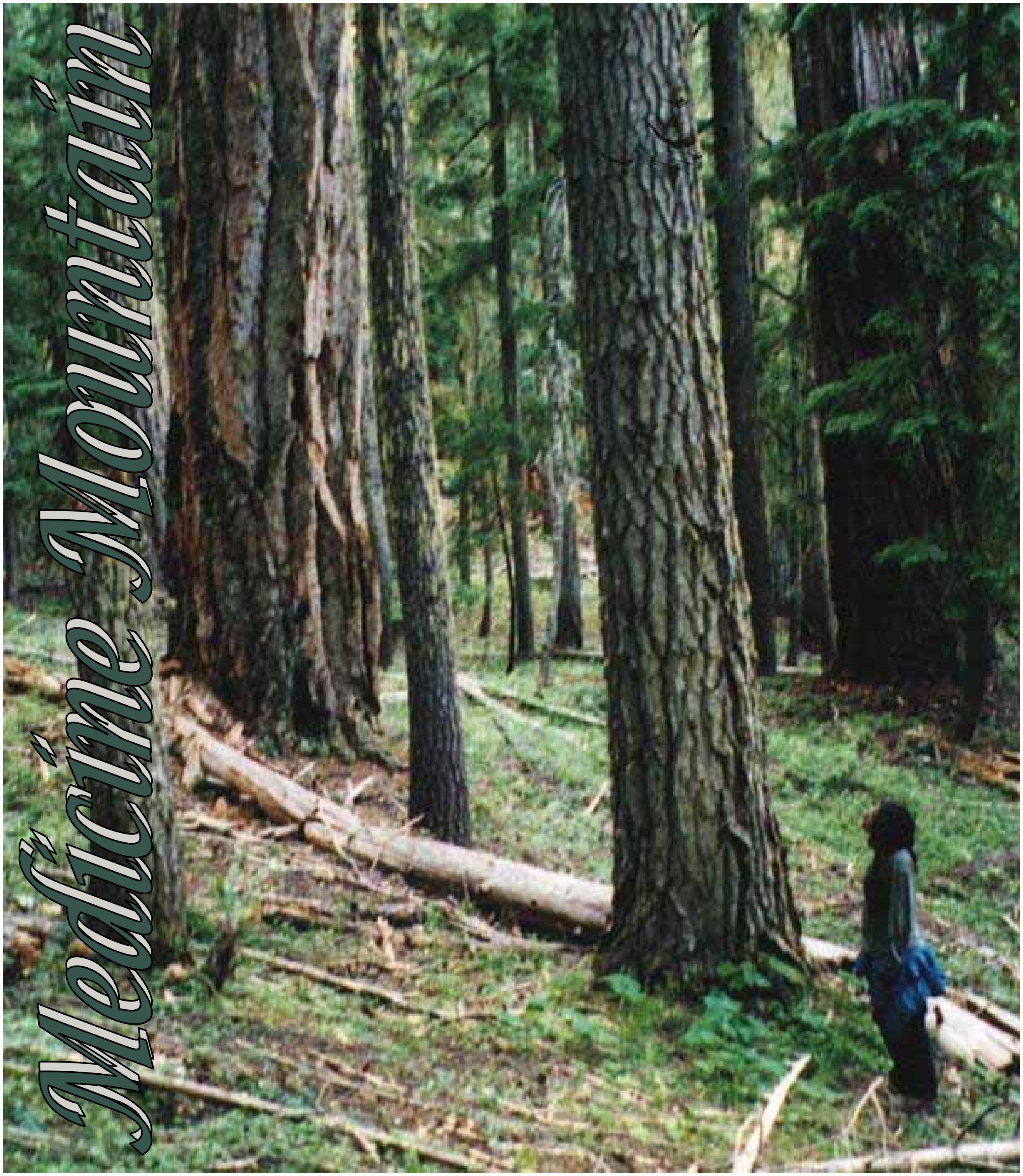

Scientific Justification For the Proposed Medicine Mountain National Monument

Credits

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On the Cover

Site of the Bear Paw timber sale, 1998. This area was part of the US Forest Service inventoried Mount Bailey Roadless Area. See page 14 for pictures of the same site in July 2000.

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Introduction

Seven thousand years ago, Mount Mazama, a volcano in the Oregon Cascades reaching some 10,000 feet in elevation over the southern horizon of the Medicine Mountain area, violently erupted, obliterating the surrounding area with a rushing cloud of hot rock and ash. What living things that were not destroyed by this pyroclastic flow were blanketed under fine ash, accumulating in depths over 35 feet many miles north of Mount Mazama. After the eruption, what is today known as the Medicine Mountain area would have looked not unlike the blast-zone of Mount St. Helens does today, a desolate, gray and black landscape. This catastrophic event would change the face of the region and give rise to a land of sublime contradictions.

Mt. Bailey, 8400 feet, towering over Diamond Lake, the largest of the high cascade mountain lakes

Mount Bailey (8,353 feet elevation) and nearby Diamond Lake are now the dominant features of the Medicine Mountain landscape. The highly porous soil resulting from the Mount Mazama eruption readily absorbs rainwater and snowmelt. As a result, there are few streams in the area. Cold, clear rivers emanate from groundwater springs where tributaries are few. These features and many others in the area held special significance for the Native Americans inhabiting the Medicine Mountain Area. The local Native Americans referred to Mount Bailey as Medicine Mountain because they regarded it a source of spiritual power, and many of the remaining Native American sites in the area have views of it.

The climate of the Pacific Northwest has produced some of the most biologically rich and ecologically important late-successional and old-growth forests in the world, but a half-century of heavy-handed logging and management has seen them all but gone. They are now considered an endangered ecosystem (Noss et al. 1995). Some of the oldest trees remaining in the Pacific Northwest grow in the Medicine Mountain area and blanket some of the newest and most radically altered geologic formations. These forests are invaluable for many reasons. Besides their uniqueness as a distinct ecosystem, they provide habitat for biologically unique and diverse assemblage of flora and fauna that depend on the many intricacies of these forests for their survival. They harbor great reserves of genetic diversity. They ameliorate the effects of global warming and climate by intake and storage of vast amounts of carbon from the air and lessening the effects of floods and droughts. They harbor an untold amount of knowledge for medical treatments all branches of science.

These relict forests that blanket the Medicine Mountain area are its most important feature. However, they are imperiled by the destructive and fragmentary impacts of logging and associated activities. It's designation as a national monument is necessary to prevent continued degradation and fragmentation of this unique landscape.

Significance of the proposed Medicine Mountain National Monument

This report demonstrates the significance of the Medicine Mountain area and makes an argument for its designation as a national monument under the Antiquities Act of 1906. It's warranting features are:

1. Extensive old-growth forests, listed as an endangered ecosystem by Noss et al. (1995), providing a wide array of ecosystem functions and creating reserves for all forms of biological diversity.
2. Ecological integrity of the area in spite of the cumulative effects of logging and related activities.
3. Occurrence of many old-growth dependent species such as northern spotted owls, northern flying-squirrels, fisher, and marten.
4. Function as a landscape linkage between adjacent protected areas; insuring the dispersal ability of old-growth dependent species and flow of genes across the region.
5. Ability to accommodate, through its size, large-ranging, sensitive species such as wolverine and lynx.
6. Occurrence of many other species of special conservation concern.
7. An important part of the Mount Mazama/Crater Lake landscape and ecosystem.
8. Unique geology featuring active, and often cataclysmic, volcanic eruptions and glaciations.
9. Unique network of rivers and streams originating from groundwater springs and providing clean water.
10. Historical significance of over 6,000 years of human occupation, including many Native American vision quest sites.
11. Value of recreational opportunities
12. Vulnerability to continued logging of old-growth forests, road building, and development.

Designation of the Medicine Mountain area as a national monument will preserve the essential character of this imperiled landscape. This report details the unique geology, landscape ecology, biology, archaeology, culture and history of the Medicine Mountain area and argues for its justification as a national monument.

Proposed Area

The proposed Medicine Mountain National Monument lies in the heart of the Oregon Cascade Mountains and covers over 206,600 acres (Figure 1). This area has long been recognized for its uniqueness and need for protection. In 1886, when William Gladstone Steel petitioned for the creation of a national park to protect the Crater Lake area, he included Mount Bailey and much of the surrounding area. President Grover Cleveland withdrew from homesteading, mining, or timber harvest ten townships in the Crater Lake/Mount Bailey area (Figure 2) on February 1, 1886 until Congress could consider establishing a national park. Survey of the area by the US

Geological Survey, determined that the townships set aside did not extend far enough east to cover the entire Crater Lake area. In order to include other features unique to Crater Lake, they dropped the Mount Bailey area from the national park proposal.

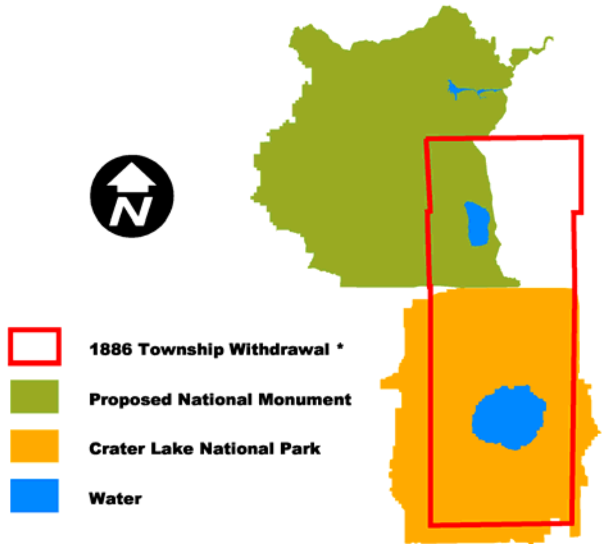

Figure 2. Location of the ten townships withdrawn by President Grover Cleveland in 1886 as a possible site for the Crater Lake National Park.

The proposed Medicine Mountain National Monument is located on the eastern half of the Diamond Lake Ranger District, Umpqua National Forest in eastern Douglas County, Oregon (Figure 3). A small section of the proposed monument extends into the Rogue River National Forest to the south. The northern border of the monument is the boundary between the Umpqua and the Willamette National Forests. The eastern border follows the designated Oregon Cascades Recreation Area. The southern boundary follows the Rogue-Umpqua Divide Wilderness, along Highway 230, and along the Crater Lake National Park northern boundary. The western edge of the proposed monument follows the Boulder Creek Wilderness and the Late-Successional Reserve as defined by the US Forest Service.

Ownership and Management

The proposed Medicine Mountain National Monument is entirely National Forest Land (Figure 3). The majority, 93.6%, is in the Umpqua National Forest, and the remaining 6.4% is in the Rogue River National Forest. While the proposed monument area is surrounded by Wilderness, Crater Lake National Park, the Oregon Cascades Recreation Area, and other administratively withdrawn areas (i.e., Late-Successional Reserves), the area within the proposed national monument receives little protection. Small portions of the proposed area have been designated as late-successional reserves, but the vast majority of the proposed monument area in the Umpqua National Forest is designated as Matrix under the Northwest Forest Plan (Figure 4). The Matrix allocation receives very little protection under the Northwest Forest Plan and is the portion of the landscape dedicated to timber production and other extractive uses. Recent evaluations of logging rates in the matrix of the Umpqua National Forest estimate that the remaining late-successional and old-growth forests that do not currently receive protection would

John Ouimet, Diamond Lake District Ranger, stands in a proposed logging road and landing.

be cut or otherwise altered within 76 years (US Fish and Wildlife Service 1998).

Although significant logging and road-building has taken place in the proposed area, many large tracts of land still remain in a state largely unaltered by current and past logging practices. The proposed national monument boundary contains six US Forest Service inventoried roadless areas (Figure 5). These inventoried roadless areas comprise only approximately 35,000 ac (14,200 ha) or 16.9% of the total proposed area. Of these the Mount Bailey Inventoried Roadless Area is the largest tract of unroaded land on the Umpqua National Forest and possesses a high degree of ecological integrity (USDA Forest Service 1996). An additional 52,700 ac (21,300 ha) of uninventoried roadless areas over 1000 acres in size, as mapped by Pacific Biodiversity Institute in 1998, exists within the proposed boundary. The uninventoried roadless areas account for an additional 25.5% of the total proposed area. Combined, the uninventoried and inventoried roadless areas total 87,700 ac (35,500 ha) or 42.4 % of the Medicine Mountain area.

Roadless areas are critical to conservation of biodiversity across large areas. Because they have not been intensively managed, most roadless areas retain a high degree of natural integrity. For example, exotic, invasive species are much less common in roadless areas than in roaded landscapes (Trombulak and Frissell 2000). Also, the existing system of national parks, wilderness areas, and other reserves is heavily biased toward high-elevation and low-productivity sites (Scott 1999, Scott et al. unpublished manuscript). Roadless areas are essential to conservation efforts because they often contain under-represented ecosystem types with a high degree of natural integrity (Dellasala and Stritholt 2000).

Roads have significant negative impacts on the biota of an area, and roadless areas are important for the ecological integrity of an area (Hourdequin 2000). Road-building activities impact the landscape in many ways. There is the obvious mortality to plants and animals associated with road building and the collisions of animals with vehicles, but there are also not so easily observed effects such as changes in animal behavior, alteration of the physical and chemical environment of an area, spread of exotic and generalist species, and increased use by humans (Trombulak and Frissell 2000). It is the accumulation of these latter effects that causes the most impact to an ecosystem. Many species (e.g., black bears [*Ursus americanus*; Brody and Pelton1989], elk (*Cervus elaphus*; Grover and Thompson 1986]) shift their movements away from roads or experience decreased reproductive success near roads (e.g., bald eagles [*Haliaeetus leucocephalus*; Anthony and Isaacs 1989]). Roads also alter the physical and chemical environment around them extending over 100 meters from the road cut by changing soil densities, light infiltration, temperatures, and water runoff patterns, and introducing heavy metals, salts, ozone, and nutrients to the surrounding areas (Forman 2000, Trombulak and Frissell 2000). Edges created by roads and forest clearing can entice birds to nest there through increased food availability and decreased competition; however, generalist predators and parasitic species are also attracted to these same areas, creating an "ecological trap" (Gates and Gysel 1978). The combined inventoried and uninventoried roadless land in the proposed Medicine Mountain area are of sufficient size and well dispersed, allowing them to function as habitat for many species and provide landscape linkages between the larger protected areas in the region (See Hudson 1991, Saunders et al. 1991).

Landscape Ecology

The situation of the proposed area in the midst of other reserves adds to the need to protect the Medicine Mountain area. Ecosystems have, as one of their defining characteristics, natural processes that must be able to proceed in order to sustain the biodiversity of that area (Noss 1994). This includes the ability for organisms to disperse from one area to another, thereby maintaining genetic flow and allowing recolonization of sites following local extirpation. Many late-successional and old-growth dependent species do not disperse well across forest openings and clearings (Norse 1990). Other processes are natural disturbances including fire, storms, and infestations by native insects and pathogens. The late-successional and old-growth forests of the Pacific Northwest evolved with these disturbances and their occurrence is part of the normal ecosystem function. However, fragmentation of the landscape and isolation of remaining virgin forests intensifies the impact of these events and inhibits natural rebuilding of the sites after such an event (Saunders et al. 1991). Thus in addition to the ecological value of what is inside the proposed Medicine Mountain National Monument boundary, the area functions as a keystone, connecting those areas surrounding it. The size of the proposed Medicine Mountain National Monument was intended not only encompasses large tracts of old-growth forests in need of conservation, but also to connect the other conservation reserves in the area. The ecological integrity of the Medicine Mountain area will influence the condition of its surroundings.

Vegetation and Land Cover

The general land cover of the proposed Medicine Mountain National Monument is mostly coniferous forest (Table 1, Figure 6). Biologically rich, mid and low elevation forests comprise 80% of the proposed National Monument. The mapped land cover types are generalizations of the actual land cover on the ground. Minor differences in tree density and microhabitat features (e.g., forest openings, small meadows, talus slopes) are not depicted in the data used in our analysis of land cover. The US Forest service recognizes seven major plant series in the area: Western Hemlock (*Tsuga heterophylla*), Mountain Hemlock (*Tsuga mertensiana*), Douglas-fir (*Pseudotsuga menziesii*), White Fir (*Abies concolor*), Pacific Silver Fir (*Abies amabilis*), Shasta Red Fir (*Abies magnifica shastensis*), and Lodgepole Pine (*Pinus contorta*) (USDA Forest Service 1996). Significant riparian communities exist within the area along streams, rivers, lakes and wetlands.

Table 1: General land cover types of the proposed Medicine Mountain National Monument

Cover Type	Area	Percent
Mountain Hemlock Montane Forest	17,873 ac (7,236 ha)	8.7%
True Fir, Hemlock Montane Forest	75,653 ac (30,629 ha)	36.6%
Subalpine Fir, Lodgepole Pine Montane Forest	17,292 ac (7,001 ha)	8.4%
Douglas-fir, Western Hemlock, Western Red Cedar	26,940 ac (10,907 ha)	13.0%
Douglas-fir dominant mixed conifer forest	52,289 ac (21,170 ha)	25.3%
Alpine grasslands, fell, and snowfields	2,023 ac (819 ha)	1.0%
Regenerating young forest	10,583 ac (4,285 ha)	5.1%
Water	3,918 ac (1,586 ha)	1.9%

Data source: Oregon Gap Analysis Project/Oregon Natural Heritage Program

Old-growth forest in a proposed timber sale.

By far, the richest resource in the proposed Medicine Mountain National Monument is its extensive and diverse late-successional and old-growth forests. The definition of old-growth forests given by the Forest Ecosystem Assessment Management Team (FEMAT; 1993) is forests that "differ significantly from younger forests in structure, ecological function, and species composition. Old-growth characteristics begin to appear in unmanaged forests at 175-250 years of age. These characteristics include (1) a patchy multilayered canopy with trees of several age classes, (2) the presence of large living trees, (3) the presence of larger standing dead trees (snags) and down woody debris, and (4) the presence of species and functional processes that are representative of the potential natural community." Forests are generally considered late-successional once they reach approximately 80-110 years. However, tree productivity also decreases around this point for many Northwest conifers. Consequently, many managed stands never progress beyond this point before they are harvested. Late-successional forests are critical to conservation of old-growth forests. Because they share many of the same structural and functional components of true old-growth forests, they are inhabited by many of the same species. And while some old-growth characteristics may not peak until the stand reaches 500 years old (Spies and Franklin 1988), these relatively younger, late-successional forests have the potential to continue developing old-growth characteristics.

The majority of the Medicine Mountain forests are dominated by large Douglas-firs, some reaching eight feet in diameter. Many of the old-growth trees exceed 600 years old. Due to the short growing season at middle and higher elevations, the trees grow slower here than in more temperate climes. Thus, a tree in the Medicine Mountain area could be significantly older than one of comparable size in a coastal old-growth forest.

FEMAT (1993) mapped late-successional and old-growth forests in the Pacific Northwest from multi-spectral satellite imagery. They identified 65,500 ac (26,500 ha) or 33.5% of the Medicine Mountain area as late-successional forest and 63,300 ac (25,600 ha) or 32.4% as old-growth (Figure 7 and 8). Portions of this estimated old-growth forest have been logged since their assessment. While 19% of the proposed area has been logged to some extent (estimate based on Umpqua National Forest harvest data, 1999), large blocks of contiguous old forests still exist in the area, particularly around Mount Bailey (Figure 7 and 8).

The Pacific Northwest has witnessed dramatic declines in its amount of late-successional and old-growth forests since pre-settlement times. Estimates of the losses range from 83 to 90 percent in the Douglas-fir region of Oregon and Washington (Spies and Franklin 1988, Norse 1990, Noss et al. 1995). Noss et al. (1995), considered old-growth forests to be an Endangered Ecosystem (one that has experienced 85 to 95 percent decline). Almost all of the remaining virgin late-successional and old-growth forests are on federal lands (Norse 1990), but many of them do not receive protection. Norse (1990) estimated that at 1990 logging rates, all unprotected old-growth forests in Oregon and Washington would be gone by 2023. The political climate has changed since then and logging rates have dropped dramatically, but old-growth forests are still being cut down and remain in an imperiled state (See "Current Threats" below). The Medicine Mountain area has seen timber sales of over 70 million board feet of old-growth timber in the past 5 years (F. Eatherington, pers. comm.).

Late-successional and old-growth forests are immense reserves of biodiversity. Biodiversity is the variety of living things. However, it is not just the number of species inhabiting an area (Noss 1994). There are three widely recognized levels of biodiversity: genetic, species, and ecosystem (Meffe and Carroll 1994). While species level biodiversity is the most widely known, genetic and ecosystem biodiversity are equally important (Norse 1990). Within each of these levels are components, structures, and functions that define that level.

Genetic variation is the parent of all other forms of biodiversity (Meffe and Carroll 1994) and is a primary reason for conserving late-successional and old-growth forests in the Pacific Northwest (Norse 1990). The importance of genetic diversity comes from three things (Rudolph 1990). First, genetic variability allows adaptation to local conditions such as microclimate, topography and competition. The US Forest Service has long been aware of this, evidenced by its efforts to use local seed sources to restock harvests. Secondly, genetic variation is a strategic defense against pathogens and insect pests. This is perhaps the most important aspect of genetic diversity from a conservation standpoint. Rudolph (1990) points out that "trees in genetically uniform stands would be long-lived 'sitting ducks' for insect pests and pathogens, which have much shorter generation times and can therefore evolve much faster. But insects and pathogens faced with an array of trees, each differing unpredictably from its neighbors in defensive chemistry, might have difficulty evolving all-purpose ways to exploit such variable resources." Spread of western spruce budworm outbreaks in Douglas-fir fit this fit this pattern of spread and highlights the importance of genetically-diverse, native late-successional and old-growth forests (Rudolph 1990). Third, genetic variation allows continuation of evolution and adaptation to changing environments. This is particularly germane in the context of global climate changes that are ongoing.

Old-growth forests are great reservoirs of species level biodiversity. The Pacific Northwest has more species of giant conifers than anywhere else on earth (Norse 1990). The wet, temperate conditions and high plant diversity promote the growth of a wide variety of fungi. Thomas et al. (1993) identified 667 species that were closely related to Pacific Northwest late-successional and old-growth forests in at least part of their range. The Northwest Forest Plan associates 234 rare and endemic species of fungi to old-growth forests in the Pacific Northwest (FEMAT 1993). Wildlife species found in Pacific Northwest old-growth forests are also very diverse (Bunnell and Kremsater 1990). The value of Pacific Northwest old-growth forests as wildlife habitat comes from the interaction of several key features (Norse 1990):

1. An exceptionally moist, moderate temperate climate with summer drought
2. Exceptional topographic and climatic diversity
3. An exceptionally diverse disturbance regime
4. Unequaled diversity of giant conifers
5. Exceptional longevity
6. Exceptional biomass of living plants, snags and downed logs
7. Exceptional vertical and horizontal spatial complexity.

Late-successional/old-growth characteristics such as multiple canopy layers, downed woody material, large-diameter snags, and canopy openings add three-dimensional structure to a forest stand. MacArthur and MacArthur (1961) discovered that habitats with more three-dimensional complexity contain more species. The public is most aware of the old-growth dependent species (e.g., the northern spotted owl). However, many species that can survive in other habitats do better in old-growth forests (Bunnell and Kremaster 1990). For example, Thomas (1992) found seven species of myotis bats three times more abundant in old-growth forests. Snags, natural cavities, and downed woody material provide nesting and feeding opportunities for many species as well as protection from predators. Franklin et al. (2000) referred to these components as "structural legacies." Additionally, these forests serve as refuges during hard times, ameliorating the effects of disturbances such as droughts, floods, storms, and food shortages. In summary, Morrison et al. (1991) noted, "Continued logging of the few remaining larger stands of ancient forest and the few fragments of ancient forest at lower elevations poses a significant threat to biological diversity. Loss of ancient forests at low elevations will also decrease the potential to recover the rare and threatened native species in the region."

Mountain hemlock tree in Snog timber sale.

Natural ecosystems are combinations of species and interactions that have evolved together over time. As such, each represent a unique set of features that are worthy of conservation. The declines in late-successional and old-growth forests in the Pacific Northwest qualifies this ecosystem to be in danger of extinction (Norse 1990, Noss et al. 1995). The Medicine Mountain area, with its high proportion of late-successional and old-growth forests, should be protected as an example of an endangered Pacific Northwest ecosystem.

Late-successional and old-growth forests also provide a diversity of ecosystem services (Norse 1990). The prevalence of dead plant material and the unparalleled richness of fungi, and decomposing insects in late-successional and old-growth forests contributes to formation of soils. Multiple canopy layers, ground cover, and extensive root systems contribute to soil stabilization and minimize erosion. By uptake of carbon dioxide and the process of photosynthesis, late-successional and old-growth forests store massive amounts of carbon, helping to ameliorate the increase in atmospheric carbon dioxide and the resulting global warming (Norse 1990). Late-successional and old-growth forests have the highest average carbon per hectare of anywhere on earth (900-1,000 tons C/ha [Houghton 1990]).

While it is relatively easy to grow trees, recreating a late-successional or old-growth forest takes time. Though attempted, silvicultural treatments (e.g., logging) cannot replicate late-successional or old-growth forests (FEMAT 1993). Structural features may be able to be accelerated, but processes such as maturation of tree crowns, thickening of bark and decay of tree boles cannot be recreated through management (FEMAT 1993). Many species of lichens and bryophytes (mosses, liverworts, and hornworts) that participate in many of the ecosystem functions of late-successional and old-growth forests and serve as food for many old-growth dependent species do not become established in forests younger than 100 to 200 years (Norris 1987, Henderson et al. 1988, Lesica et al. 1991, McCune 1991). Norse (1990) summarizes this best saying, “That [natural and managed forests] share the same name reflects the inability to see the forest for the trees.”

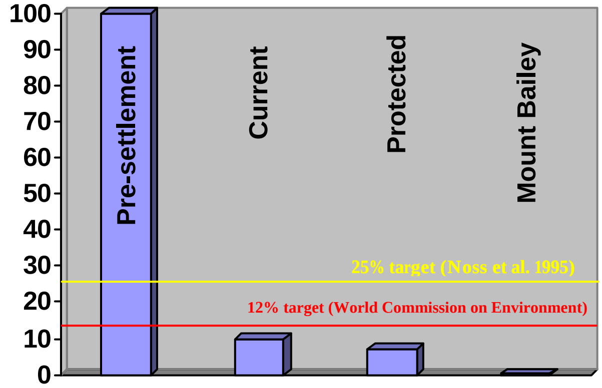

Figure 9. Current late-successional and old-growth forests are approximately one tenth of those that covered the Northwest before settlement. Of the ten percent remaining, approximately 75 percent of that is under some from of federal protection (i.e., congressionally withdrawn, administratively withdrawn, or late-successional reserve; FEMAT 1993). Suggested targets for conservation of ecosystems range from 12 to 25%. Less than 10% of late-successional and old-growth ecosystems remain – far short of what scientists call for as the minimum necessary to preserve the integrity and functioning of these dwindling ecosystems. This illustrates the need to conserve the remaining late-successional and old-growth forests. While the Medicine Mountain area accounts for only 0.25 percent of pre-settlement old-growth, it’s contribution would be significant in closing the gap between what is currently protected and what is

It is impossible to preserve an individual species in the wild without protecting its environment and interactions. Thus conservation of ecosystems is necessary for preserving the species that inhabit them (Meffe and Carrol 1994). Ecosystems also provide a convenient unit for conservation since protection of an ecosystem also confers some degree of protection to its components (Noss et al. 1995). Estimates of how much of an ecosystem to conserve vary widely, but a commonly accepted figures range from12 percent (World Commission on Environment and Development) to 25 percent (Noss 1992). This does not mean 12 to 25 percent of what is currently extant: this refers to that much of pre-settlement conditions (Figure 9). The fact that remaining late-successional and old-growth forests fall short of the suggested 12 percent conservation target heightens the need to protect our dwindling old-growth reserves. FEMAT (1993) estimated remaining late-successional and old-growth forests within the range of the northern spotted owl (*Strix occidentalis caurina*) at approximately 8,330,900 acres. Of that acreage, approximately 5,926,600 acres receive some sort of protection in the form of congressional withdrawals (e.g., wilderness areas, national parks), administrative withdrawals (i.e., land set aside in management plans), or late-successional reserves. This still leaves a “conservation gap” of 2,404,300 acres. The late-successional and old-growth forests in the Medicine Mountain area would be a small, though significant, contribution to closing this gap.

Rare, Threatened and Endangered Species

Species Observations

The Oregon Natural Heritage Program has maintained records of 116 sightings of 20 species of conservation concern in the area proposed for a national monument from 1950 to 1999 (Table 2). These rare species have either state or federal status as endangered, threatened, sensitive, or candidate species. Many of these species are dependent on habitat provided by the extensive late-successional forests located in the proposed National Monument. All species listed below have declined well below natural and historic levels and are impacted adversely by human activities.

Table 2: Sightings of Species of Conservation Concern

Common Name	Scientific Name	Number of Sightings
Adder's-tongue	*Ophioglossum pusillum*	1
Bald eagle	*Haliaeetus leucocephalus*	3
Bufflehead	*Bucephala albeola*	2
California wolverine	*Gulo gulo luteus*	7
Cascades frog	*Rana cascadae*	16
Common loon	*Gavia immer*	1
Crenulate grape-fern	*Botrychium crenulatum*	1
Gray wolf	*Canis lupus*	1
Harlequin duck	*Histrionicus histrionicus*	1
Jepson's monkeyflowr	*Mimulus jepsonii*	7
Lesser bladderwort	*Utricularia minor*	3
Long-legged bat	*Myotis volans*	1
Northern spotted owl	*Strix occidentalis caurina*	49
Northwestern pond turtle	*Clemmys marmorata marmorata*	3
Pacific fisher	*Martes pennanti pacifica*	9
Pacific western big-eared bat	*Corynorhinus townsendii townsendii*	1
Slender meadow-foam	*Limnanthes gracilis var gracilis*	1
Tailed frog	*Ascaphus truei*	5
Thompson mistmaiden	*Romanzoffia thompsonii*	2
Whitney's haplopappus	*Haplopappus whitneyi ssp discoideus*	2

Data source: Oregon Natural Heritage Program

Northern Spotted Owl

As the amount of late-successional and old-growth forests has declined, so have the numbers of northern spotted owls (Thomas et al. 1990). Northern spotted owls nest almost exclusively in old-growth conifers. Those individuals that do nest in forests that have been previously harvested experience decreased success in breeding (Murphy and Noon 1992). Carey et al. (1992) considered forest fragmentation the most serious threat to conservation of forest raptors (including the northern spotted owl). They found that spotted owl pairs in the Umpqua River watershed just west of the Medicine Mountain area ranged over 85% more area in heavily fragmented Douglas-fir forests. Managed forests do not contain equivalent amounts of resources as late-successional and old-growth forests, requiring the owls to cover more area to meet their needs. This may be attributable to the isolation of prey populations, primarily northern flying squirrels (*Glaucomys sabrinus*), in heavily managed landscapes.

Spotted owls are regular inhabitants of the old-growth forests in the proposed national monument area. There are 51 100-acre spotted owl core areas on the Diamond Lake Ranger District (USDA Forest Service 1998). Much of the Diamond Lake Ranger District is suitable nesting/roosting/foraging habitat for northern spotted owls (USDA Forest Service 1996, USDA Forest Service 1996).

Forest Carnivores

Several forest carnivores have been detected in the proposed national monument area including American marten (*Martes americana*) and Pacific fisher (*Martes pennanti pacifica*). Wolverine (*Gulo gulo*) and Canada lynx (*Lynx Canadensis*) have been sighted outside of the proposed boundary. Their inhabitation of the area has not been confirmed, but is very likely. The US Fish and Wildlife Service has designated all of the proposed monument as suitable habitat for lynx. These species require late-successional forests and large tracts of undisturbed land for survival and successful reproduction. Lyon et al. (1994) found fragmentation of late-successional and old-growth forests to be the most important factor in limiting dispersal for lynx, fisher and marten. For these species, physical structure of the environment appears to be more important than the vegetation species composition. Lyon at al. (1994) also notes, "The arrangements and linkages between stands are even more important for species like the marten and fisher that exhibit great reluctance to cross openings or venture very far from overhead cover. For these species, fragmentation of continuous forest cover may have negative consequences." Indeed, habitat fragmentation is the most important isolating mechanism for lynx and marten and continued clearcutting of contiguous forests may preclude conservation of forest carnivores. This underscores the need to protect the undisturbed areas and old-growth forests of the Medicine Mountain region. Also it is valuable to provide landscape linkages within the Medicine Mountain area and between adjacent reserves.

Ranid Frogs

Frogs of the family Ranidae have seen declining populations worldwide, and thus are considered species of concern. Three species of Ranid frogs occur in the proposed national monument area: the Cascade frog (Rana cascadae) and northern red-legged frog (*Rana aurora aurora*) were detected during an assessment for the North Umpqua Hydroelectric Project (USDA Forest Service 1996), and the Oregon spotted frog (*Rana pretiosa*) was listed as species of management concern in the Lemolo and Diamond Lakes Watershed Assessment (USDA Forest Service 1998). Researchers in the Pacific Northwest have noted declines in Oregon spotted frog populations since the 1950's when Frogs were not able to be located at confirmed historic sites. The Oregon spotted frog is considered rare and is known only to relatively restricted geographic areas in Washington and Oregon (McAllister 1998).

Wildlife

A great diversity of wildlife inhabit the Medicine Mountain area. A study of the Mowich Park and Stump Lake areas during the summer of 1995 detected 81 bird species (USDA Forest Service 1996; See Appendix A for species list). This is a high number for a single-year survey. Breeding Bird Survey records for the Clearwater River transect from 1991 (date the transect was first surveyed) to 1999 list 97 species detected (See Appendix A for species list). Sixteen small mammal and six amphibian species were detected at the Watson Falls and Dog Prairie Demo sites in the fall of 1995. Again this is a large number of species for a single-season survey. Species detected here included old-growth dependent species such as northern flying squirrels (*Glaucomys sabrinus*) and Vaux's swifts (*Chaetura vauxi*) (See Appendix a for full species lists). Winter and summer range for Elk (*Cervus elaphus*), is found throughout the area. Bald eagles (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaaetus*) have been observed on many of the lakes and major waterways in the North Umpqua River watershed. Bald eagles have attempted nesting on Diamond Lake and Lemolo Lake, however, the only successful breeding in the past five years has occurred on Lemolo Lake.

Fish

The value of the Medicine Mountain area to anadromous fish is its contribution of pure and clear water to the downstream fisheries (See "Geology and Geomorphology" below). The anadromous fisheries downstream of the Medicine Mountain area are among the best remaining in the contiguous United States. This is largely due to the quality of the water in the Umpqua River drainage. Road-building and logging greatly increase the amount sediment deposited in streams (Norse 1990). The excess sediment clogs stream channels, covering spawning beds for anadromous salmonids. Thus, continued road-building and logging of late-successional and old-growth forests in the Medicine Mountain may have negative impacts on the quality of water in the Medicine Mountain area and eventually the famous Umpqua River fisheries.

Spring River's water source comes only from the aquifers beneath the lodgepole pine flats now proposed for clearcutting.

The proposed Medicine Mountain National Monument has a very simple fish fauna. Anadromous fish are blocked from entering the upper Umpqua River by Toketee Falls. While historically present below the falls in the Umpqua River and Fish Creek tributary, they are prevented from entering this drainage by the Soda Springs hydroelectric dam. All current species of fish in the area have been introduced, either intentionally or by accident. There may have been a native population of rainbow trout (*Onchorhyncus mykiss*) that survived the eruption of Mount Mazama in protected tributaries, but the extensive stocking of hatchery rainbow trout would have significantly altered the genetics of any native strain. Below Tokatee Falls, the only species known to exist are rainbow trout, brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). Above the falls, these species exist as well as Kokanee Salmon (*Oncorhyncus nerka kennerlyi*) in Lemolo Lake, and Tui chub (*Gila bicolor*), an accidentally introduced baitfish.

Geology and Geomorphology

The proposed Medicine Mountain National Monument is situated within five major watersheds (as defined by the Umpqua National Forest): the Diamond Lake/Lemolo Lake watershed, the Upper Clearwater Watershed, the Lower Clear Watershed, the Upper North Umpqua Watershed, and the Fish Creek Watershed.

Watson Falls in the proposed Mount Bailey National Monument

The geomorphology, and to a large extent the geology, of the proposed National Monument has been defined by the eruption of Mount Mazama approximately 6,000 years ago (creating what is now Crater Lake) (US Forest Service 1998). The area to the north and east of Diamond Lake was deposited as air-fall tephra (pumice) prior to the main eruption. These deposits can reach a depth of 20 meters, and though they cover only approximately 25% of the watershed, their high porosity is important to water infiltration. Immediately following the tephra deposits, the main eruption of Mount Mazama blanketed the Medicine Mountain area with a pyroclastic ash-flow that formed deposits on the valley floors. The proposed national monument would protect this significant portion of the Mount Mazama landscape. Away from the valley floors, the terrain is of andesitic basalt origin. The lava flows forming Mount Bailey, Rodley Butte and Hemlock Butte are thought to be the youngest rock of the High Cascades.

Much of the Medicine Mountain area is underlain with an extensive aquifer that formed approximately 40 million years ago. The air-fall tephra and pyroclastic ash-flow from the Mount Mazama eruption have formed a crust over the area, acting like a sponge feeding water to the aquifer. The volcanic rocks and deposits in the proposed national monument are highly porous, allowing rainfall and snowmelt to infiltrate into the ground very readily. Hence, the area has extraordinarily low stream densities, the water regime being primarily influenced by groundwater. Extensive springs surface from the aquifer at the margins of the ash deposits and provide a significant source of water for the North Umpqua River. "The Spring River emanates from a contact of Ash Flow deposits and Glacial Outwash near the mouth of Lake Creek and provides a large contribution, particularly during the summer and fall. On the upstream side of Lemolo Lake, a number of large springs coalesce and are known as Crystal Springs. These are unique in that the flow appears to be influenced by the abutment of the Mazama Ash Flow and are forced to flow east to join the North Umpqua River above Lemolo Lake" (USDA Forest Service 1998). It is estimated that apprixomately 25 percent of the Diamond Lake/Lemolo Lake watershed is underlain with aquifer; however, the area contributing to the aquifer likely exceend 75 percent (USDA Forest Service 1998).

The high infiltration rate of the soil also helps to minimize erosion by preventing surface flow of water. Activities that cause soil compaction (e.g., logging, road building) decrease the infiltration rate of water into the soil and promote accelerated erosion.

Historic and Cultural Attributes

The Medicine Mountain landscape has been home to Native Americans for thousands of years. Extensive evidence points to the area's importance as both a hunting/gathering ground as well as a place for spiritual worship.

Old-growth Douglas-fir in the proposed Lemolo timber sale.

Evidence of human presence in the Medicine Mountain area dates back 7,000 years ago, prior to the eruption of Mount Mazama. Four sites have been identified from this time period in the Diamond Lake Ranger District. Use of the area by Native Americans prior to the Mount Mazama eruption may have been widespread, but traces of such uses could have been destroyed or buried by the event. A total of one hundred ninety prehistoric sites have been identified on the Diamond Lake Ranger District. The majority of these sites are either cairns (stacks or mounds of rock occurring singularly or in clusters) or lithic scatters (sites where tools, tool fragments, or other evidence of occupation has been found). Several peeled tree sites (Native Americans used the pitch and cambium of trees for medicinal purposes), rock shelters, and a quarry site have also been identified.

Cairn sites can serve a wide variety of purposes. They were used as prayer monuments, memorials, or trail markers. Some were constructed as part of young Native American's vision quest. Many of the cairns on the Diamond Lake Ranger District are built on ridges or other vistas and have views of Mount Bailey. Mount Bailey (referred to as Medicine Mountain by the Native Americans) was considered to be a source of power by the local Native Americans. The Upper Clearwater River Watershed Analysis Report (USDA Forest Service 1996) states, "According to Indian tradition, the medicine men and priests often feasted on the summit of this mountain [Mount Bailey] and communed with the upper world. John B. Waldo wrote in 1886 of the existence of a 'rock monument on the summit' after climbing the mountain.

Many sites have been identified as hunting-task camps. Artifacts at these sites include hammerstones, obsidian flakes, scraper/knives, and arrow/spear points. These artifacts indicate tool manufacture, hunting and hide processing. Several sites have contained groundstones or other indications of plant food processing. Most of the lithic artifacts identified in the Diamond Lake Ranger District are of obsidian, a volcanic rock found east of the Cascades but not within the Umpqua drainage. This indicates travel and trade with other Native American groups across a wade range.

The most recent Native Americans known to occupy the Medicine Mountain area were the Southern Molalas. First identified by the Indian Affairs superintendent Joel Palmer in 1853, the Southern Molalas occupied the Cascade uplands of southwest Oregon. Although the history, culture, and language of the Southern Molalas is poorly documented, we know they participated in the guardian spirit rituals that were practiced by most Native groups in Oregon. Elements of this practice included the guardian spirit quest (vision quest) and the spirit-ghost complex. The numerous cairn sites in the Diamond Lake Ranger District provide evidence of this. Early study of the Molala language suggested that the Southern Molalas were relatively new to the upper Umpqua river drainage; however, subsequent study has suggested the existence of Native Americans in the area over a much longer period of time, possibly consisting of an ancient Molala of proto-Molala population. Evidence exists of the Molalas using forest fire for the maintenance of deer forage. The Upper Clearwater River Watershed Assessment Report (USDA Forest Service 1996) relates, "The presence of multiple task sites or seasonal camps, and peeled tree sites may be an indicator of maintenance burning by Indian groups… In How High Thy Bounty, Jesse Wright tells us that the Indians burned Oak Flats and Big Camas for deer forage. Pine Bench is another example of maintenance burning. A case could be made for maintenance burning in Mowich Park… It is likely that 'park' indicates an open setting under the canopy. The name could be an indicator of another area burned for deer forage."

Current Threats

Due to the designation of most of the proposed Medicine Mountain National Monument as Matrix under the Northwest Forest Plan, the largest threat to the area comes from logging of old-growth forests and attendant activities (e.g., road building). Timber operations reduce biological diversity in three ways: by destroying, fragmenting and simplifying ecosystems (Norse 1990).

Site of the Bear Paw timber sale, July 2000. This is the same area as the picture on the cover page.

The Umpqua National Forest has proposed many timber sales in the area. In 1996, the Umpqua National Forest sold 25 million board feet (mmbf) from the Paw complex in the Mount Bailey Roadless Area. This included 2,983 acres of suitable northern spotted owl habitat (e.g. old-growth forest) (US Fish and Wildlife Service 1996). Most of this has already been harvested. In 1997, the Bull, Watson Falls, Yogi, Pigout, Dog Prairie, and Peanuts timber sales amounted to over 50 mmbf. The Umpqua National Forest, in 1998 decided to sell 48 mmbf in the Upper North and Warm Springs timber sales. These sales have been held up in litigation and have not yet been cut. The Lemolo timber sale, proposed for year 2000, would remove 31 million board feet (mmbf) from the Lemolo lake area, including portions of the Bunker Hill uninventoried roadless area. The proposed Upper North and Warm Springs timber sales would cover 2,000 acres, including roadless areas, and occur right over two maintained recreation trails. The Mount Bailey Inventoried

Roadless Area has declined in size from 20,300 in 1979 to 18,627 due to road building for logging. The Umpqua National Forest Plan (US Forest Service 1990) calls for an additional 11,200 acres to be logged, leaving 7,427 acres of which approximately 4,500 acres are not forested.

The US Fish and Wildlife Service (1996) estimated that at 1996 harvest rates, all of the late-successional and old-growth forests of Matrix designation in the Umpqua National Forest would be cut within 68 years. In 1998, they revised that estimate to 76 years based on FY 1998 to FY 2002 planned harvests (US Fish and Wildlife Service 1998). Even if harvest rates continue to decrease in the short-term, the late-successional and old-growth forests of the Medicine Mountain area would be either be gone within a century or fragmented and isolated to the point where many of their essential features would cease to function.

Populations of accidentally introduced Tui chub have exploded in the lakes and rivers of the upper Umpqua River drainage. To combat such a situation in the 1950's, the chemical rotenone was applied to Diamond Lake, killing all fish species in the lake. The lake was then restocked. Plans are being prepared for another rotenone application to Diamond Lake.

The hydroelectric plant on the Umpqua River at Soda Springs is currently being reviewed for relicensing. Recommendations will likely be made for installation of a fish ladder or removal of the dam (F. Eatherington, pers. comm.) to restore access to the Fish Creek Watershed for anadromous fish. The hydroelectric facilities in the Medicine Mountain area use channeled water diverted from streams to generate electricity. The water channels that feed the power plant are concrete lined.The wide, fast-moving water creates a barrier to movement for many small wildlife species. Petitions have recently been made to cover the channels and provide movement pathways for wildlife (F. Eatherington, pers. comm.)

Other threats include development of a geothermal lease of 200 acres on the south side of Mount Bailey, development of a destination ski resort on Mount Bailey (project recently stalled because of trouble securing funding for an environmental impact statement). Several active mining claims are in the proposed National Monument, but mining activity has not historically been intense.

Conclusion

This report provides scientific evidence demonstrating the need for the Medicine Mountain area to be protected and preserved as a national monument under the Antiquities Act due to the unique geology, geomorphology, landscape ecology, biology, and cultural history. Designation of the Medicine Mountain area as a national monument would retain the integrity of not only the proposed area, but the surrounding landscape as well.

Headwaters of the world-famous North Umpqua River.

The proposed Medicine Mountain National Monument will contribute to the preservation of all levels of biodiversity. Protection of the area's old-growth forests will bolster the conservation of diminishing Pacific Northwest old-growth forests, contributing to preservation of this endangered ecosystem. Protection will also come to the flora and fauna that inhabit this diverse and unique landscape. Finally, protection of the area insures landscape linkages between adjacent reserves adding robustness to the regional conservation network and aiding in the flow of genes between populations.

Franklin et al. (2000) described "biological legacies" as organisms, or ecosystems that survive through a disturbance. The old-growth forests and undisturbed areas of the proposed Medicine Mountain National Monument and the species that inhabit them should be considered biological legacies. They have survived a century that has seen much of the Pacific Northwest logged, developed, or otherwise altered. To protect this valuable yet dwindling resource, the Medicine Mountain area should be granted protection as a national monument.

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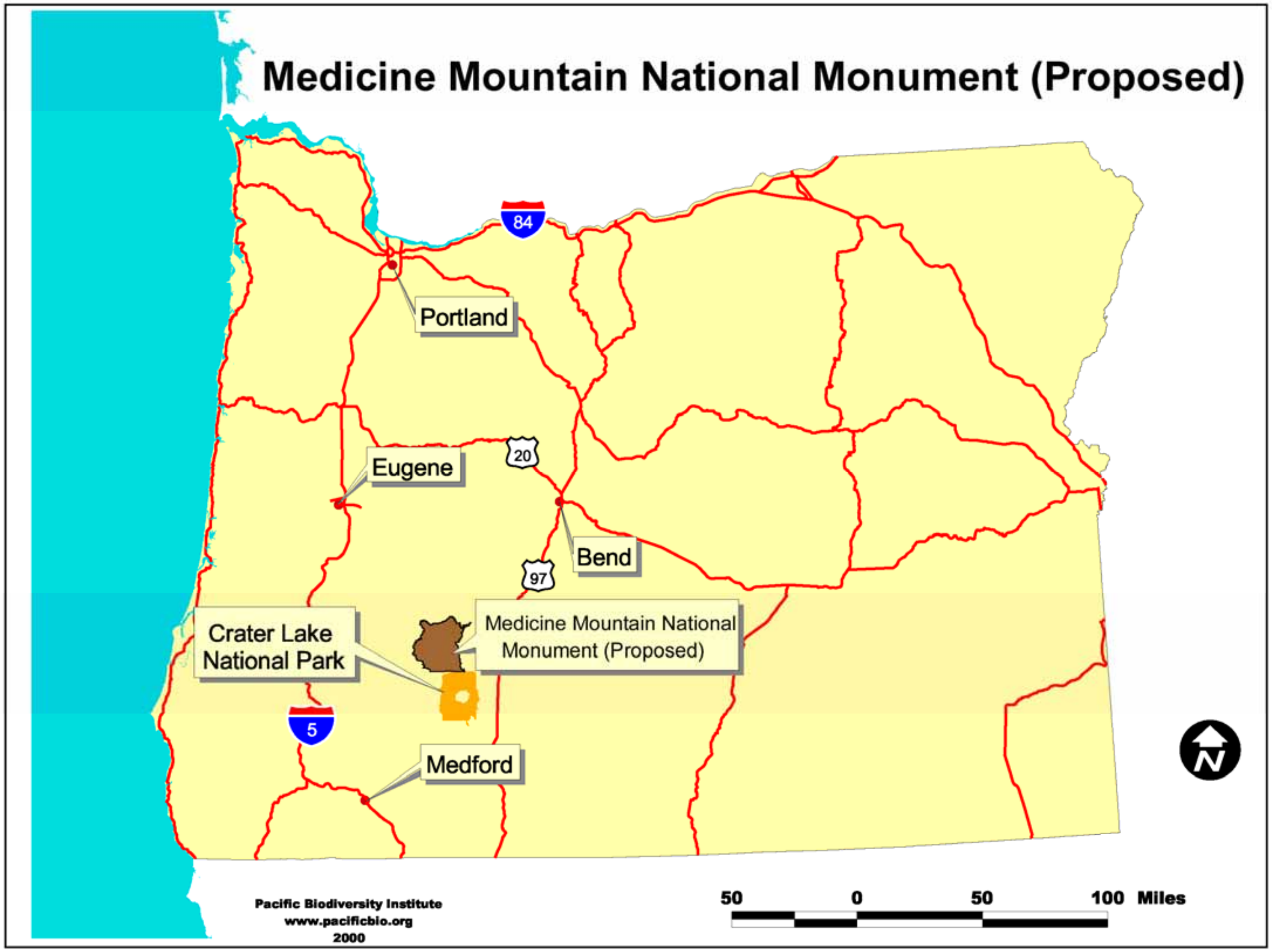

Figure 1. The proposed Medicine Mountain National Monument is north of Crater Lake National Park, in the Oregon Cascade Mountains

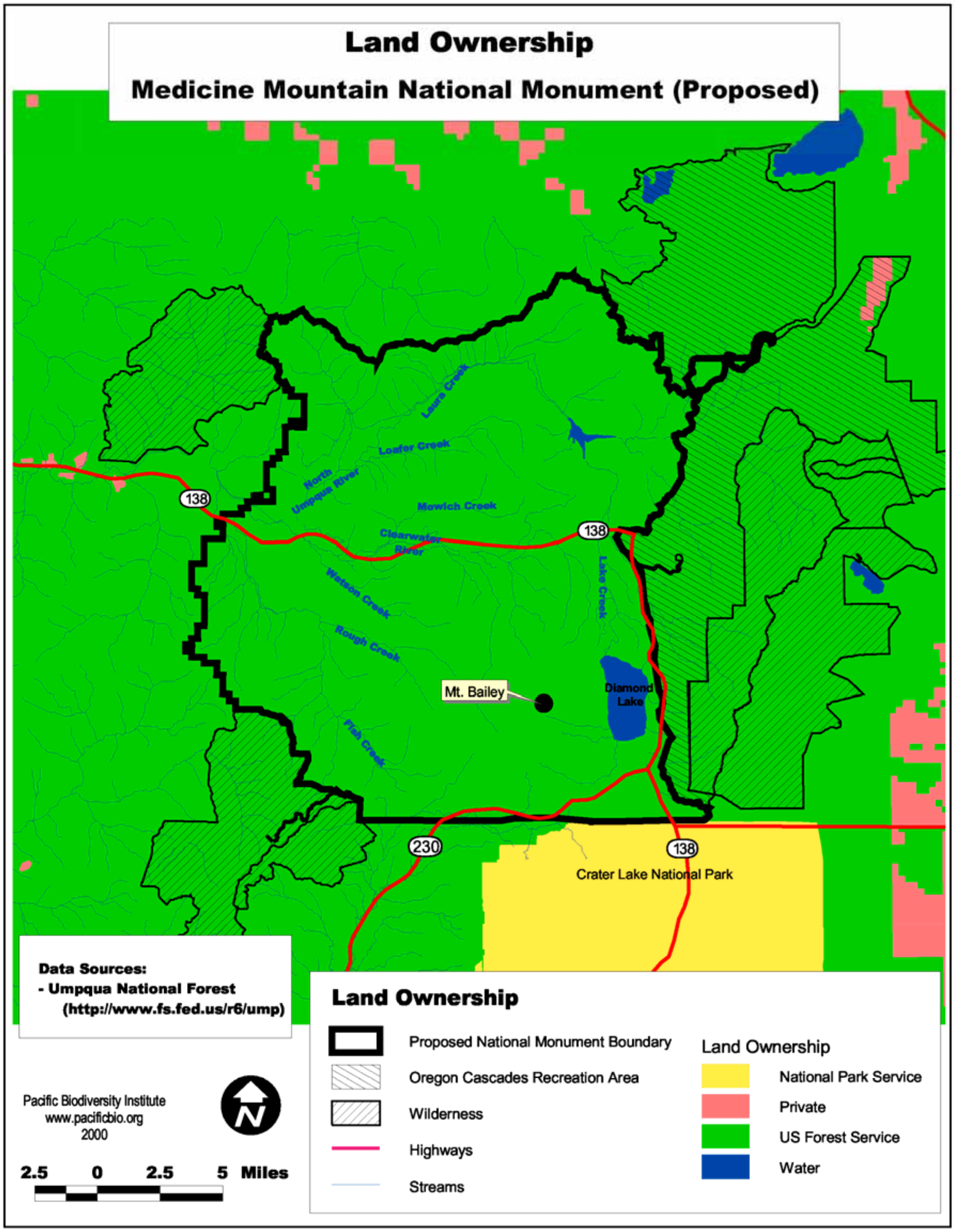

Figure 3. The proposed Medicine Mountain National Monument is entirely within US Forest Service Land. The majority of the area is in the Umpqua National Monument, with a small portion of the southern boundary extending into the Rogue River National Forest. The proposed Monument is bordered by Wilderness Areas, the Oregon Cascades Recreation Area, and Crater Lake National Park.

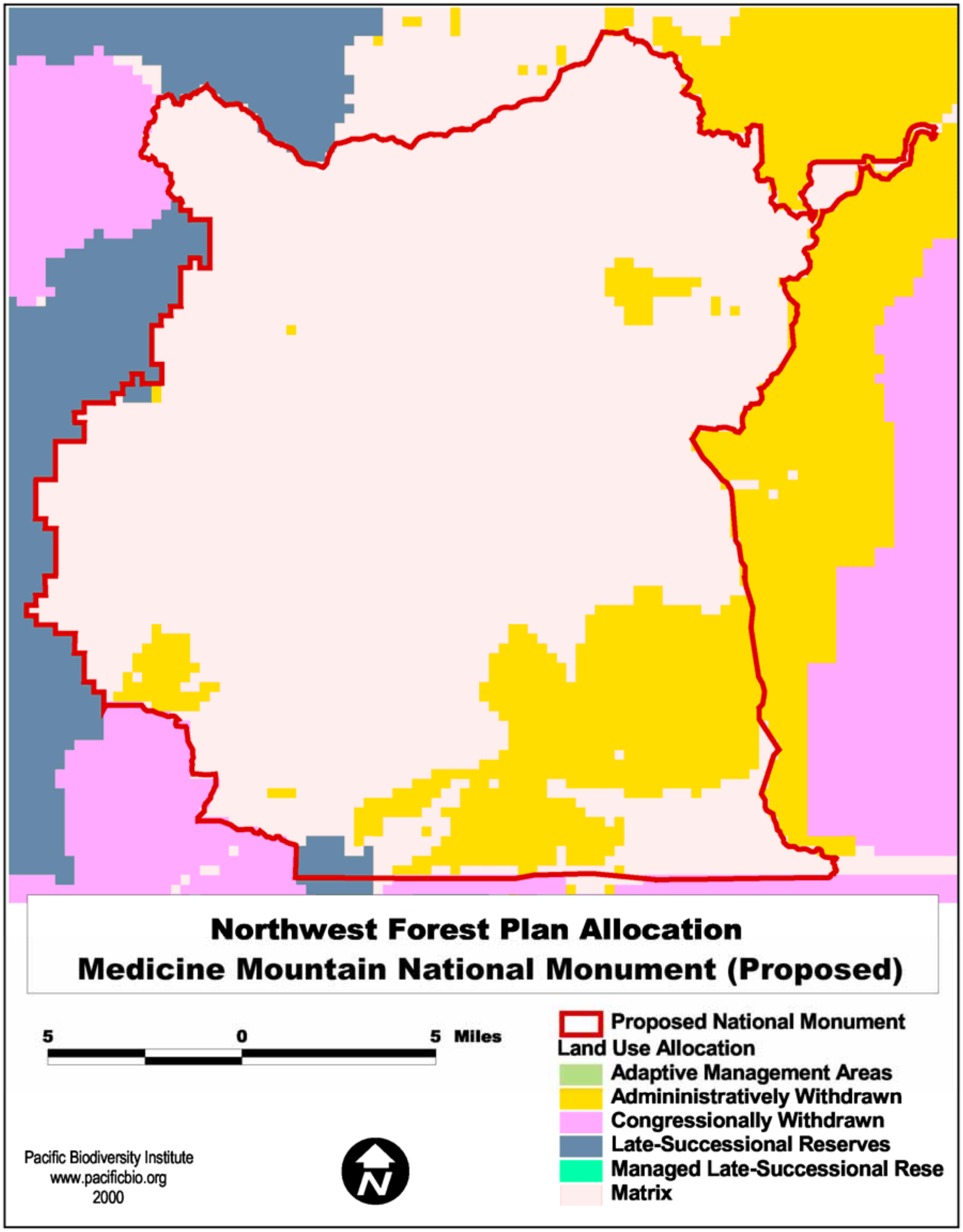

Figure 4. Management designations for the proposed Medicine Mountain National Monument under the Northwest Forest Plan.

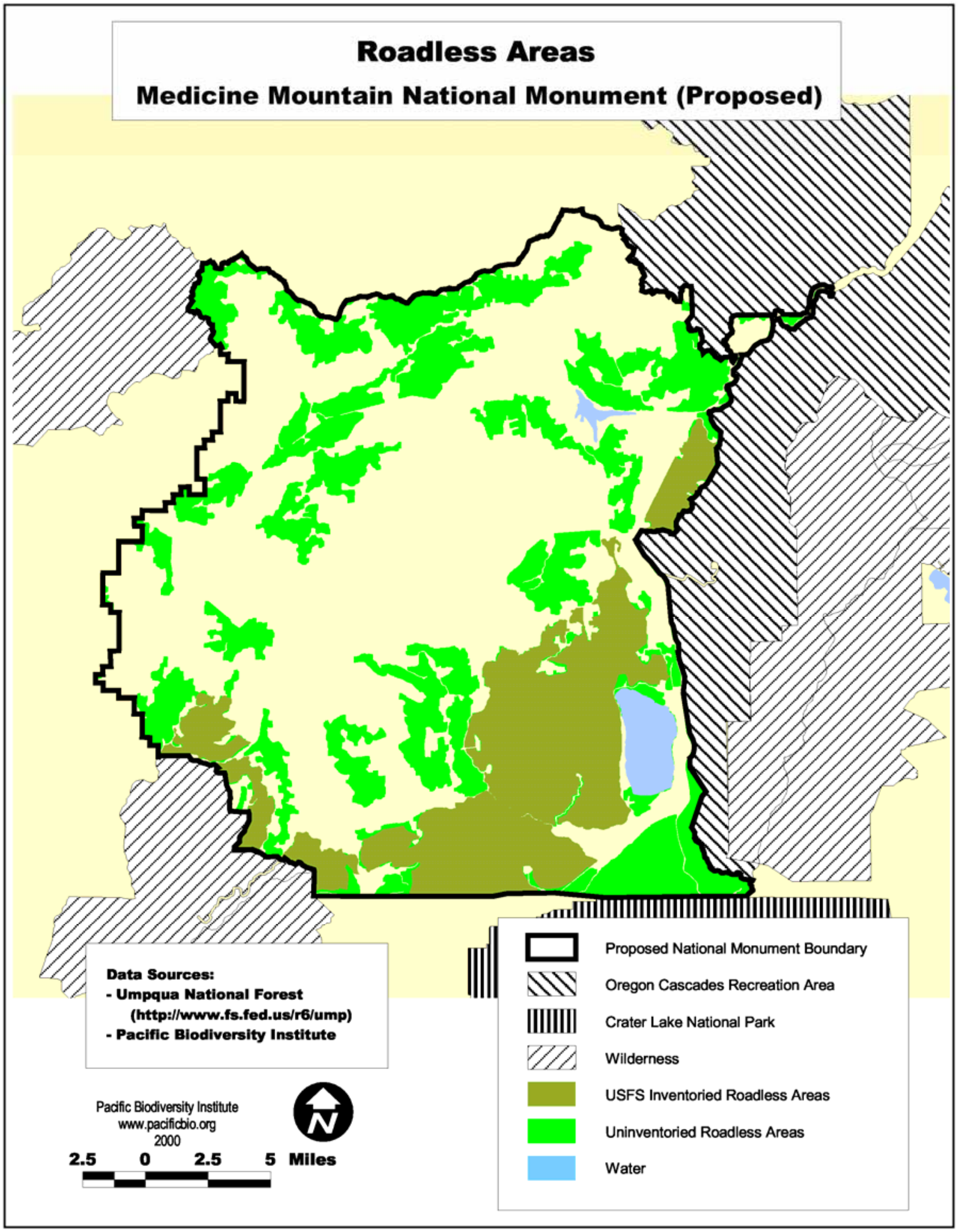

Figure 5. US Forest Service Inventoried Roadless Areas and uninventoried roadless areas in the proposed Medicine Mountain National Monument.

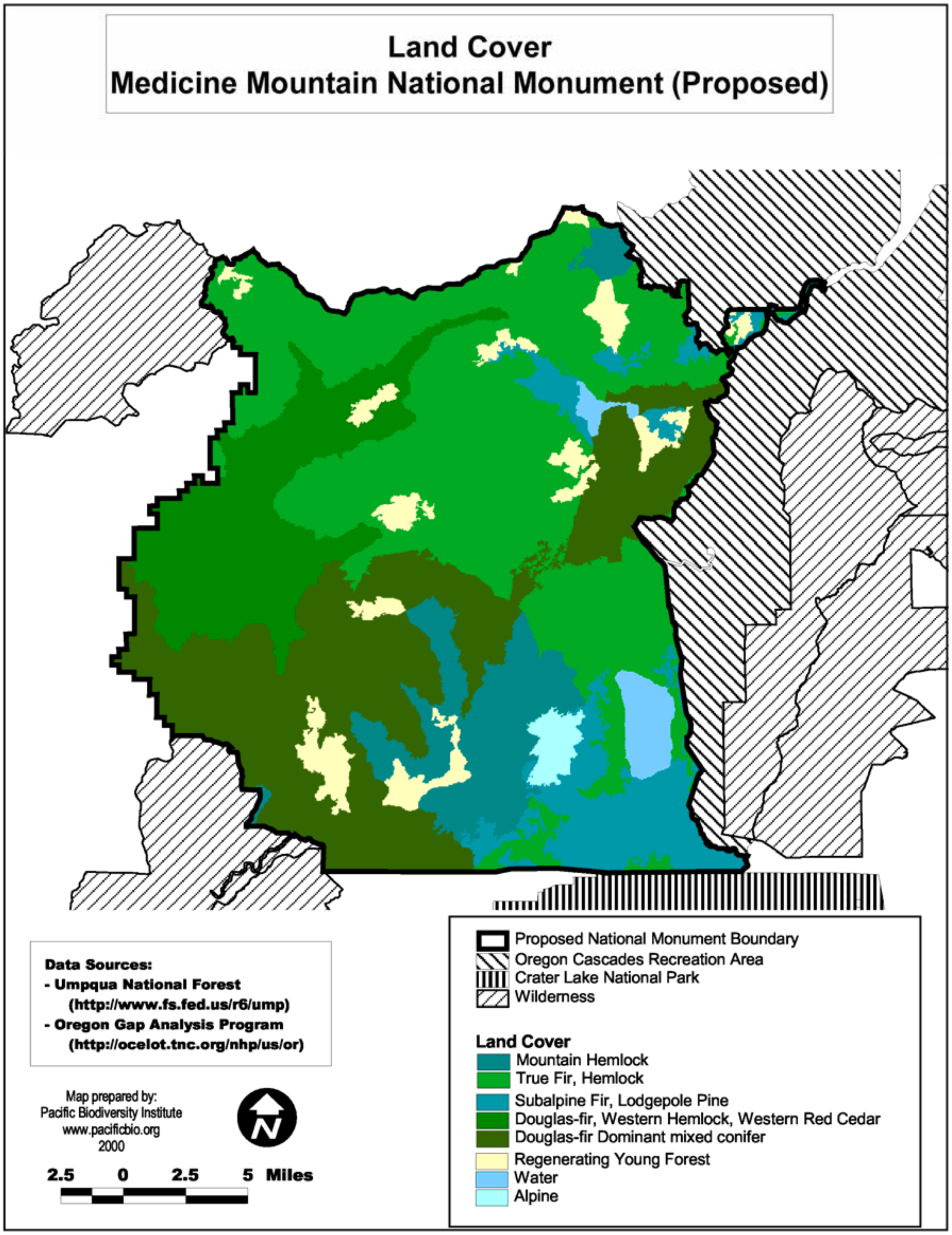

Figure 6. General land cover for the proposed Medicine Mountain National Monument.

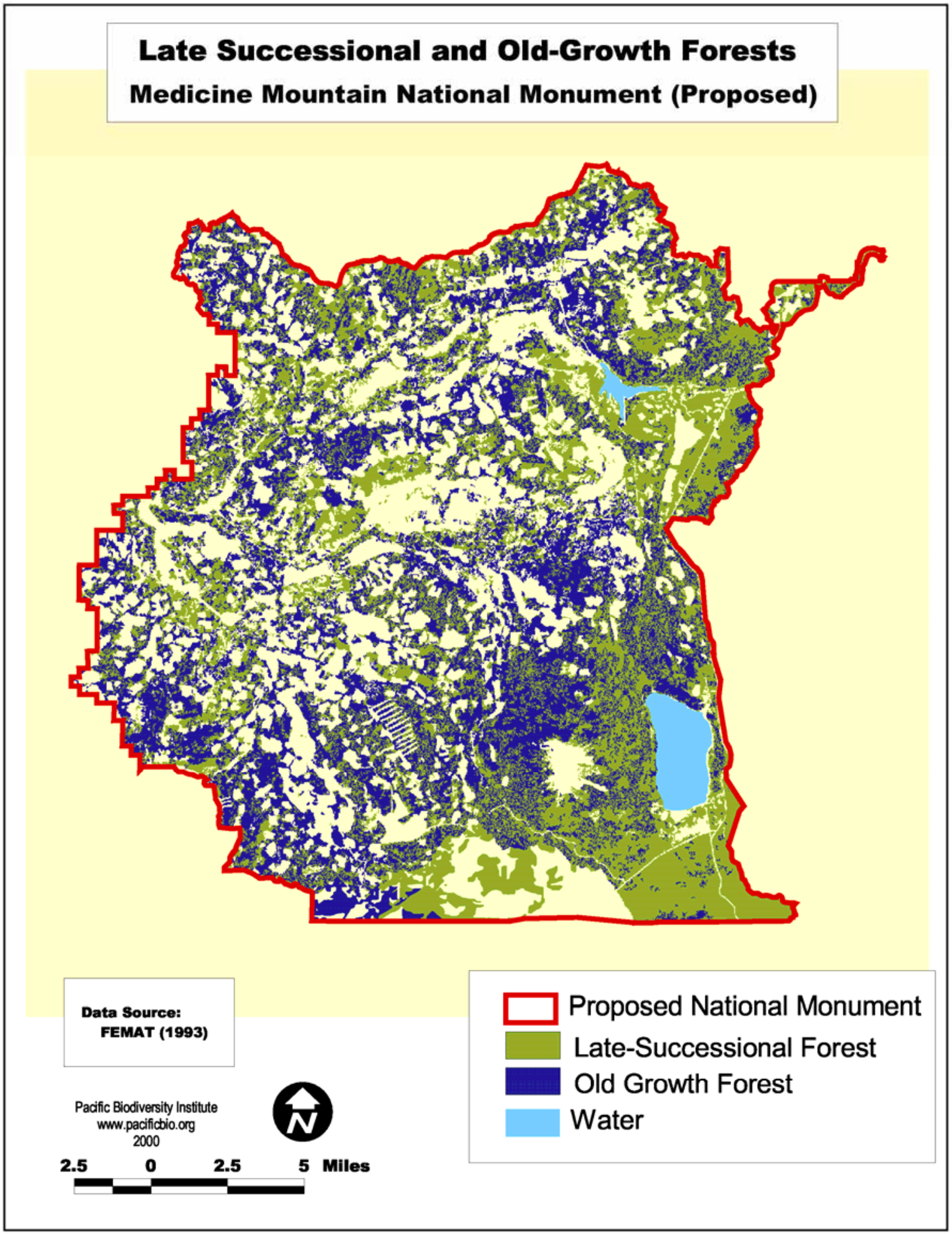

Figure 7. Late-successional and Old-growth forests in the proposed Medicine Mountain National Monument as mapped by FEMAT (1993).

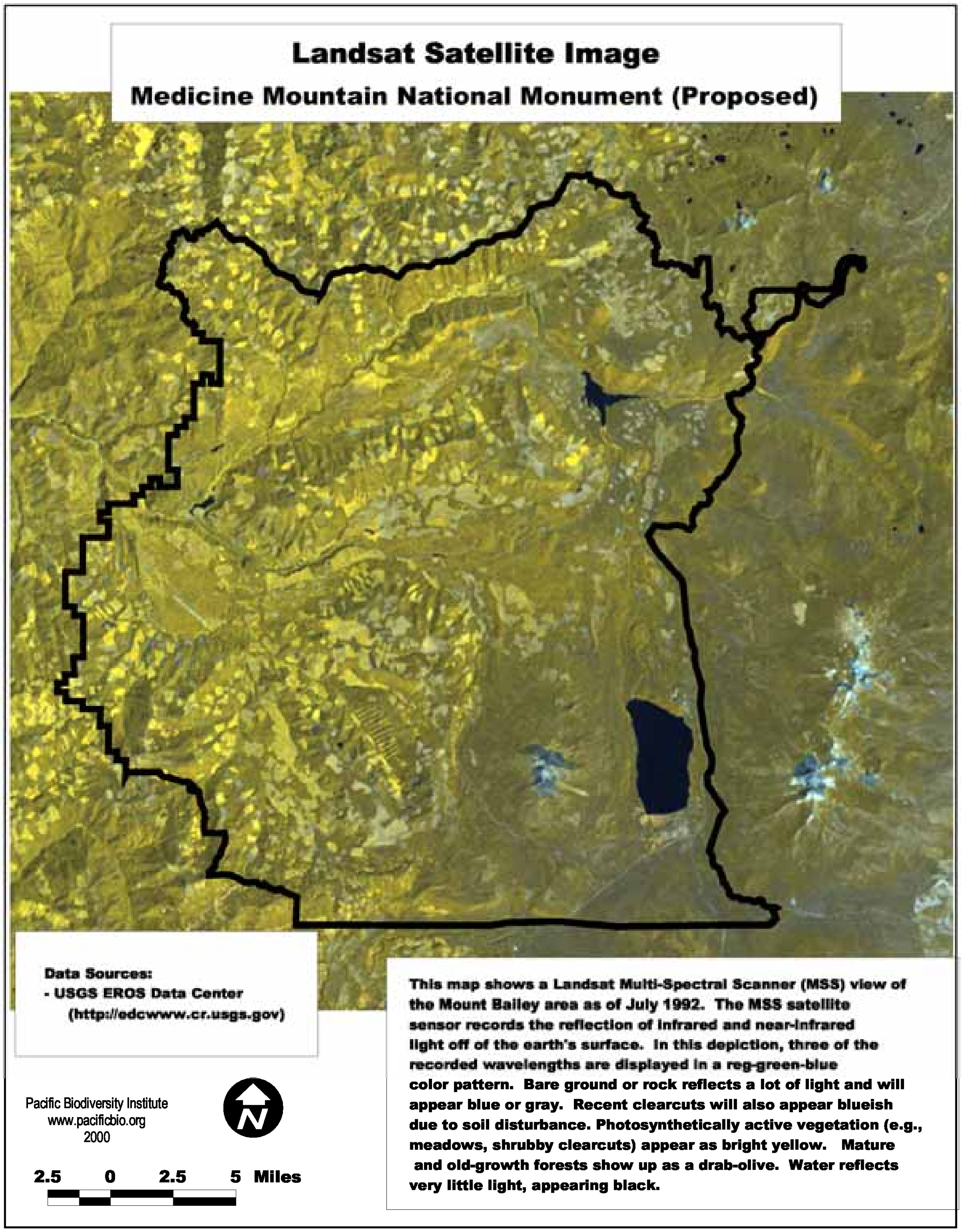

Figure 8. A view of the proposed Medicine Mountain National Monument from the Landsat Multispectral Scanner (MSS) satellite. This satellite image was taken in 1992.

OWNWERSHIP AND MANAGEMENT

Description: "The Mt. Bailey Roadless Area is located in Eastern Douglas County, approximately six miles north of Crater Lake National Park, and directly west of Diamond Lake."

Location: Mount Bailey Roadless Area

Source: USDA Forest Service. 1990. p. 128

Description: "The Mt. Bailey Roadless Area is located in the High Cascades geological province. Mt. Bailey, at 8,363 feet is the highest point. Bear Creek at 4,200 feet is the lowest elevation. Much of the area is steep, moderately dissected landform with slopes exceeding 40 percent. Vegetation is diverse with four loosely defined forest zones represented. These zones are characterized by their primary tree species: Douglas-fir, lodgepole pine, mountain hemlock-Shasta red fir, and subalpine fir-mountain hemlock."

Location: Mount Bailey Roadless Area

Source: USDA Forest Service. 1990. p. 128

Description: "Mt. Bailey is the largest tract of unroaded land which is not currently designated as Wilderness on the Forest. … Lake Creek, the only outlet of Diamond Lake is a major fishery."

Location: Mount Bailey Roadless Area

Source: USDA Forest Service 1990, p. 128

Description: "The area possesses a high degree of natural integrity. . . most ecological processes have been allowed to occur naturally."

Location: Mount Bailey Roadless Area

Source: USDA Forest Service 1990, p. 130

Description: "The removal of 1,043 acres and downgrading or degradation of 1,453 acres of suitable spotted owl NRF habitat in FY 1998.... At this rate it will take 76 years to impact the remaining unprotected currently suitable NRF habitat in the action area."

Location: Entire Area

Source: US Fish and Wildlife Service Biological Opinion 1998

Description: "The collective impacts of the actions proposed in the FY 1996 biological assessments... will result in the loss of approximately 2,983 acres of the remaining 161,812 acres of unprotected suitable spotted owl habitat within the matrix... Therefore, if 2,384 acres of matrix habitat per year were cut, it would take 68 years to cut 100 percent of... unprotected suitable spotted owl habitat in the matrix."

Location: Entire Area

Source: US Fish and Wildlife Service Biological Opinion 1996

GEOLOGY AND GEOMORPHOLOGY

Description: "Plate tectonic processes which have occurred within the Cascadia province have resulted in the highly diverse landscapes seen today. The deeply eroded and weathered Western Cascades, and the striking peaks and highlands of the High Cascades physiographic subprovinces are both represented within the analysis area."

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. 1998, p. 15

Description: "The volcanic deposition of the Western Cascades began about 40 million years ago and underwent numerous periods of deposition and erosion which resulted in a series of peaks, ridges and valleys. It is assumed that the ancestral North Umpqua valley was developed during this period. About 5 million years ago, the rock assemblage presently known as the Western Cascades was subjected to accelerated and differential uplift throughout the province. As a result, drainage systems became deeply entranched, creating a highly dissected mountainous landscape."

Location: Diamond Lake Ranger District

Source: Michaels, N. et. al. 1998, p. 15

Description: "The volcanic activity about 1 million years ago is typically considered the beginning of the High Cascades rock assemblage. These rocks are believed to be in contact with the older Western Cascades along a predimonantly north-south orientation. The Rouge Fault…is the identifiable boundary just west of the analysis area. The construction of a number of composite volcanoes such as Mt. Thielsen and Mt. Bailey predominated the landscape during this period."

Location: Diamond Lake Ranger District

Source: Michaels, N. et. al. p. 15

Description: "The glacial events of the past 1-2 million years affected topographic features in both erosional and depositional environments. The Western Cascades in the Upper

North Umpqua show evidence of glacial erosion, however the more predominant features are glacial deposits, typically as till on the mid-upper slopes of the ridges. About 7,000 years ago, the formation of the caldera associated with the eruption of another composite volcano, Mt. Mazama, resulted in the deposition of unconsolidated tephra (pumiceaous material) over a widespread area."

Location: Diamond Lake Ranger District

Source: Michaels, N. et. al. p. 15

Description: "Several significant features in the Lemolo / Diamond Lake area are associated with the basaltic andesite terrain. Most noticeable of these is the east flank of Mt. Bailey, as well as Rodley Butte and Hemlock Butte which are all located on the western side of the analysis area. These lava deposits are thought to be some of the younger rocks in the high Cascades based on limited glacial erosion and scattered age dating."

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 17

Description: "...The role of these units associated with groundwater storage and transport is not well understood, other than the general acceptance that these units have a high permeability and porosity which lends itself to rapid infiltration and low release. The enormous contribution of these rocks to the North Umpqua River has been suggested for a number of years, however little research has occurred to quantify the assumptions. Sherrod, in his dissertation, suggested that the thickness of these deposits may exceed 1200 meters in the vicinity of Mt. Thielsen. Even with half this thickness, the amount of available storage for groundwater would be substantial."

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 17

Description: "A large area to the north and east of Diamond Lake is overlain by an air-fall tephra deposit... (Pumice) are associated with volcanic events which led to the formation of the Crater Lake Caldera. This deposit thickens rapidly to the southeast and buried much of the underlying rock units to depths in excess of 20 meters (Sherrod 1986, Bacon 1983).... The largest fragments exceed 15 cm, however the average is 2-4 mm and is often termed popcorn pumice. Although this Surficial Deposit covers less than 25 percent of the analysis area, its importance in the groundwater hydrology is believed to be substantial."

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 18-19

Description: "Immediately after the air-fall events, the eruption of ash-flow deposits occurred.... These pyroclastic flow deposits form the floors of the valleys and the sharp contact of the deposits along the valley walls suggest that they were controlled by topography during the depositional period. The deposits in the vicinity of Diamond Lake ponded to depths of 12 meters...”

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 19

Description: “...the importance of the contribution of groundwater to the North Umpqua River from this area has been recognized for years... the water regime is predominantly controlled by groundwater...”

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 20-21

Description: “Although the total stream miles on these landscapes is low the extensive springs that emerge along the margins of these glacial deposits area a significant source of the total flow of the North Umpqua River. The Spring River emanates from a contact of Ash Flow deposits and Glacial Outwash near the mouth of Lake Creek and provides a large contribution, particularly during the summer and fall. On the upstream side of Lemolo Lake, a number of large springs coalesce and are known as Crystal Springs. These are unique in that the flow appears to be influenced by the abutment of the Mazama Ash Flow and are forced to flow east to join the North Umpqua River above Lemolo Lake.”

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 21

Description: “Under the inventory system developed in the LRMP, about 33 percent of the analysis area is underlain by aquifer terrain. From a geomorphic perspective it is estimated that upwards of 75 percent would be included.”

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 21

Description: “The soil parent material of the watershed is derived from a mix of glacial activity and volcanic eruptions, most notably from Mount Mazama. The surface of almost all of the soils is covered by either air-fall ash or pyroclastic flow from Mazama. [now called Crater Lake National Park].”

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 21

Description: "The sandy texture of the watershed's soils allow for a high rate of infiltration in their natural state... The high rate of infiltration prevents surface flow that could cause erosion of these non-cohesiveness soils. Unfortunately, some past practices may have decreased the high rates of infiltration through compacting the soil of harvest units. Compaction of the soil occurred with ground-based harvesting... most noticeable in the units harvested before the 1970s. Certain harvest sites show signs of excessive alteration... these units show compaction that has remained after 30 years. The disturbance begins four inches below the mineral surface of the soil and extends down to the profile 12 inches."

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 23

Description: "Diamond Lake is a large, relatively shallow lake bounded by Mt. Thielsen to the east and Mt. Bailey to the west. The lake bathymetry is highly regular, reaching a maximum depth of 15.8 m (52 ft) in the north central portion of the lake with a mean depth of 7.3 m (24 ft)..."

Location: Diamond Lake, Lemolo Lake Watershed

Source: Michaels, N. et. al. p. 37

Description: "The Upper Clearwater Watershed is characterized by three distinct geologic assemblages. Sherrod (1986) discussed these in terms of the Western Cascades, High Cascades, and Surficial Deposits."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 13

Description: "There are two distinctly different geologic units that make up the Western Cascade in this area. The andesite rocks (Tla) encompass three percent of the watershed and are associated with the topographic feature known as Watson Ridge. This rock was emplaced between 26 and 20 million years (my) ago based on correlations made by Sherrod (1986)… Approximately 11 percent of the area is underlain by the rock unit Twb, a basalt that was deposited between 9 and 17 my ago. This basalt abuts up against the andesite and extends beyond the analysis area to the north as far as Dread and Terror Ridge. Two areas within the Clearwater are dominated by this rock unit and are similar in drainage density and erosional process. They are Trap Mountain, west of Bear Creek and Elephant Mountain near the head of Mowich Creek."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 14-15

Description: "The rocks associated with the High Cascades in this area can be defined as lava flows with pyroclastic deposits in localized areas. These lava flows are associated with the development of young volcanoes such as Mt. Bailey, as well as older vents like Garwood Butte."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 15

Description: "A complex of basaltic andesite that extends along the west slope of Bear Creek is identified as Qtba (three percent) and is about one to two my old. This rock originated from a vent complex associated with Garwood Butte and apparently flowed down the ancestral Bear Creek Drainage."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 15

Description: "Another feature associated with this basalt as well as other lava units in the High Cascade is the storage and recharge capacity that affects runoff rates. These porous and permeable lava flow units act as large reservoirs, capturing snowmelt and systematically releasing water at more uniform rates that extend into the summer season via and extensive network of streams."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 15; Ingebritsen et al. 1994

Description: "A series of vent exposures identified as Qtmv are a small but important component of the geologic record. These are the features that served as the predominant source of the lava flows seen in the basin and were used by native Americans for vision quests. Rodley Butte and Garwood Butte are two noticeable examples of this rock unit and tend to be steep sided topographic promontories with little soil development."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 15

Description: "A predominant visual feature in the Clearwater Watershed is Mount Bailey. Bedrock adjacent to the peak is young andesite identified as Qya, which is probably some of the youngest volcanic lavas in the area… Unlike Mt. Thielsen, Mt. Bailey has been subjected to only minor glaciation that predominated the landscape 25,000 to 12,000 years ago."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 16

Description: "Much of the analysis area is covered by unconsolidated alluvium and colluvium or slightly indurated glacial till deposits."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 16

Description: "The primary deposits associated with the tephra eruptions of Mt. Mazama (Qaf) encompass 16 percent of the analysis area. This material is primarily unsorted white ash with pumice lapilli and bombs up to 40 cm in size. The pumice was deposited as a pyroclastic ash-flow event associated with the eruption of 40 to 50 km^3 of material."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 17

Description: "Bear Creek is associated with the trace of the Rogue River Fault (Barnes 1978) and has been suggested at the boundary between the High Cascade and Western Cascade sub-provinces."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 18

Description: "While there are no indications of movement alone this fault in the past 15 my, it still controls the development of the Bear Creek drainage."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 18

Description: "The Clearwater River is kept cool by groundwater near 40 degreed Fahrenheit (40F). When the North Umpqua below Steamboat is 65F in July and August, and its tributaries are 65-75F, the Clearwater might reach a maximum of 50F."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 24

Description: "The Fish Creek Watershed Analysis Area is situated within a broad transition zone that separates the Western and High Cascades physiological subprovinces."

Location: Fish Creek Watershed

Source: USDA Forest Service. 1999a, p. 16

Description: "Erosional processes exerted a more dominant role in shaping the physical appearance (physiography) of the Fish Creek Watershed Analysis Area as constructional volcanism gradually began to wane in the ancestral Cascades approximately 12.4 million years ago."

Location: Fish Creek Watershed

Source: USDA Forest Service. 1999a, p. 16; Sherrod 1986

Description: "A lattice of three dimensional interconnecting fractures and joints within these lava flows act as a vast reservoir that stores and uniformly dissipates groundwater, providing for cold temperature late season stream flows into the North Umpqua River. These 'aquifer-bearing' lava flows contribute immensely to the outstanding water quality of the North Umpqua River (Ingebritsen et al. 1994)."

Location: Upper North Umpqua River Watershed

Source: USDA Forest Service. 1997, p. 18; Ingebritsen et al. 1994

Description: "In general, the pumice and ash tephra become increasingly thicker towards the southeastern end of the watershed, as this area lies within the influence of the main ash plume during the climatic eruptions [of Mount Mazama] (Sherrod 1991)."

Location: Upper North Umpqua River Watershed

Source: USDA Forest Service. 1997, p. 18; Sherrod 1991

VEGETATION

Description: "Seven plant series are represented within the watershed. They include the Western Hemlock, Mountain Hemlock, Douglas-fir, White Fir, Pacific Silver Fir, Shasta Red Fir, and Lodgepole Pine plant series. Generally, the Western Hemlock, White Fir and Douglas-fir Plant Series occur below 4,500 feet in elevation and the Pacific Silver Fir, Shasta Red Fir, Lodgepole Pine, and Mountain Hemlock Plant Series occur above 4,500 feet in elevation"

Location: Clearwater River Watershed, Diamond Lake/Lemolo Lake Watershed

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Source: USDA Forest Service. 1996. p. 28; Michaels, N. et. al. 1998, p. 73

Description: "There are two large areas (greater than 4,000 acres) of unfragmented late seral stage forest located in the eastern central and southeastern sections of the watershed."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 31

Description: "Riparian associated plant communities vary from the wet meadow complexes of Old Man Camp, Toolbox Meadows, and Stump Lake to the early, mid, and late seral stage forests along the Clearwater River, Bear Creek, Mowich Creek, Trap Creek, Lava Creek, and their tributaries."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 31

Description: "A sensitive plant is present *Haplopappus whitneyi ssp. Discoideos*. It grows above timberline on the rock slopes of Mt. Bailey."

Location: Mount Bailey Roadless Area

Source: USDA Forest Service 1990. p. 130

Description: "There are six Sensitive plant species documented to occur within or immediately adjacent to the Lemolo-Diamond Lake Watershed. These are *Allium campanulatum, Arnica viscosum, Asarum wagneri, Haplopappus whitneyi, Mimulus jepsonii, Utriculatia minor*. In addition, the following sensitive plant species may also occur within this watershed: *Arabis septentrionale, Astragalus umbraticus, Botrychium pumicula, Calamagrostis breweri, Campanula scabrella, Collmia mazama, Cimifuga elata, Cypripedium fasciculatum, frasera umpquensis, Fritillaria glauca, Gentiana newberryi, Hieracium bolanderi, Iliamna latibracteata, Lewisia columbiana, Lewisia leana, Owypolis occidentalis, Romanzoffia thompsonii*."

Location: Diamond Lake/Lemolo Lake Watershed

Source: Michaels, N. 1998. p. 76

Description: " This are of over 100 acres has been identified as a special interest area by the LRMP for botanical interest. It has a number of large incense cedar trees growing in a stand. There are no facilities at this location. It is located in the southwest corner of the analysis area."

Location: Fish Creek Watershed

Source: USDA Forest Service. 1999a. p. 145

Description: "Demo vegetation species – unit #2

Atrichum selwynii
Aulacomium androgynum
Barbula convoluta
Brachythecium asperrimum
Bryum capillare
Brychythecium hylotapetum
Brychythecium salebrosum
Gnaphalium purpureum
Goodyera oblongifolia
Habenaria unalascensis
Hieracium albiflorum
Horkelia fusca
Hypericum formosum
Hypericum perforatum

Brychythecium velutinum
Cephalozia bicuspidata
Cephalozia lunulifolia
Ceratodon purpureaus
Claopodium bolanderi
Dicranum sp.
Dicranum fuscescens
Dicranum howelii
Dicranum scoparium
Dicranum tauricum
Eurhychium oreganum
Eurhynchium praelongum
Homalothecium fulgescens
Homalothecium megaptilum
Hypnum circinale
Hylocomium splendens
Hypnum subimponens
Isopterygium seligeri
Isothecium stoloniferum
Leucolepis menziesii
Lepidozia reptans
Lescuraea stenophylla
Mnium spinulosum
Neckera douglasii
Orthotrichum affine
Orthotrichum consimile
Orthotrichum lyallii
Orthotrichum speciosum
Plagiothecium curvifolium
Plagiomnium medium (Ch spelling)
Porella condeana
Polytrichum juniperinum
Porella navicularis
Ptilidium californicum
Radula complanata
Rhizomnium glabrescens
Rhytidiadelphus loreus
Rhytidiopsis robusta
Rhytidiadelphus triquetrus
Riccardia multifida
Scapania bolanderi
Abies concolor
Achillea millefolium
Achlys triphylla
Adenocaulon bicolor
Anemone deltoidea
Linnaea borealis
Listera caurina
Lonicera ciliosa
Lotus micranthus
Lotus purshianus
Madia gracilis
Melica subulata
Osmorhiza chilensis
Pedicularis racemosa
Pinus monticola
Polystichum munitum
Prunella vulgaris
Pseudotsuga menziesii
Pyrola picta
Pyrola secunda
Rhamnus purshiana
Rubus nivalis
Rubus ursinus
Satureja douglasii
Senecio jacobaea
Smilacina stellata
Solidago canadensis
Symphoricarpos mollis
Synthyris reniformis
Taxus brevifolia
Tiarella trifoliata
Tiarella trifoliata unifoliata
Trientalis latifolia
Trillium ovatum
Tsuga heterophylla
Vancouveria hexandra
Viola glabella
Viola spp.
Viola orbiculata
Alectoria imshaugii
Alectoria sarmentosa
Bryoria capillaris
Bryoria fremontii
Bryoria fuscescens
Cetraria canadensis
Cetraria orbata
Cladonia spp.
Cladonia chlorophaea
Cladonia fimbriata
Cladonia ochrochlora
Cladonia pyxidata

Anaphalis margaritacea
Asarum caudatum
Berberis nervosa
Castanopsis chrysophylla
Carex spp.
Campanula scouleri
Chimaphila menziesii
Chimaphila umbellata
Circaea alpina
Cirsium canescens
Cirsium remotifolium
Cirsium vulgare
Clintonia uniflora
Cornus canadensis
Cypripedium montanum
Disporum hookeri
Elymus glaucus
Epilobium angustifolium
Festuca occidentalis
Festuca subulata
Festuca subuliflora
Fragaria vesca
Galium oreganum
Gaultheria ovatifolia
Galium triflorum
Cladonia squamosa
Cladonia transcendens
Hypogymnia imshaugii
Hypogymnia inactiva
Hypogymnia metaphysodes
Hypogymnia occidentalis
Hypogymnia physodes
Letharia vulpina
Lobaria pulmonaria
Nephroma bellum
Nephroma helveticum
Nephroma parile
Nephroma resupinatum
Parmeliopsis ambigua
Parmeliopsis hyperopta
Parmelia sulcata
Peltigera collina
Peltigera leucophlebia
Platismatia glauca
Platismatia herrei
Pseudocyphellaria anthraspis
Pseudocyphellaria anomala
Usnea sp.

Location: Upper Clearwater River Watershed

Source: USDA Forest Service 1996

FISH AND WILDLIFE

Description: "The Clearwater River contains a simple fish community as compared to many North Umpqua River tributaries downstream from Soda Springs dam. This is primarily due to the lack of connectivity to the North Umpqua River mainstem, the resultant lack of access by fluvial and anadromous species, and the cold water temperatures of the Clearwater River system."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 33

Description: "Three species of fish are currently known to inhabit the Clearwater River system. Ranibow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) inhabit the river mainstem and some of the tributaries. Brown trout (*Salmo trutta*) enter the lower river mainstem, outside of the analysis area, from Toketee Lake for spawning during the fall of the year."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 33

Description: "Anadromous fish are excluded from the Clearwater River by three barriers on the North Umpqua River mainstem: Soda Springs dam, Toketee Falls, and Toketee dam."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 33

Description: "Fish habitat in the Clearwater River system ranges from fair to high quality. The best fish habitat is contained in the Clearwater River mainstem and Stump Lake (created by the hydropower project)."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 33

Description: "Elk in the Upper Clearwater Watershed move between a variety of habitat types from newly harvested logging units to late successional forests, depending on food availability, weather conditions, time of year, and disturbance factors."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 37

Description: "Suitable nesting/roosting/foraging (NRF) habitat [for northern spotted owls] in the analysis area is in the northern portion, primarily the Bear Creek corridor and Mowich Park…There are seven, one hundred acre spotted owl core areas within the Upper Clearwater Watershed."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 37

Description: "With the exception of white pine blister rust, all of the insects and pathogens influencing the Upper Clearwater are native to the region. They have evolved with their hosts."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. p. 54

Description: "Two species of trout, brown (*Salmo trutta*) and rainbow (*Oncorhyncus mykiss*), and a small population of kokanee salmon (*Oncorhyncus nerka kennerlyi*) exist in Lemolo Lake." [Note: All fish in Lemolo Lake were introduced. Lemolo Lake is a reservoir as part of the North Umpqua Hydropower Development.]

Location: Lemolo Lake

Source: Michaels, N. et. al. 1998. p. 34

Description: "Diamond Lake has an abundant macrophyte population generally present in depths of 2 m to 8 m (Laurer et al. 1979). Laurer et al. (1979) reported that the community occurred as three distinct bands in which *Elodea Canadensis* was dominant from 2 to 4 m, *Potamogeton praelongis* and *E. Canadensis* were co-dominant from 4 to 6 m, and *Nitella* was dominant from 6 to 8 m. *Elodea* and *Potamogeton* are aquatic vascular plants, whereas *Nitella* is actually a macroalge related to *Chara*… The fragility of some species of *Nitella* also restrict their growth to deeper quiescent waters."

Location: Diamond Lake

Source: Michaels, N. et. al. 1998. p. 58

Description: "The macroinvertebrates in Diamond Lake are an important component of the biological community because of their role in decomposition of the detritus and as a food source for fish… The macrobenthos is represented by two distinct communities, a mid-lake community dominated by *Chironomus* spp. and oligocheates, and a more diverse littoral community comprised of *Tanytarsus* spp., amphipods, leeches, and gastropods. Macroinvertebrate densities were generally greatest in the mid-lake site, but densities fluctuated at all sites among years (Lauer et al. 1979)."

Location: Diamond Lake

Source: Michaels, N. et. al. 1998. p. 58; Lauer et al. 1979

Description: "The fisheries in Diamond Lake are comprised of two introduced species, the rainbow trout and the tui-chub. Prior to 1910, Diamond Lake was fishless."

Location: Diamond Lake

Source: Michaels, N. et. al. 1998. p. 60

Description: "Because of the high value of the fisheries to the local economy, plans are being prepared to proceed with a second rotenone application to eliminate the tui chub and restock the lake with rainbow trout."

Location: Diamond Lake

Source: Michaels, N. et. al. 1998. p. 60

Description: “Currently known [northern spotted] owl nest sites are also concentrated in the western portion of the watershed. Fifty-one, one hundred acre spotted owl core areas (unmapped late successional reserves) have been identified on the district. There are five of these core areas within the watershed and 3 other home ranges which extend into the watershed.”

Location: Diamond Lake/Lemolo Lake Watershed

Source: Michaels, N. et. al. 1998. p. 78

Description: “The only active [bald eagle] nest observed in the past year (where breeding activity occurred) was on the north side of Lemolo Lake. Nesting attempts have been made on the silent Creek nest on Diamond Lake in the past 5 years.”

Location: Diamond Lake/ Lemolo Lake Watershed

Source: Michaels, N. et. al. 1998. p. 78

Description: “The western populations of the spotted frog are listed as sensitive by the Forest Service in Region 6. It is being petitioned for inclusion on the Endangered Species List…It is usually found in or near a perennial water body such as a spring, pond, lake, or sluggish stream. It is often associated with non-woods wetland plant communities. It is found at higher elevations than most other native frog species, up to 8000 ft (Corkran and Thoms 1996)…This species has had precipitous population declines, especially at lower elevations.”

Location: Diamond Lake/Lemolo Lake Watershed

Source: Michaels, N. et. al. 1998. p. 78; Corkran and Thoms. 1996.

Description: “Rainbow trout have been introduced, but a native strain may have also been present.”

Location: Diamond Lake/Lemolo Lake Watershed

Source: Michaels, N. et. al. 1998. p. 78

Description: “Currently, the only fish species known to be present in the Fish Creek system are resident rainbow and brook trout. Brown trout may enter the lower few hundred feet of Fish Creek from Soda Springs reservoir to spawn, but this has not been documented.”

Location: Fish Creek Watershed

Source: USDA Forest Service. 1999a. p. 138

Description: "…it is believed that rainbow trout were already present in much of the system before hatchery supplementation began. It is possible that genetic alteration of the native strain has resulted from stocking practices."

Location: Fish Creek Watershed

Source: p. 138

Description: "Elk are found throughout the Watershed. The Thorn Prairie/Mountain Meadows areas are the primary winter ranges located in this watershed."

Location: Upper North Umpqua Watershed Analysis

Source: USDA Forest Service. 1997. p. 38

Description: "Suitable nesting/roosting/foraging (NRF) habitat [for northern spotted owls] is found throughout the analysis area. Currently known owl nest sites are concentrated in the northern portion of the watershed."

Location: Upper North Umpqua River Watershed

Source: USDA Forest Service. 1997. p. 38

Description: "Mature and immature [bald] eagles are commonly seen around Toketee Lake in the winter, but no nesting activity has been observed."

Location: Upper North Umpqua River Watershed

Source: USDA Forest Service. 1997. p. 39

Description: "…Amphibians, reptiles and small mammals found in the Upper North Umpqua Watershed and North Umpqua Hydroelectric Project Area."

Common Name	**Scientific Name**	**Habitat**
Tailed frog	**Ascaphus truei**	Flowing water
Pacific giant salamander	*Dicamptodon tenebrosus*	Flowing water
Northwestern salamander	*Ambystoma gracile*	Still water
Rough-skinned newt	*Taricha granulosa*	Still water
Pacific chorus frog	*Pseudacris regilla*	Still water
Northern red-legged frog	*Rana aurora aurora*	Still water
Cascade frog	*Rana cascadae*	Still water
Northwestern pond turtle	*Clemmys marmorata marmorata*	Still water
Ensatina	*Ensatina eschscholtzii*	Terrestrial
Western red-backed vole	*Clethrionomys gapperi*	Terrestrial
Pacific/Fog Shrew Complex	*Sorex spp.*	Terrestrial

Location: Upper North Umpqua Watershed Analysis

Source: USDA Forest Service. 1997. p. 39

Description: "The Upper North Umpqua River and analysis area tributaries contain simple fish communities as compared to the North Umpqua River and many tributaries downstream from Soda Springs Dam."

Location: Upper North Umpqua River Watershed

Source: USDA Forest Service. 1997. p. 39

Description: "Anadromous fish have not had access to Fish Creek since the early 1950's, when Soda Springs Dam was constructed. Once Soda Springs Dam was built, not only was access to Fish Creek by anadromous fish eliminates, but the connection to the resident and fluvial fish communities in the lower mainstem of the North Umpqua River was severed as well. If non-anadromous cutthroat trout were historically present in the lower three miles of Fish Creek, a number of factors may have contributed to their decline, but their extirpation may have been primarily caused by hybridization with rainbow trout."

Location: Fish Creek Watershed

Source: USDA Forest Service. 1999a., p. 138

Description: "Bird species counted at Stump Lake and/or Mowich Park Sites – summer of 1995.

Common Name	***Scientific Name***
Greater white-fronted goose	*Anser albifrons*
Turkey vulture	*Cathartes aura*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentiles*
Red-tailed hawk	*Buteo jamaicencis*
American kestrel	*Falco sparverius*
Osprey	*Pandion haliaetus*
Blue Grouse	*Dendagapus obscurus*
Ruffed Grouse	*Bonasa umbellus*
Mountain Quail	*Oreortyx pictus*
Wild Turkey	*Meleagris gallopavo*
Western Screech Owl	*Otus kennicotti*
Northern Saw-whet owl	*Aegolius acadius*
Northern Pygmy Owl	*Glaucidium gnoma*
Common Nighthawk	*Chordeiles minor*
Vaux's Swift	*Chaetura vauxi*
Calliope Hummingbird	*Stellula calliope*

Rufous Hummingbird	*Selasphorus rufus*
Northern Flicker	*Colaptes auratus*
Red-breasted Sapsucker	*Sphyrapicus rubur*
Hairy Woodpecker	*Picoides villosus*
Downy Woodpecker	*Picoides pubescens*
Black-backed Woodpecker	*Picoides articus*
Pileated Woodpecker	*Dyrocopus pileatus*
Olive-sided Flycatcher	*Contopus borealis*
Western Wood Pewee	*Contopus sordidulus*
Gray Flycatcher	*Empidonax Wrightii*
Dusky Flycatcher	*Empidonax oberholseri*
Pacific Slope Flycatcher	*Empidonax dificilis*
Tree Swallow	*Tachycineta bicolor*
Violet Green Swallow	*Tachycineta thalasinna*
Stellar’s Jay	*Cyanocitta stelleri*
Gray Jay	*Perisoreus canadensis*
Clark’s Nutcracker	*Nicifraga columbiana*
American Crow	*Corvus brachyshynchos*
Common Raven	*Corvus corax*
Mountain Chickadee	*Parus gambeli*
Chestnut-backed Chickadee	*Parus rufescens*
Bushtit	*Psaltriparus minimus*
Brown Creeper	*Certhia americana*
Red-breasted Nuthatch	*Sitta canadensis*
House Wren	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Rock Wren	*Salpinctes obsoletus*
Canyon Wren	*Catherpes mexicanus*
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Western Bluebird	*Sialia mexicana*
Mountain Bluebird	*Sialia currucoides*
Townsend’s Solitaire	*Myadestes townsendii*
Hermit Thrush	*Catharus guttatus*
Swainson’s Thrust	*Catharus ustulatus*
Varied Thrush	*Ixoreus naevius*
American Robin	*Turdus migratorius*
Solitary Vireo	*Vireo solitarius*
Warbling Vireo	*Vireo gilvus*
Orange-crowned Warbler	*Verimvora celata*
Nashville Warbler	*Vermivora ruficapilla*
Yellow-rumped Warbler	*Dendroica coronata*
Townsend’s Warbler	*Dendroica townsendi*
Hermit Warbler	*Dendroica ociidentalis*
Yellow Warbler	*Dendroica petechia*
MacGillivray’s Warbler	*Oporornis tolmei*

Wilson's Warbler	*Wilsonia pusilla*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Rufous-sided Towhee	*Pipilo erythrophthalmus*
Song Sparrow	*Melospiza melodia*
Chipping Sparrow	*Pizella passerina*
Dark-eyed Junco	*Junco hyemalis*
White-crowned Sparrow	*Zonotrichia leucopyhrys*
Fox Sparrow	*Passerella iliaca*
Brown-headed Cowbird	*Molothrus ater*
Western Tanager	*Piranga ludoviciana*
Pine Siskin	*Carduelis pinus*
American Goldfinch	*Carduelis tristis*
Red Crossbill	*Loxia curvirostra*
Cassin's Finch	*Carpodaccus cassinii*
Purple Finch	*Carpodascus purpureus*
Evening Grosbeak	*Coccothraustes vespertina*

Location: Upper Clearwater River Watershed

Source: USDA Forest Service 1996

Description: "Small mammals trapped at Watson Falls and Dog Prairie Demo sites 4 October – 1 November 1995

Common Name	***Scientific Name***
California red-back vole	*Clethrionomys californicus*
Northern flying squirrel	*Glaucomys sabrinus*
Oregon vole	*Microtus oregoni*
Townsend vole	*Microtus townsendii*
Longtail weasel	*Mustela frenata*
Shrew-mole	*Neurotrichus gibbsii*
Deer mouse	*Peromyscus maniculatus*
Pacific mole	*Scapanus orarius*
Pacific water shrew	*Sorex bendirii*
Pacific shrew	*Sorex pacificus*
Fog shrew	*Sorex sonome*
Trowbridge shrew	*Sorex trowbridgii*
Vagrant shrew	*Sorex vagrans*
Allen's chipmunk	*Tamias senex*
Mazama pocket gopher	*Thomomys mazama*
Pacific jumping mouse	*Zapus trinotatus*

Location: Upper Clearwater River Watershed

Source: USDA Forest Service 1996

Description: "Amphibians trapped at Watson Falls and Dog Prairie Demo Sites 4 October – 1 November 1995

Common Name	*Scientific Name*
Northwestern salamander	*Ambystoma gracile*
Clouded salamander	*Aneides ferreus*
Ensatina	*Ensatina eschscholtzi*
Pacific treefrog	*Pseudacris regilla*
Red-legged frog	*Rana aurora*
Rough-skinned newt	*Taricha granulosa*

Location: Upper Clearwater River Watershed

Source: USDA Forest Service 1996

ARCHAEOLOGIC AND HISTORIC

Description: "The Diamond Lake Ranger District currently has identified 190 prehistoric sites. Of these, 28% are cairn sires (n-53) or multi-featured sites containing cairns; 8% are peeled tree sites (n=15) or multi-featured sites containing peeled trees; 3% are rockshelters (n=7); and 1% are quarry sites (n=1). The remaining 60% of sites are lithic scatters or groundstone/lithic scatters."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1996. Appendix K, p. 2

Description: "Four prehistoric sites with pre-Mazama components have been identified on the Diamond Lake Ranger District, indicating human occupation in the upper North Umpqua drainage about 7,000 years before present."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1996. Appendix K, p. 2

Description: "The presence of multiple task sites or seasonal camps, and peeled tree sites may be an indicator of maintenance burning by Indian groups… In How High Thy Bounty, Jesse Wright tells us that the Indians burned Oak Flats and Big Camas for deer forage. Pine Bench is another example of maintenance burning. A case could be made for maintenance burning in Mowich Park… It is likely that 'park' indicates an open setting under the canopy. The name could be an indicator of another area burned for deer forage."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1996. Appendix K, p. 3

Description: "Obsidian, a volcanic rock, is a non-local lithic resource found in Diamond Lake archaeological sites as flakes tools and waste flakes. It was quarried from several sources on the east side of the Cascades and it indicates cross-Cascade trade and travel."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1996. Appendix K, p. 3

Description: "These cairn sites vary from a single identified cairn to 12-14 cairns in ¼ acre site, to an estimated 3.2 kilometers of cairns in clusters of three to twenty. Vision quest cairns usually afford views of a 'power source.' Cairn sites in the Campwood WAA have views of Mt. Bailey. Cairn sites are considered late archaic period sites."

Location: Clearwater River Drainage

Source: USDA Forest Service. 1996. Appendix K, p. 3

Description: "The Dumbo WAA survey identified eight isolate finds but no sites. Isolates included a hammerstone, obsidian flakes, a scraper/knife and biface fragment made of obsidian, a side-notched point and a basal notched point. These isolates indicate tool manufacture, hunting, and hide processing. An additional isolate, a hopper mortar base indicates plant food processing. The quantity of isolates in the Dumbo WAA suggests a high potential for the future identification of sites."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. Appendix K, p. 4

Description: "The other site [in the Mich WAA] is a rockshelter that was extensively ransacked in the 1950's. A written description of this suggests a cache site. Photographs of stolen arrowheads show Gunther barbed style, indicating Late Archaic time period. A portion of the stolen cache was recovered in 1995 and tests on these artifacts amy be able to provide additional information on this site."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. Appendix K, p. 4

Description: "The Upper Clearwater Analysis Area is located within the ethnographic territory ascribed to the Southern Molala. The language, culture and history of the Southern Molala are poorly documented."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. Appendix K, p. 4

Description: "The Southern Molala were identified as a group in 1853 by Joel Palmer, who was then the Superintendent of Indian Affairs…The actual extent of the Southern Molala homeland is unknown, but the west side of the Cascades, east of Klamath Lake, North of Crater Lake, in the upper reaches of the Rouge, South and North Umpqua Rivers and northward into Lane County was Southern Molala territory."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. Appendix K, p. 9

Description: "Due to early interpretations of language data it was once thought the Molalas were relative new comers to the west side of the Cascades, but increasing archaeological evidence now suggests the existence of and 'indigenous mountain people' (a Molala or proto-Molala population?) in the Cascades over a considerably longer period."

Location: Clearwater River Watershed

Source: USDA Forest Service. 1996. Appendix K, p. 9

Description: "The Southern Molala participated in the guardian spirit complex which was practiced by most groups in Oregon and on the Plateau. Elements included the guardian spirit quest (vision quest) and the spirit-ghost complex. This is evidenced by the quantity of cairn sites identified within their ethnographic homeland."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1996. Appendix K, p. 11

Description: "According to Indian tradition, the medicne men and priests often feasted on the summit of this mountain [Mt. Bailey] and communed with the upper world. John B. Waldo wrote in 1886 of the existence of a 'rock monument on the summit' after climbing the mountain."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1996. Appendix K, p. 11

Description: "Cairn sites are usually a stack or mount of piled rocks. Cairns may have been built for a number of reasons. Some were constructed as part of an Indian youth's vision quest, others may be trail markers, prayer monuments, or memorials. These sites are usually associated with a ridgeline or crest with a vista. A large proportion of cairn sites on the Diamond Lake Ranger District have vistas of Mt. Bailey."

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1998. Appendix C, p. 2

Description: “At peeled tree sites, Ponderosa pine trees bearing rectangular scars had the bark ‘peeled’ from the tree to allow access to the cambium layer. The pitch and cambium layer of the Ponderosa pine was used by the Indians as medicine to cure a sore throat, to treat bronchial and intestinal ailments, and to eat as a starvation food. Pine pitch also was also used as a glue and to waterproof baskets.”

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1998. Appendix C, p. 2

Description: “A mountain people with a toehold in the valleys, the Southern Molala lifeway seems to have revolved around the snows of their upland territory. In the winter they apparently lived in settlements located along streams in relatively lower elevations. They probably occupied semisubterranean houses near the snow line because deer were easier to take when they floundered in the snow or ran into snow covered pits. In spring, nuclear families moved to higher elevations ranging long distances and foraging for foodstuffs. In the summer, they went to a favored huckleberry gathering place southwest of Crater Lake. Summer houses, when necessary, probably consisted of a mat or brush huts, or rockshelters with lean-to covered entries were used.”

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1998. Appendix C, p. 9

Description: “Hunting was the mainstay of Molala subsistence. Hunting task sites dominate the prehistoric sites identified on the Diamond Lake Ranger District.”

Location: Diamond Lake Ranger District

Source: USDA Forest Service. 1998. Appendix C, p. 9

Description: “Of the prehistoric sites identified in the Fish Creek Watershed Analysis Area, 47% (n=24) are lithic scatter sites, quarries, and lithic sites with quarries. Lithic scatter sites with groundstone comprised 6% (n=3) more identified sites. No sites have been identified as lithic scatters associated with peeled trees. In addition, 18% (n=9) more identified sites were lithic scatters associated with cairns.”

Location: Fish Creek Watershed

Source: USDA Forest Service. 1999a. p. 139