IV. The Pacific Powers Area

This area of the Siskiyou National Forest consists of the Powers Ranger District, and generally the coastal drainages contained in the Gold Beach and Chetco Ranger Districts. The analysis area runs from the north at the town of Powers, along the western slopes of the Oregon Coast Mountain Range south to the California border.

Although this area has some road connections between the western and eastern portions of the Siskiyou National Forest, it is a logical roads analysis unit (see Map IV-1).

A. Background and Historical Context

A transportation system can simply be defined as a means to travel from one place to another. From the earliest prehistoric times the need for an open travel way for the movement of people and goods was essential for our survival as a species. Resource procurement was the driving factor for the development of these early pathways. Trade routes between neighboring groups allowed for the procurement of resources not locally available.

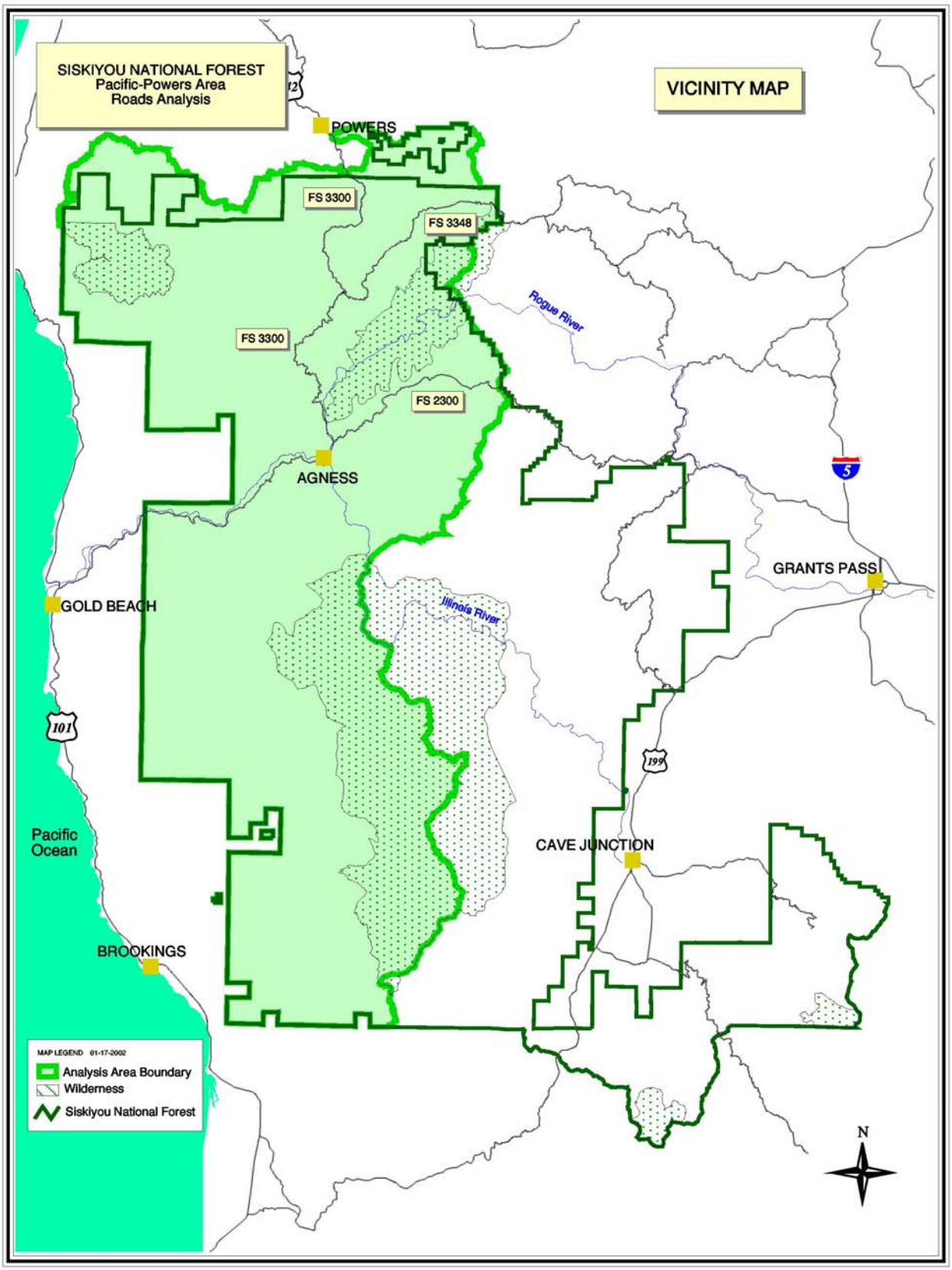
The earliest travel routes simply followed established game trails or "the path of least resistance". Later in time, adaptations appear to have changed from a moderately mobile, hunting and gathering lifestyle to more sedentary specialized economies. Travel routes became more established and, in some cases, more far reaching. "Chief" Elwin Frye, who was a Forest Service packer and descendent of early Rogue River settlers, identified many of the trails in the Pacific-Powers Roads Analysis Area as Indian travel ways.

From the early 1850s through the 1860s, Euro-American miners and settlers descended on the west slope of the Siskiyou Mountains. Most were drawn to the area by the discovery of gold in southwest Oregon in 1851, and almost all were involved in some type of prospecting activity. New routes were established to the mining districts, and used by miners and the packers that supported them to get their materials and supplies to and from the prospects. Other trails were used to drive cattle to summer pasture. Trail systems effectively linked the coastal area with the interior of the Forest, and the interior with the Rogue Valley.

With the establishment of the Siskiyou National Forest in 1906, it soon became apparent that various trails, lookouts, camps, guard stations and telephone lines would be necessary for the administration of such a large timberland. Many administrative trails were established during the first three decades of this Forest's history, often utilizing Indian trails and miners' routes. With the passing of time, many of these administrative trails were improved and expanded to create wagon roads. These same routes eventually became "jeep" trails that provided motorized access to the Forest interior.

The development of transportation systems in the Powers portion of the analysis area differed substantially from that in the Pacific Zone. The reason for this was the relatively easy route, generally following the Middle Fork of the Coquille River, which connected the interior valleys with the coast. This route avoided much of the rougher country of the Coast Range and had been in use since prehistoric times. The Coos Bay Wagon Road was established along this route as early as 1878, long pre-dating road construction in the Pacific Zone to the south.

MAP IV-1. Pacific Powers Area - Vicinity Map



The Siskiyou National Forest Map of 1911 displays a road following the South Fork Coquille River from the Coos Bay Wagon Road to the town of "Rural", later to be known as Powers. It should be noted however, that travel to the south, east and west from this point was still trail dependent.

Another important difference in development of the Powers transportation system was the advent of railroad logging. The Simpson Lumber Company built a railroad up Daniels Creek "to the base of the mountains" just after the turn of the century. Logs would be lowered down the mountain slopes using steam donkeys to the railroad tracks below. In several cases, the logs were transported on railroads to the nearest streams, where they were rafted and towed to the mills. By 1919, the railroad had reached Powers from Myrtle Point. In the ensuing years, the railroad would push towards and eventually cross in to the National Forest. Many of these railroad grades formed the basis for the future road system in this portion of the Forest.

Early road development on the west side of the Forest was in response to the need to protect the forest from wildfire, carry out administrative work, access timber, and to serve local communities and homesteaders. The Middle Elk Road was surveyed in 1917 and constructed in 1918 with help from local homesteaders and the people of Port Orford. Work was done on the Winchuck River Road in 1919, the same year that the Roosevelt Highway began to progress along the coast.

Work continued on the Winchuck River Road in 1920, the same year that the Siskiyou National Forest received its first government truck. In 1922 work began on the Sixes River Road. In 1923 money was received for the Agness-Wedderburn Road. Work on the Agness-Wedderburn Road continued in 1924 and the final 1½ miles to Lobster Creek was completed in 1925.

During the Great Depression of the 1930's, the federal government created (through New Deal Legislation) a number of programs called work-relief, to combat the effects of the poor economy. Civilian Conservation Corps camps were established in a number of locations on the west side of the Forest, and one of their major undertakings was the construction of roads and bridges. In 1930 the Chetco Road was extended to Long Ridge, and the Low Water Bridge was built across the Chetco River. The Chetco Road made the Long Ridge Guard Station the first guard station on the Siskiyou National Forest to be served by a road. A road route from Rueben Creek to Sawmill Gap was surveyed in 1931.

The Siskiyou National Forest was entering a new era with a increase of transportation for fire fighting and administrative work. In 1932 construction began on the Mt. Reuben Road from the Glendale side. A Siskiyou National Forest transportation study was also completed that year. There was an increase in road projects in 1933, with starts on the Sanger Peak, Agness-Oak Flat, Agness-Illahe, Coquille River, Pistol River, and others. Twenty miles of the Mt. Rueben Road were also constructed. In 1934 work began on the Bear Camp Road from Camp Rand. The Civilian Conservation Corps constructed the Coquille River Road, and the Illinois River Road was pushed toward Oak Flat from Agness. The Mt. Rueben Road was extended from Cold Springs to the East Fork of the West Fork of Cow Creek. The Mule Creek spur road was constructed to Marble Ledge. Work was done on the Middle Elk, French Peak, Swede Basin, and Pistol River Roads. Road building was the main improvement on the Forest in 1935 and work continued on the Bear Camp, Coquille River, and other roads in 1936.

In 1937, the Chetco Utilization Road was started and work continued on the Bear Camp Road. The two ends of the Coquille River Road (Agness-Illahe) were joined creating the first road to Agness from the outside. Work continued on the Chetco Utilization Road in 1938. In 1939 the Snowcamp-Tin Cup Road was started and work continued on the Bear Camp Road from Rand. The Almeda Road junction with the Mt. Rueben Road was roughed through in that year.

Road construction slowed in the 1940's during World War II.

In 1950, the first major post-war timber sales were held. Road building began in more of the major drainages as the demand for commercial wood production increased throughout the 1950's. By the end of the 1960's an arterial and collector transportation system provided access to the lower reaches of most major drainages. Timber sales paid for the road construction that provided access for firefighting, administrative work, and recreation. The roads were soon used for multiple purposes such as hunting, firewood gathering, berry picking, and sightseeing. By the 1970's, multiple uses of the road system moved to the forefront, and the development of higher standard roads to accommodate mixed user traffic began. Through the 1970's and 1980's, shorter spur roads were developed mainly for timber harvest, and by the early 1990's the transportation system on the west side of the Forest was nearly complete.

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B. Current Situation

1. Management Direction

Current direction for road management is found in the 1989 Land and Resource Management Plan (LRMP) for the Siskiyou National Forest, which states as one of the Forest Management Goals: "Plan, design, operate, and maintain a safe and economic transportation system to provide efficient access for the movement of people and materials involved in the use and protection of National Forest Lands" (Chapter IV, page 2). Forest-Wide Standards and Guidelines provide direction for transportation planning, road construction and reconstruction, road maintenance and road closure (pages IV-56 through IV-58).

The 1994 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (Northwest Forest Plan) amended the 1990 LRMP for the Siskiyou National Forest. This document provides direction to decommission roads in Key Watersheds (Page B-19) and restore watersheds in part through management of the road system with a variety of possible treatments including closing and stabilizing roads, upgrading roads by modifying road drainage systems to reduce the extent to which the road functions as an extension of the stream network, and reconstructing stream crossings to reduce the risk and consequences of road failure or washing out at the crossings. (Page B-31) "Road construction in Late-Successional-Reserves… generally is not recommended…"(Page C-16). In riparian reserves, "… achieve consistency in road design, operation, and maintenance necessary to attain Aquatic Conservation Strategy objectives." (Page C-32)

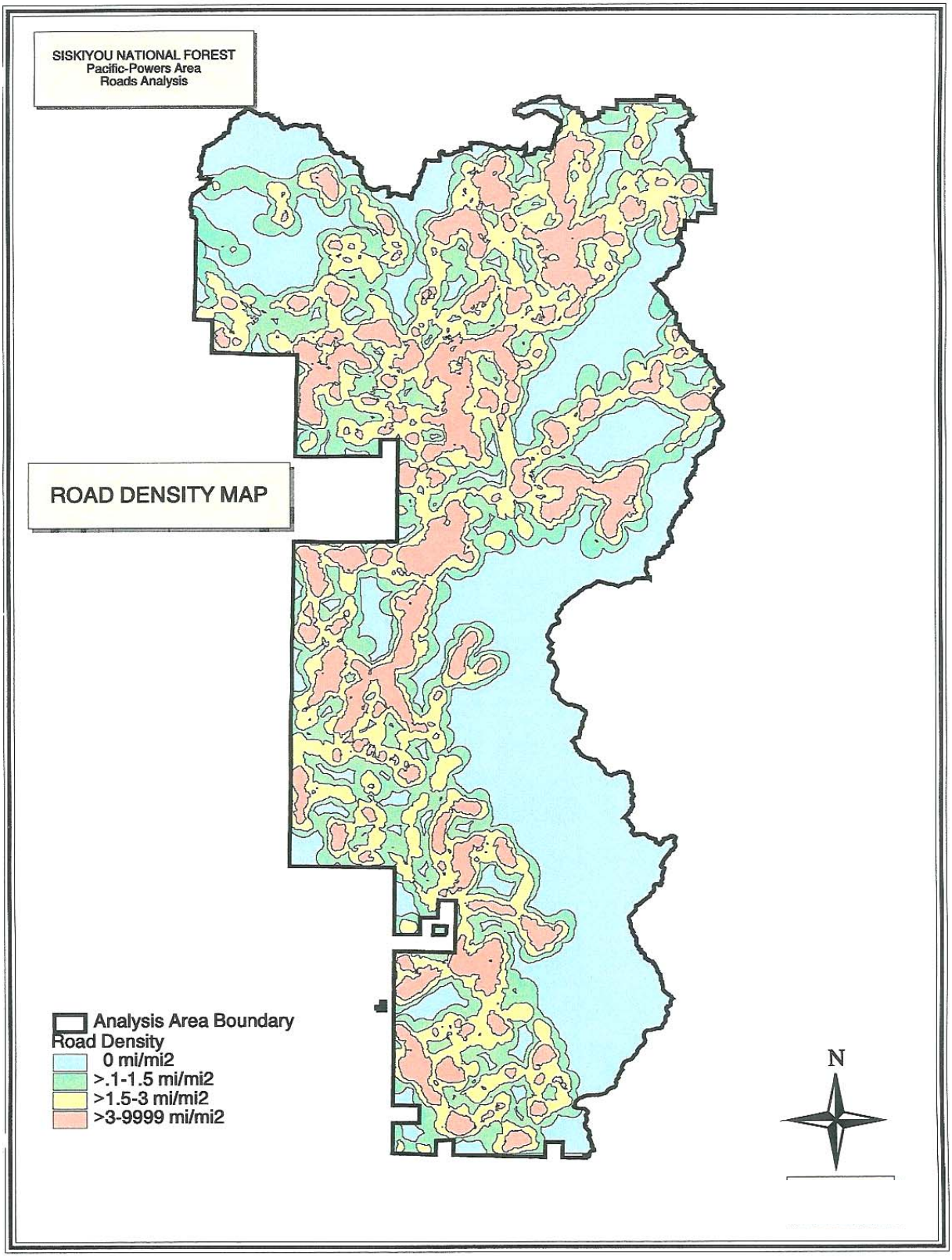
On January 12, 2001, the U.S. Department of Agriculture, Forest Service, developed manual direction (FSM 7700) to address both the access benefits and ecological costs of road-associated effects, give priority to reconstructing and maintaining needed roads and decommissioning unneeded roads, or, where appropriate, converting them to less costly and more environmentally beneficial other uses. Responsible officials are directed to use a roads analysis process to ensure that road management decisions are based on identification and consideration of social and ecological effects. The objective is to manage forest transportation system facilities to provide user safety, convenience, and efficiency of operations in an environmentally responsible manner and to achieve road related ecosystem restoration with the limits of current and likely funding levels.

2. Road Density

Road density, as displayed in the following map (Map IV-2), shows the number of miles of classified road per square mile of land area. Classified roads are those roads needed for long-term motor vehicle access that may include State roads, county roads, private roads, National Forest System roads, and other roads authorized by the Forest Service.

This map does not include unclassified roads. Unclassified roads, such as an unplanned road, an abandoned travel way, an off-road vehicle track not designated and managed as a trail, or roads that were once under permit or other authorization, but not decommissioned at the end of the authorization, are not managed as part of the forest transportation system. The unmapped unclassified roads may or may not have associated environmental concerns.

MAP IV-2. Road Density - Pacific Powers Area



3. Road Statistics

The Siskiyou National Forest (SNF) currently supports a total of 3,226.4 miles of road. Of this amount, the Pacific-Powers Analysis Area contains 1,919 miles of classified road under Private, Forest Service, and Other Public Agency jurisdiction, and includes one Scenic Byway.

- Eighty-seven percent of roads within the Analysis Area are under Forest Service jurisdiction
- Six-percent are under County jurisdiction
- Less than one-percent are administered by other Federal Agencies
- Two-percent are under the jurisdiction of private citizens or companies, wherein public access may be restricted or limited

The remaining five-percent fall under Forest Service jurisdiction, but have been decommissioned from service. These roads are still tracked under the current system so that the restored area may be monitored for resource protection and to maintain an historical record of ground-disturbing activities in the area.

There is approximately 3,256 acres of land committed to road prisms. The transportation system within the Pacific-Powers Roads Analysis Area serves the Chetco, Gold Beach, Powers and a portion of the Galice Ranger Districts. Currently, eighty-seven-percent of the roads within the Analysis Area are open year-round to vehicular traffic (weather permitting).

The following figure displays the Pacific-Powers transportation system in relation to the amount of miles classified in each Maintenance Level.

Figure IV-1. Pacific-Powers Analysis Area - Summary by Maintenance Level

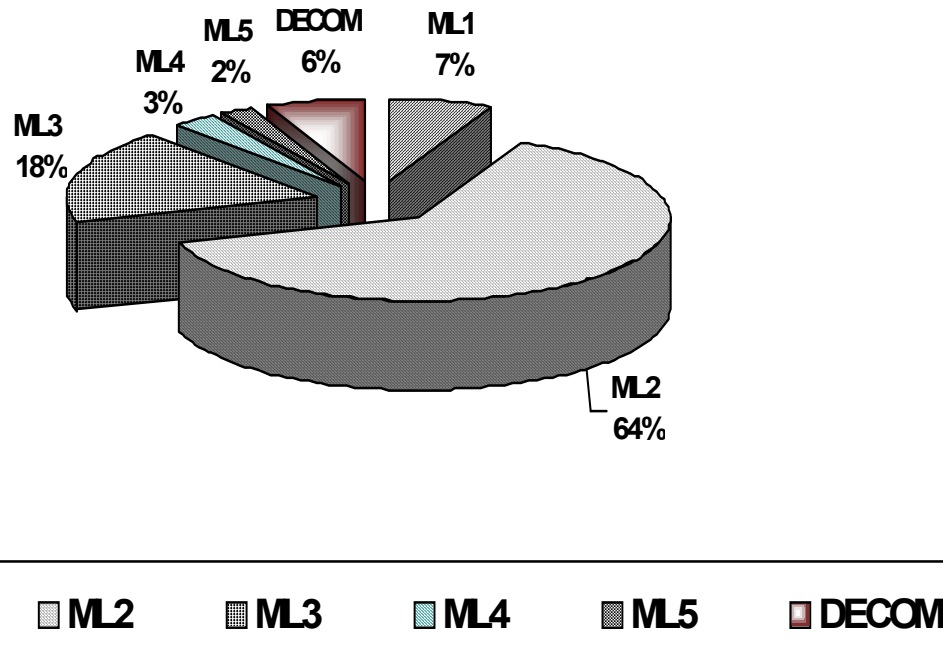
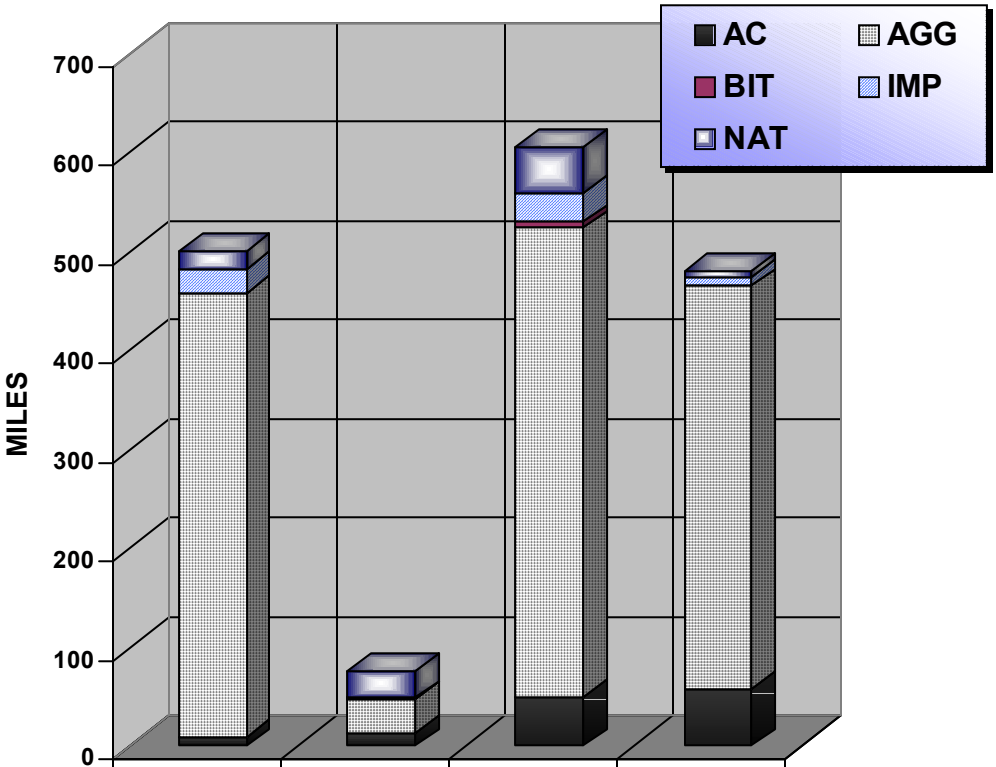


Chart Key: **DECOM** = Decommissioned, **ML#** = Operational Maintenance Level

See Appendix E – Glossary for definitions of Decommission and Maintenance Levels

The majority of roads in the Pacific-Powers system are surfaced with varying depths of crushed rock (aggregate). The chart that follows displays the various surface-types found in the Analysis Area and shows how they are distributed over the districts:

Figure IV-2. Surface Type Summary



	CHETCO	GALICE	G BEACH	POWERS
NAT	18.61	26.95	46.3	5.19
IMP	23.81	0.64	29.09	9.85
BIT	0	0	6.04	0
AGG	448.24	34.86	474.433	406.43
AC	9.76	13.5	49.69	58.56

Table Key – Surface-types:
NAT = native (natural) or "un-surfaced," **IMP** = Improved native surface,
BIT = Bituminous (i.e. any non-rigid petroleum-based pavements), **AGG** = Aggregate or Crushed Rock, **AC** = Asphalt.

4. Existing Uses

The current road uses on the west side of the Forest fall under three general categories: Commercial, Non-commercial, and Administrative.

Commercial: Changes in National Forest management created by the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (the President's Northwest Forest Plan) in 1994 has reduced the amount of commercial traffic due to the significant reduction of timber volume available for commercial use. Existing commercial uses include: the gathering of special forest products, use by Outfitter/Guides, use by miners, log haul, and hauling of common mineral materials such as rock, sand and gravel. A few livestock permittees use the roads to bring their cattle onto the small west side range allotments on the Gold Beach and Chetco Districts in the spring and to remove them in the fall.

Non-commercial: Non-commercial uses of the roads include: gathering of special forest products and common minerals for personal use, recreational activities, and transportation. People gathering special forest products use the entire road system, including short spur roads, to gain access to the various sites where these products can be found. The recreating public uses the roads to get to, campgrounds and day-use areas, dispersed recreation sites, and trailheads. They also use the roads for hunting and fishing access, wildlife viewing, and sightseeing. A few Forest roads are also used for general transportation to and from local communities and homes. Examples are the Agness Road, the Agness-Powers Road, the North Bank of the Chetco Road, and Bear Camp Road.

Administrative: Forest Service Employees continue to rely on the road system for quick and safe transportation into the Forest. The roads support the administration of commercial permits, resource protection including firefighting, recreation management, vegetation management, and monitoring of the Forest. Other Federal and State agencies that use Forest Service roads for administration of their lands or responsibilities are: The Bureau of Land Management, Oregon Department of Fish and Wildlife, and Oregon Department of Forestry.

C. Issues and factors

Issues regarding management of the Forest road system are divided between those relating to potential or actual environmental harm (environmental costs), and those issues relating to the ways roads are utilized (road benefits). These issues and subparts (factors) of these issues are described here.

1. Environmental Costs

a. Aquatic Environment

The aquatic environment factors identified for the Pacific-Powers Area Roads Analysis are:

- Sediment
- Large Wood
- Listed and Sensitive Fish Passage
- Key Watershed

Several example map products (Maps VI- 1, 2, 3, 4, 5, 6 in the Recommendations chapter) are included in this document, which show the results of intersecting the factors associated with Environmental Costs and Road Benefits. Road Benefits, as represented in the Geographic Information System (GIS), with the classified road system. Using ARCVIEW (software for Desk Top GIS, and mapping), factors intersecting roads may be seen individually or in a variety of combinations that best meet the needs of the project interdisciplinary team. Road segments are analyzed within sub-watersheds (6^{th} field Hydrological Unit Code (HUC), and are identified by road number. A road that leaves one sub-watershed and enters an adjacent sub-watershed is considered a new road segment. Example results are also available in Tables VI-1 and 2 (Recommendations chapter) and are located immediately after the example maps. Maps and Tables for all roads are available in GIS, but are too bulky to include in this report.

Unique to the Aquatic Environment factors are a set of sub-watershed ratings. These are included to provide a better sub-watershed rating for aquatic environmental costs relative to the road system.

1) Sediment

Geologic Background- The west side of the Siskiyou National Forest has a complex geologic history. Ancient sedimentary and igneous rocks of the Klamath geologic province underlie most of the Chetco and Gold Beach Districts, with more recent sedimentary rock formations to the north in the Powers District.

The Klamath province is made up of 'exotic' terrains that were once oceanic crust and volcanic island arcs. These were carried eastward by the movement of tectonic plates, and subjected to extreme pressures as the pieces were accreted to the existing continental edge. The terrains were then intruded by granitic magmas, adding heat to the metamorphic process. In the Analysis Area, one result of these processes can be seen in wide shear zones between different types of rock. These shear zones can be recognized by folds or fractures in the rock, or by bands of serpentine. Faults and shear zones are typically areas of concentrated groundwater, more deeply weathered bedrock, and deeper soils. They are often related to the large, ancient, inactive or only periodically active landslide forms that are common on the west side.

More recent sedimentary rocks are exposed in the Powers Ranger District. These poorly consolidated and non-cohesive rocks were formed from sediments that were deposited in shallow marine environments by rivers draining inland mountains.

Slope Stability- Erosion and sedimentation are natural and on-going processes that involve both mass-wasting (landslides) and surface erosion. These processes can be influenced and often accelerated by roads. Roads produce fine sediments from both the road surface and entire road prism (cut slopes and fills), and deliver that sediment to drainages through ditches and culverts. The amount of sediment produced is related to factors such as maintenance and traffic levels, road grade and surfacing material as well as soil and parent material. Landslides can be initiated or the failure rate accelerated by road construction, which destabilizes slopes by undercutting or loading the slope with fill material.

Midslope roads divert ground or surface water and concentrate flow to unstable slopes, both natural and engineered, initiating slope and fill failures. Failures at stream crossings often produce debris flows. Debris flows are failures in saturated sediments that scour slopes and stream channels for long distances from the initial landslide. Indirectly, increased rates of sedimentation can change channel morphology and function, for example, by diverting stream flow and undercutting the toe of a landslide deposit, causing stream bank failures downstream.

The road system may directly affect large wood and sediment delivery processes, and alter fish habitat, fish migration patterns, and aquatic habitat conditions. Roads and stream crossings may change the mechanism by which wood and sediment reach streams, and change fish migration patterns. Roads paralleling or bisecting stream channels and adjacent riparian zones occupy space where vegetation once grew, and increase the likelihood of increased sediment delivery to stream channels. Most large wood is delivered to the stream network by directly falling in to a stream channel, or by being transported along with sediment by a landslide. The contribution zone for trees is principally within one site tree height (174 feet for the sake of this analysis) of a stream channel, or from an area prone to slope failure that delivers large wood to a stream channel. In a forested environment, large wood delivered by tributary channel transport, direct entry from riparian zones, and side-slope landslides, influences fish habitat. The large wood begins to sort diverse stream substrate sizes, creates habitat units (pools, riffles), forms depositional bars, builds floodplains with diverse topography, and reflects other influences on aquatic and riparian habitat. Sediment delivery from roads contains less wood than sediment from unroaded slopes. The loss of stream channel roughness and the increase in fine and coarse sediment will simplify aquatic insect and fish habitat, cause channel widening, and have other negative influences on aquatic habitat.

Cumulative effects and exponential increases in sediment delivery can occur where roads impact a single stream channel in several locations along the stream profile. Within this analysis, for comparative purposes, the miles of stream in the sub-watershed divided the miles of road within one site tree height. Stream crossings per mile of stream channel were also used to rate impacts of roads within the sub-watershed.

The streams used for this broad-scale analysis are those in the GIS system, which are all of the perennial streams, and a small percentage of intermittent streams. For the Sediment Factor, the rating systems used to assess the environmental cost of excess sediment entering the stream system are:

Percent of Sub- watershed Stream Network with Roads Within One Site Tree Height (174 Feet)

Sub-Watershed Ratings
Low - <7% of the stream system has roads located in the riparian reserve
Medium - 7 % – 15% of the stream system has roads located in the riparian reserve
High - >15% of the stream system has roads located in the riparian reserve

Stream Crossing Frequency Within the Sub-Watershed

Individual Road Segment Ratings:
Low - <2 stream crossings per mile of road
Medium - 2 – 4 stream crossings per mile of road
High - > 4 stream crossings per mile of road

Sub-Watershed Ratings
Low - <1 crossing per mile of stream within sub-watershed
Medium - 1-3 crossings per mile of stream within sub-watershed
High - >3 crossings per mile of stream within sub-watershed

Erosion Potential Analysis - The erosion potential analysis was done using existing information, with limited field verification. Maps used for the analysis included soil mapping of Coos County by the Soil Conservation Service (SCS) and Natural Resource Conservation Service (NRCS), geology maps of Curry and Coos Counties produced by Oregon Department of Geology and Mineral Industries (DOGAMI), and landslide and stability mapping done in conjunction with the soils surveys and various forest projects.

A map showing erosion potential was produced based on the following parameters:

- Parent material of the soils
- Percent slope
- Erosion descriptions derived from
    - Coos County Soil Survey
    - Curry County Soil Survey
    - Soil shear strength parameters based on textural parameters (k-factor, c)

This model was used for the East Fork Illinois River Roads Analysis, and showed good correlation for shallow landslides (debris slides and debris torrents), but moderate to poor correlation for deep-seated movement (earth flows, slumps and rotational slides). A 50-meter buffer on the landslide points was applied to compensate for map distortion that may occur when transferring manuscript data into digital format. Although road construction can initiate or accelerate the movement of deeper-seated landslide, most erosion processes related to roads and impacting streams are from shallow failures or surface erosion. Therefore, the erosion potential model is believed to be useful tool in Roads Analysis.

The Erosion Potential mapping used for this analysis is based on generalized descriptions and groupings of soil complexes and parent material. The maps and reports derived from the analysis are useful for broad comparisons of erosion potential between sub-watersheds and for hazard assessment, but not for site-specific planning. Individual soil polygons, geologic maps, and field verification of rock and soil type are necessary to assign stability and erosion potential at the project planning scale.

The Number of Miles of Road in High Erosion Potential by Sub-watershed

Ratings by Sub-watershed
Low - <0.5 miles in areas with High Erosion Potential
Medium - 0.5 – 1.5 miles in areas with High Erosion Potential
High - >1.5 miles in areas with High Erosion Potential

2) Large Wood

For the Large Wood factor, as with the Sediment factor, the portion of each road segment that is within one site tree height of the stream was calculated using the Geographical Information System (GIS). The effects of roads on wood delivery were analyzed similarly to the effects of roads on the sediment regime.

The assigned Low, Medium, and High scores are relative, used here only to compare road segments and sub-watersheds in the analysis area.

Percent of Road Segment Within One Site Tree Height

Individual Road Segments
Low - <5% of road segment within one site tree of a stream channel
Medium – 5% - 10% of the road segment within one site tree of a stream channel
High - > 10% of the road segment within one site tree of a stream channel

Percent of Sub-watershed Stream System with Roads Within One Site Tree Height
(Same as for sediment)

Sub -Watershed Ratings (6th Field HUC)
Low - <7% of the stream system has roads located in the riparian reserve
Medium - 7 % – 15% of the stream system has roads located in the riparian reserve
High - >15% of the stream system has roads located in the riparian reserve

3) Listed and Sensitive Fish Passage

Fish passage and migration are affected by stream crossing structures in the road system. Bridges and natural bottom structures have little or no effect on the migration of fish upstream and downstream, however culverts or other structures used to support the road facility over the stream can interrupt fish movement in a watershed by introducing prohibitive jump heights into the pipe, long swimming distances without adequate light, and water velocities within the pipe that are too high for fish to successfully swim. These situations present impediments to juvenile and adult migrating fish moving upstream.

Connectivity of aquatic habitat is paramount for fish to retain the ability to migrate to: stream habitat with more favorable spawning conditions, areas with optimum water temperatures, and stream reaches with preferred aquatic habitat features, (e.g. deep pools and adequate hiding cover).

Listed and sensitive fish species are fish species of concern that are listed under the Endangered Species Act (ESA) or identified on the Pacific Northwest Region (Region 6) Sensitive Species list. Coho salmon (*Oncorhynchus kisutch*) and occupied and potential Coho salmon habitat (Critical Habitat) are listed as threatened under the ESA.

Coastal cutthroat trout (*Oncorhynchus clarki*) are on the Region 6, Regional Forester's Sensitive Species List. Within this analysis," fish bearing streams" are streams with listed or sensitive fish species.

The presence of road crossings in streams containing Coho salmon, Coho salmon critical habitat, or coastal cutthroat trout within a sub-watershed

Individual Road Segments
Low - <1 road crossings per mile of road in fish bearing streams
Medium - 1-2 road crossings per mile of road in fish bearing streams
High - >2 road crossings per mile of road in fish bearing streams

4) Key Watershed

The Key Watershed designation is part of the Aquatic Conservation Strategy in the Northwest Forest Plan (NWFP). These watersheds or sub-watersheds were designated by scientists as core areas of aquatic/riparian habitat integral to recovering depressed anadromous fish populations.

Twelve Key Watersheds are designated within the Pacific-Powers Roads Analysis Area. They are identified as: Elk River, South Fork Coquille River, Shasta Costa Creek, Indigo Creek, Silver Creek, Lawson Creek, Quosatana Creek, North Fork Chetco River, Emily Creek, Winchuck River, North Fork Smith River.

South Fork Lobster Creek Watershed is identified by the Oregon Department of Fish and Wildlife and the Forest Service as crucial to anadromous fish production in the Lower Rogue sub-basin. Therefore, for the sake of this analysis, South Fork Lobster Creek Watershed is rated "High" even though it is not a Key Watershed.

The road system within a Key Watershed is of special concern. Under the Aquatic Conservation Strategy of the Northwest Forest Plan, a guideline for no net increase in the total miles of road within these watersheds is stated with an emphasis placed on reducing the miles of road in areas with high erosion and high sediment delivery potential.

The rating system applied to Key Watersheds for the sake of Roads Analysis

Low – A watershed or sub-watershed is not designated as a Key Watershed in the NWFP
High - A Key Watershed, or South Fork Lobster Creek Watershed
There is no "Medium" rating for this factor.

b. Terrestrial Wildlife Environment

The factors identified as wildlife environmental costs within the Pacific-Powers Roads Analysis area are:

- Late Successional Fragmentation
- Travel Migration Corridors
- Threatened, Endangered and Sensitive Species

These factors describe where and how the road system may directly affect wildlife and wildlife habitat.

1) Late Successional Fragmentation

Over 1,100 terrestrial species have been determined to be closely associated with late successional and old growth forests, including the northern spotted owl, red tree vole, bats, salamanders, and numerous mollusk and plant species.

These natural populations may be affected by habitat fragmentation caused by the presence of roads and associated management activities (timber harvest), which change the landscape structure. Roads and associated management activities fragment by dissecting vegetation patches and increasing the edge-affected area, thereby decreasing interior habitat.

Forest fragmentation eliminates blocks of continuous habitat, or degrades the quality of remaining habitat for those species sensitive to an increase in the amount of forest edge. During the daytime, forest edges typically have lower humidity; higher air temperatures, higher soil temperatures and lower soil moisture, increased solar radiation, and higher wind speeds than interior forests. Edge-affects manifest themselves in several ways. Birds' nests show an increase of parasites and nest depredation. Amphibian distributions change, as well as plant distributions and abundance. Noise from vehicle traffic degrades habitat for birds, and big game such as deer and elk. Snag removal along Forest Service roads to ensure safety for the public and employees, has an effect on bats and cavity nester species that require dead trees for forage and nesting.

To measure the fragmentation cost, Mature Habitat and Old Growth stands (Late and Giant from the forest vegetation layer) were buffered 120 meters inside the perimeter of each stand. They were then intersected with the road layer.

Fragmentation cost ratings

Low - Road segment did not fall within the buffered area or the interior habitat section
Medium - Road segment fell within the 120 meter buffered area
High - Road segment passed through the interior habitat section

2) Travel Migration Corridors

Riparian Reserves serve as key travel corridors for many species because the three essential survival elements are found there: food, water, and shelter. The riparian corridors are generally intact, and offer continuous canopy cover, which moderates the extremes in conditions found outside the reserves. Riparian Reserves are viewed as reservoirs of the natural environment branching through stands of managed forests.

This connected habitat between late successional stands is used to travel from higher to lower elevations as the seasons change, and between feeding, breeding, brooding, and rearing habitats. Intersection of reserves by roads dissects the travel corridors and the area occupied by roadbeds is removed from the available habitat base. These conditions can have adverse affects on a number of species.

This factor intersected the road layer with the Riparian Reserve layer.

Travel Corridor cost ratings

Low – Road segment did not enter the Riparian Reserve
Medium – Road segment ran parallel to a stream within the Riparian Reserve, but did not cross the stream
High – Road segment dissected the Riparian Reserve and crossed the stream, completely fragmenting the travel corridor.

3) Threatened, Endangered and Sensitive Species

Peregrine falcons, marbled murrelets, northern spotted owls, and bald eagles can be negatively affected by disturbance due to road presence. Peregrine falcons are particularly sensitive to their surroundings during the nesting season, and will sometimes abandon the nest of eggs or young because of disturbance, allowing predator access to the nest and resulting in nesting failure. Northern spotted owls and marbled murrelets may be disturbed from activities on roads within ¼ mile of nest sites. Bald eagles may be impacted by road activities within ½ mile of an active nest site.

In summary, no terrestrial vertebrate taxa appear immune to the myriad of road-associated factors that can degrade habitat or increase mortality. These multifaceted effects have strong management implications for landscapes characterized by moderate to high densities of roads. In such landscapes, habitats are likely underused by species sensitive to road activities. Moderate or high densities of roads sometimes index areas that function as population sinks; that would otherwise function as source environments if road density was low or zero.

The following rates impacts to peregrine falcon, marbled murrelet, northern spotted owl, and bald eagles from habitat that may be associated with disturbance due to road presence.

For the peregrine falcon, the road layer was intersected with the primary, secondary, and tertiary nest protection zones. Environmental costs were determined as follows:

Low - Road segment fell outside of either zone or within the tertiary nest protection zone (>1.5 to 3.0 miles radius).
Medium - Road segment fell within the secondary nest protection zone (>0.5 to 1.5 miles radius)
High - Road segment fell within the primary nest protection zone (0.0 to .05 miles radius from the nest site)

For the marbled murrelet and northern spotted owl, the road layer was intersected with a ¼ mile buffer around known occupied stands for marbled murrelet, and known nest sites or activity centers for spotted owl. Environmental costs were determined as follows:

Low – Road segment fell outside of the buffer
High - Road segment fell within the ¼ mile buffer
There is no "Medium" rating for this factor

Currently, one bald eagle nest is known on the Forest (Gold Beach RD), and it is located in the Wild Rogue Wilderness (a BEMA has not been written for this site, and is not necessary). On the coast districts, it is possible that bald eagles will someday nest at sites that contain existing road segments, and BEMAs would then be necessary. The following rating system would then be brought in to the mix.

Low - Road segment fell outside the BEMA
High – Road segment fell inside the BEMA
There is no "Medium" rating for this factor

c. Botanical Environment

The factors identified as Botanical Environment costs within the Pacific-Powers Roads Analysis area are:

- Port-Orford-Cedar
- Noxious Weeds
- Other Botanical Factors

These factors describe how the road system may affect the spread of root disease, and unwanted vegetation.

1) Port-Orford-Cedar (POC)

Managing POC to prevent the spread of *Phytophthora lateralis,* a devastating root disease, from infested to non-infested stands directly effects how the SNF administers and implements other forest projects. Observing fungicide protocol, and washing equipment and tools that have been used in infested stands delays projects, and creates higher operating costs for the forest and contractors. Although prevention costs are high, these procedures are beneficial in slowing the spread of this disease from infested POC to non-infested POC stands. POC is a highly valued indigenous tree species, and healthy stands are of paramount importance within its endemic range.

Guiding Principles of POC Management were outlined in a Forest Policy letter signed by the ROR/SIS Forest Supervisor, Jack Williams, on 11/8/2000, directing the forests to prevent import of *Phytophthora lateralis* to road systems containing non-infested POC, and to prevent export of *Phytophthora lateralis* from roads in the midst of infested POC.

Current GIS products are available identifying POC stands as well as *Phytophthora lateralis* areas within stands. This factor intersected the road layer with POC stands.

Port-Orford-Cedar cost ratings
Low – Road does not enter *phytophthora lateralis* infested area
High – Road does enter *phytophthora lateralis* infested area
There is no "Medium" rating for this factor

2) Noxious Weeds

Forest Service policy defines noxious weeds as "…those plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease and being non-native or new to or not common to the United States or parts thereof."

Weeds are a threat to native ecosystems. They displace native plants and decrease the quality of habitat for wildlife. Noxious weeds may exist along roads, in roadside ditches and even in roadbeds of infrequently used roads and not all of their locations may be known. The chance of introduction of noxious weeds are greatly increased by the use of heavy equipment on a fire or by the use of infested materials such as hay, seed or rock during road restoration or decommissioning activities.

Roads are, generally, the main vectors for the spread of noxious weeds. Initial road construction, vehicles, travelers, road shoulder and ditch maintenance activity, and the altered corridor habitat combine to facilitate the introduction and spread of noxious weeds along roads.

Noxious Weed cost ratings
Low – Road is not adjacent to any noxious weed location
High – Road is adjacent to a noxious weed location

3) Other Botanical Factors

The west side of the Siskiyou National Forest is botanically diverse and has many unique habitats including the Elk, Coquille, Rogue, Illinois, Chetco and Winchuck River Corridors. There is serpentine, oak woodlands, rocky cliffs along the major river corridors, granite outcrops, and redwood forest. Botanical Factors identified to be of high priority and value within the analysis area for the west side of the Siskiyou National Forest include:

- Threatened, Endangered, Forest Sensitive Species, and Survey and Manage vascular and nonvascular plant locations.
- Forest Designated Botanical Management Areas (MA 4) Special Habitats such as meadows, serpentine, oak woodlands, and Darlingtonia bogs.

Threatened, Endangered, Forest Sensitive (TES) Species, and Survey and Manage (SM) vascular and nonvascular plant locations and habitats of concern.

Protect TES and SM species within road prism and buffer. The sensitive plants *Bensoniella oregana*, *Carex gigas*, and *Salix delnortensis* are frequently found in road ditches. *Scirpus pendulus* is known only from Oak Flat Road and the adjacent meadow. Other species such as *Iliamna latibracteata* and *Arcostaphylos hispidula* can be found on road banks. Other plant species are no longer listed as forest sensitive species, however they are still important to the unique ecology of the Siskiyou National forest. Areas with *Darlingtonia californica* should be avoided during road work. Most of these areas are documented in the GIS sensitive plant layer.

The Biscuit Fire impacted many sensitive plant populations. In most cases the fire is predicted to benefit sensitive plants. Fire suppression activities including brushing, fire lines, and safety zones all have the potential to destroy sensitive plant populations and introduce noxious weeds.

Current GIS products are available identifying TES/SM plant sites. Check with the District or Forest Botanist for current information on TES/SM plants within project areas.

Presence roads with TES and SM species
HIGH -- Road segment is within a high density of rare plants
MEDIUM -- Road segment is within the 1/8th mile buffer
LOW -- Road segment is not near TES/SM plants and is outside their 1/8 mile buffer.

Forest Designated Botanical Management Areas (MA 4)

Botanical Management Areas include the best representation of unusual plants indigenous to southwest Oregon and include both sensitive plant and old growth conifer habitats.

Roads and other facilities should be located without disturbing plants and habitat within the Botanical Management Areas. New roads and other features may only be built if they do not detrimentally affect TES/ SM plants and their habitats. The new roads should cause no changes in the hydrology of bogs, fens, vernal pools, or wet meadows. In addition, rock sources will not be developed and stockpiling of rock is not permitted (See LRMP section IV, page 89). Great care should be taken to follow best management practices for noxious weeds in Botanical Management Areas.

Presence roads within or adjacent to MA 4
HIGH -- Road segment is within the MA 4.
MEDIUM -- Road segment is within the 1/8 mile buffer
LOW -- Road segment is not within the MA4 and is outside the buffer.

Special Habitats (within MA 9)

MA9 designated areas are special wildlife sites and botanical sites which are important components to overall wildlife habitat diversity and botanical values. Areas included in the MA9 designation that are particularly relevant to botanical values are: meadows, swamps/springs/wet sites and lakes/ponds, rock sites i.e. cliffs and outcrops, and Botanical sites (botanically unique and under 1 acre).

The LRMP states that roads through meadows should be designed to reduce vehicle access into the meadow. New roads are not to be routed through meadows, botanical sites and other special sites unless no other route is available. Waste material from road construction, reconstruction, or maintenance should not be left in special wildlife sites.

The hydrology of wet sites should always be protected during road improvements. Great care should be taken to follow best management practices for noxious weeds in Special Wildlife Management Areas where botanical values are intact.

Presence roads within or adjacent to MA 9

HIGH -- Road segment is within the MA 9.
MEDIUM -- Road segment is within the 1/8 mile buffer
LOW -- Road segment is not within the MA 9 and is outside the buffer.

2. Road Benefits

a. Recreation

The following factors within the Pacific-Powers Area Roads Analysis area have been identified for Recreation access benefits:

- Developed Recreation Sites
- Dispersed Recreation Sites
- Trailheads
- Cultural and Historical Sites

Access to recreation sites is a critical component in providing a "quality" recreation experience for forest visitors. This Roads Analysis project addresses the access needs for recreation sites based on a "sense of demand" for a particular site through its level of occupancy or use. For example, a recreation site that receives high occupancy or use reflects a higher demand for that site, and for its associated road access routes. In contrast, a recreation site that receives low occupancy or use reflects a lower demand for that site, and its associated road access routes. The amount of investment in facilities for each site was also considered. Recreation personnel derived the occupancy/use levels for a particular site from periodic patrols within the peak recreation season, (Memorial Day through Labor Day) at which time the number of sites occupied or number of visitors were recorded, or by the number of registration cards/fee envelopes counted.

1) Developed Recreation Sites

A developed recreation site is one that contains facilities (toilets, tables, etc.), and in turn, results in the concentrated use of an area. There are sixty developed recreation sites that have been identified within the Pacific-Powers Roads Analysis Area. These include campgrounds of varying size and complexity, day-use and picnic areas, and recreation rentals.

The investment towards, as well as level of use for, developed recreation sites to rate access benefit is defined as:

High – Roads providing access to all developed sites within the Analysis Area

2) Dispersed Recreation Sites

A dispersed recreation site or concentrated use area is one found within the general forest area, and does not have facilities associated with it towards user convenience. Generally, amenities are present only for resource protection. Within the Pacific-Powers Roads Analysis Area, there are a variety of dispersed recreation sites (road pullouts, primitive camps, river corridors and access locations, meadows, scenic views, etc.) where there is evidence of some form of recreation use. The level of use for dispersed recreation sites is generally low compared to developed sites and trailheads.

The rating for dispersed recreation sites access benefit is defined as:
Low – scattered, low capacity sites with low site appeal
Medium – scattered sites with special appeal or traditional uses that are accessed using secondary roads
High – sites concentrated along main roads with unique recreation opportunity or high special appeal

3) Trailheads

A trailhead is a developed facility designed primarily for parking, which provides access to a trail for purposes of travel by foot, stock, mechanized or motorized trail vehicle (less than 50" in width). Many trailheads in the Analysis Area have toilets, picnic tables and fire rings. All trailheads have a bulletin board and parking area.

The rating for trailhead access benefit is defined as:
Low – Trailhead does not require a Northwest Forest Pass
High – Trailhead does require a Northwest Forest Pass
There is no "Medium" rating for this factor

4) Cultural and Historic Sites with Recreational Access Needs

Cultural Resources, also called Heritage Resources, are the physical remains of districts, sites, structures, buildings, networks, or objects used by humans in the past. They may be historic, prehistoric, archeological or architectural in nature.

Historic refers to the period of time for which there is written records. The written history for Region 6 begins roughly after 1800.

Cultural and Historic Wilderness sites are not included in the Roads Analysis information because public visitation is dependent on trails for access.

The level of use for Cultural and Historic sites to rate access benefits is defined as:
Low – site appeal reflects a lower demand for recreation access
Medium – site appeal reflects a moderate demand for recreation access
High - site appeal reflects a higher demand for recreation access

b. Fire Protection and Suppression

Fire and Fuels Management uses the current transportation system to access land base for wildfire detection and suppression. The major factors representing access benefits for fire management are:

- Accessing Fire Facilities
- Patrol Routes

1) Accessing Fire Facilities

Fire facilities are identified as specific to an area, and are fundamental for an effective fire program. For this factor the road layer was combined with identified water holes and lookouts within the Pacific-Powers Roads Analysis Area.

Fire Facilities Access Benefits are rated as follows:
High – All roads accessing waterholes and lookouts

2) Patrol Routes

Various road systems are important for efficient and effective fire prevention patrols.

Fire Patrol Access Benefits are rated as follows:
High – All road systems needed to access effective fire prevention patrols

c. Vegetation Management

Access to the current timber base and other lands has a direct effect on implementation and administrative costs. Most forest roads were originally planned to provide access to programmed timber harvest stands and adjacent areas. The roads issues within the Pacific-Powers Area Roads Analysis pertain to several types of harvest, cultural, improvement, or restoration projects.

Many presale activities such as surveying, layout, marking, and cruising utilize present road systems for easy access and efficient operations. After sale operations, post-sale slash disposal, reforestation, and crop-tree release activities are performed using developed roads to access newly opened harvest areas. In addition, wildlife habitat improvement, restoration projects, fuels reduction, salvage operations, and pre-commercial thinning, as well as other stand culturing activities, are performed utilizing developed access routes.

1) Programmed Areas

As a general statement, all types of land treatment activities are less costly if the subject stands are easily accessible. Costs and efficiency of operations associated with most pre/post-sale or other project activities increase the further they are from road access.

Silvicultural access benefits are rated as:
Low – Roads that access management areas not available for land treatment activities, and not scheduled for commodity production, culturing treatments, or restoration activities.
Medium – All roads in Matrix lands not currently scheduled for land treatment activities, and managed stands not included in high priority.
High – Road access to project areas identified on: The 10-year tentative sale schedule, the 5-year tentative pre-commercial thinning needs, post sale activities, planned wildlife habitat improvement, and land restoration activities anticipated to be completed within the next 0-10 years.

2) Special Forest Products (SFP)

Special Forest Products (SFP) includes cutting and removal of personal-use firewood, boughs, bear grass, foliage, and mushrooms. This program has seen an increase in demand and workload over the last decade. The three districts covered in the Pacific-Powers Roads Analysis each have products in demand specific to the individual area.

Mushroom harvesting, done mostly on the Chetco District, often has yearly permit sales exceeding $30,000. The Powers District exclusively sells cedar for arrow shaft manufacturing. Gold Beach sells permits for other products more or less exclusive to that district. Based on permit sales for fiscal year 2000, it is estimated there are over 25,000 visitor-use days each year for the three districts combined, specific to the gathering of Special Forest Products.

The demand for particular products leads to access needs at different times of the year. The mushroom harvest in the area of the Pacific-Powers Roads Analysis runs from October through March, with the height of the season in December through February. Harvest season for most other products is spring and summer. Late fall is important for products used in wreaths and foliage arrangements.

The area for removal of various products is not specific to Management Areas as described in the LRMP, and the Northwest Forest Plan allows these products to be removed from LSR. Districts do have their own (local) restrictions, such as restricting removal of any products from Riparian Reserves, seasonal restrictions on POC bough collection, or limiting the amount of SFP collected from a specific area. There are generally no specific forest management limits on product removal other than the amount. The limits generally are in terms of where a particular product is found and if a road accesses that area.

Someone searching for SFP uses most roads at some time, however observations by field personnel indicate that certain areas and road systems are more heavily used than others. This is the basis of rating each road segment.

Low – Roads that access areas that may receive occasional product interest
Medium – Roads that access product areas for SFP harvest, but not considered heavily used
High – Roads that access geographical areas known to produce a certain SFP, and are heavily used

d. Special Uses

Mining - Existing road systems that access mining claims within the Pacific-Powers Roads Analysis Area are a special concern. According to Code of Federal Regulations (CFR) 36 2800.12, a claimant has a right to use existing roads, or to construct roads in order to access mining claims on Federal Forest System Lands with an approved plan of operation. Location of existing mining claims will be identified to determine access needs.

Rating Access Benefits for Existing Mines
High – All roads determined to be an access benefit to an existing mining claim. There is no "Low or Medium" rating for this factor

e. Road Maintenance Facilities

A number of access benefit factors were identified that related to the management of the road system, and private and other agency land connections. GIS data is not available to represent these factors, but a thorough discussion of them is included in Appendix D – Additional Road Management Analysis Factors.

Road maintenance facilities factors discussed in Appendix D include:

- Quarries
- Water Sources
- Borrow Sources
- Waste areas
- Access to Private Lands
- Access to Public Agency Lands
- Road Maintenance Condition