

**Crescent Ranger District
Deschutes National Forest**

Crescent Lake Wildland-Urban Interface Project Area

Roads Analysis Report

May 2003

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STEP 1**Setting up the Analysis*****Objectives of the Analysis***

The objective of roads analysis is to provide decision makers with the information necessary for developing road systems that are safe and responsive to public and agency needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

Roads analysis is a six-step process. The steps are designed to be sequential with the understanding the process may require feedback and iteration among steps over time as an analysis develops. The amount of time and effort spent on each step differs by project based on specific situations and available information.

The product of an analysis is a report for decision makers and the public that documents the information and analyses used to identify opportunities and set priorities for future National Forest road systems. This report documents the roads analysis performed for the Crescent Lake Wildland-Urban Interface Project. This project area was delineated in the spring of 2002 to define an area that was being proposed for hazardous fuels reduction under the National Fire Plan. The fuels reduction and forest health project involves a review of the need for access to treatment units, access for fire suppression, and emergency egress for recreation areas, subdivisions, and other developments.

Geographic Scale of Analysis

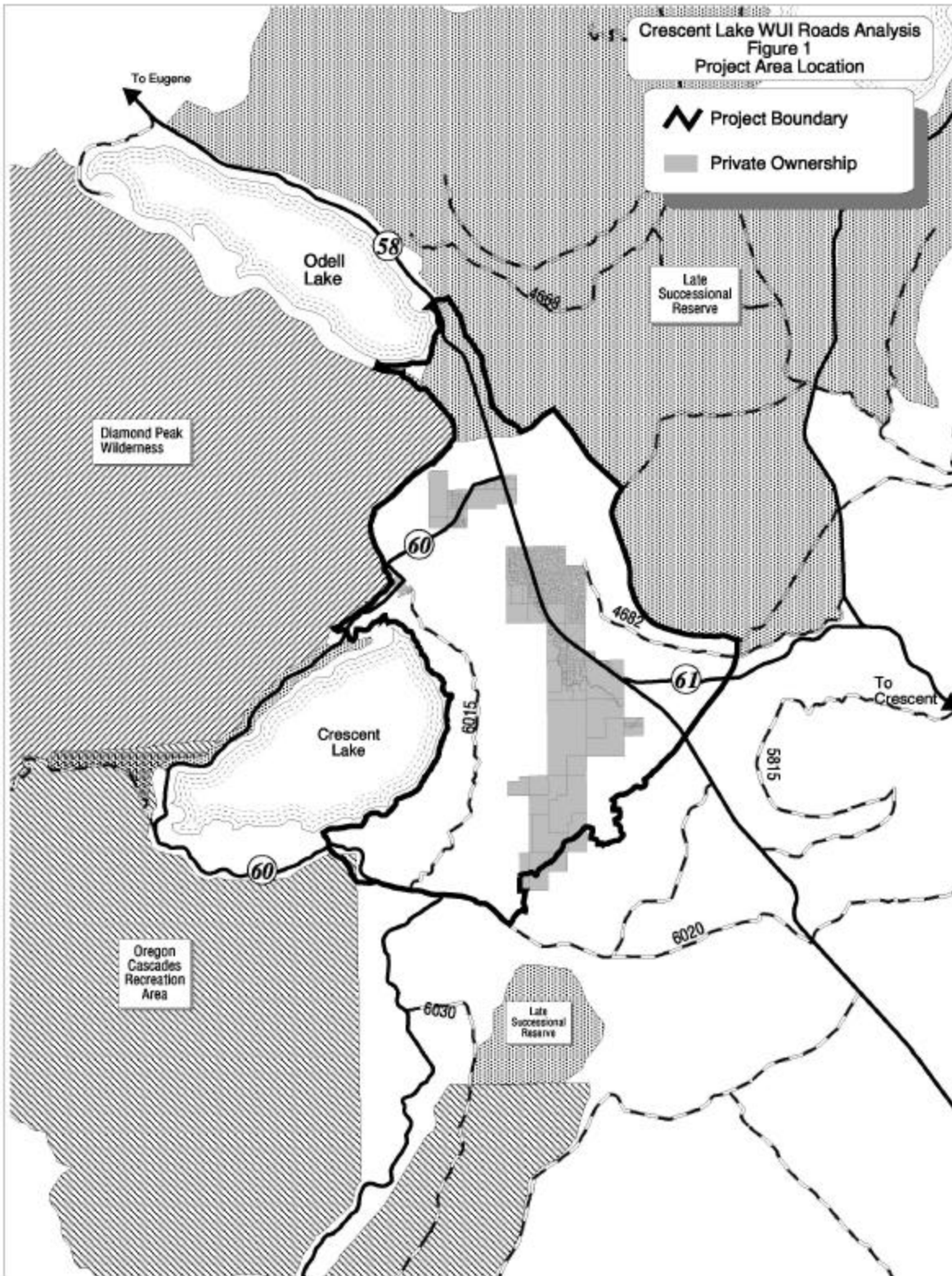
This Roads Analysis is limited in scope to the Crescent Lake WUI Project area, Figure 1. The area covers approximately 12,030 acres (9,430 Forest Service; 2,600 Private). This Roads Analysis is intended to inform any project-level decisions that affect the transportation system in the project area according to Forest Service Road Management Policy at FSM 7712.12 and 7712.13.

Information on the transportation system at larger scales is available in the Deschutes-Ochoco Forest-wide Roads Analysis (USFS 2003), the Odell Watershed Analysis (USFS 1999), and the Big Marsh Watershed Analysis (USFS 1997).

Interdisciplinary Team Members

District Ranger, Phil Cruz, and his staff provided oversight for this Roads Analysis. The interdisciplinary team members that completed the process and prepared this document are:

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STEP 2**Describing the Situation**

This section describes the current situation of the transportation system, how it has evolved, and other key information about roads in the analysis area. The analysis area encompasses approximately 12,030 acres. About 2,600 acres of this are in private ownership. The location of the project area in Oregon is shown in Figure 1, page 2. The existing transportation system is displayed in Figure 2, page 7.

Existing Road and Access System**The Location of all Roads**

The existing road system is relatively evenly distributed throughout the analysis area, with a somewhat higher density of privately owned roads within the Diamond View Estates subdivision on the southwesterly flank of Royce Mountain. Both Forest Service and private roads reside on relatively flat ground (10% slope or less) through the middle of the area, while roads on the east and west sides of the analysis area are found on steeper slopes (up to 30%). On the east side of the analysis area these roads are found on the south and west side of Royce Mountain; on the west side of the area, Road 6015 and associated local roads are located on glacially developed ridges of varying slope and aspect.

Ages and Development Histories of Roads

The majority of roads within the analysis area have been in existence for better than 40 years, with few additions having been constructed in the recent past, although some subdivision roads are of relatively recent vintage. A few roads, in particular Road 6020100, date back to the late 1920s and early 1930s and were constructed in support of railroad construction or to provide the earliest vehicular access to the Crescent/Odell Lake area.

Most Forest Service roads have been constructed through the years for access in support of timber harvest operations, although Road 6020100 is a notable exception. Private road development has largely been associated with the development of rural residential properties at the Royce Mountain and the Diamond View Estates subdivisions.

Road Surface Types and Existing Maintenance Levels

Approximately 64% of the roads within the analysis area are native surface roads, with another 15% being improved native surface roads. Roughly 8% and 11%, respectively, are classified as bituminous or asphalt surfaced. These primarily represent Highway 58, State Route 60, and the paved roads within Diamond View Estates. Approximately 2% are classified as crushed aggregate.

Thirty four percent of the Forest Service roads are in an objective maintenance category of M/L 1 (self-maintaining, closed to vehicular traffic). Objective Maintenance Level 2 accounts for 44% of the agency-administered roads, with 4% classified as M/L 3 and 4% as M/L 4. Maintenance Level 5 (high degree of user comfort) accounts for approximately 14% of roads and is represented by Highway 58. Private roads within the analysis area are not classified with regard to maintenance level, but they are by and large managed to accommodate passenger car vehicles.

Existing Road Management Objectives

The existing management objectives for roads within the analysis area generally call for roads to be managed primarily for administrative and land management purposes, with public access being a secondary consideration. Absent the traffic associated with timber harvest activities, seasonal average daily traffic values for the open roads are quite low, usually below one vehicle per day.

Virtually all of the seven-digit local roads being analyzed are managed – when open – as being suitable for high-clearance vehicles. Generally they have been designed and constructed to be single-user facilities during periods of log haul because of narrow road widths and lack of turnouts.

Road Use Patterns Over Time, Now, And In The Future

Historically there has been a mix of uses for the roads in the analysis area. Roads along Road 6015 and those found in the eastern portion of the analysis area have primarily been used for administrative purposes; many of the seven-digit local roads in these areas are physically closed to traffic and managed as Maintenance Level 1 roads. The roads in these two areas will be managed primarily for administrative use and product removal for the foreseeable future.

Roads 6020100, 6020160, and 6020170 have, over time served as either primary or secondary access to private landholdings, as have the private roads in the analysis area. These roads will continue to serve this purpose in the future and, as residential occupancy increases in Diamond View Estates, increased interest may be paid to Road 4682 as an alternative access/fire escape for the subdivision.

The existing road system is employed by two specific users in support of their commercial endeavors. Union Pacific Railroad holds a road use permit on Road 6020100 to maintain access to their main rail line running through the analysis area, and Mid-State Electric Cooperative uses parts of the existing system to service their electrical lines that pass through the analysis area. These uses, although not a significant component of the total usage, have occurred for many years (especially in the case of the railroad access for the former Southern Pacific Railroad) and will continue into the foreseeable future.

Other incidental use has been incurred by hunters and mushroom pickers on analysis area roads. Continued interest on the part of these forest visitors to gain access, especially to the area between Crescent Lake and the private inholdings to the east, will continue unabated.

Primary Destinations of Road System Users

Forest Service roads within the analysis area are generally not intended to serve any particular destination, but rather serve as routes providing general access. Two notable exceptions, Roads 5800680 and 6005100, provide direct primary access to Odell Lake Resort and Crescent Lake Resort, respectively. While Road 6020100 does provide destination access for Union Pacific Railroad to specific points on its rail line, it and most other roads serve even more importantly as access and through routes (although the condition of Rd. 6020100 inhibits its utility as a through route). Private road destinations are primarily to private property and year-round and recreational residences.

Connectivity Between the Road System and The Stream System

Within the analysis area there are several points of connectivity between various roads and streams. Bridges cross Odell Creek at Rd. 5800680 and Highway 58. Cold Creek is crossed by State Highway 60 and a private access road while Crescent Creek is crossed by bridges on Roads 6005 and 6020100. Two small unnamed tributaries to Crescent Creek are also crossed with culverts on Rd. 6020100. This road also crosses several riparian areas that have – at least during a portion of average water years – unchannelized surface water flow. Each of these road/water intersections represent at least a theoretical risk of sediment input from the roadside ditches associated with the roads, as well as the native surface on Rd. 6020100.

Social and Cultural Values of the Area

Within the small communities in and adjacent to the analysis area (Crescent, Gilchrist, Chemult, Crescent Lake Junction), residents primarily earn a living from natural resource extraction (sawmill, logging, post and pole harvest, firewood cutting), from the Gilchrist School system, from natural resource management, or from the service industry (restaurants, stores, gas stations). Residents of

the scattered subdivisions throughout the analysis area are either locally employed or are retired. There is a strong connection for many residents, both within the communities and in the subdivisions, with local National Forest land, both as a source of jobs and as a source of recreational opportunities. Some of the residents living on small parcels (and many of the owners of recreational residences) hail from larger communities and purchased these parcels not only for their own remote location but also their readily available access to the vast expanse of surrounding wildlands. Accessibility to those wildlands is a given assumption within the local culture; unlike the adjacent private timberland, which is owned by a specific entity that can dictate terms of access, these National Forest lands are theirs by right as citizens. Access is generally a component of that perceived right and proposals that threaten to affect access are usually looked upon with distaste.

Local, Regional, and National Social and Economic Benefits Derived From Existing Roads

The road system in the analysis area provides access to the benefit of a host of social and economic values. Roads with the area are the primary access route to two small destination resorts on Odell and Crescent Lakes. In addition, these roads also provide important access for those seeking other camping, fishing or boating recreation opportunities on the lakes themselves or hunting in the surrounding area. Access is also provided for snowmobilers and cross-country skiers seeking to use designated trail systems that have termini in the analysis area. This access is of benefit not only to residents of the nearby local small communities of Crescent Lake Junction, Crescent, Gilchrist, and Chemult (along with numerous residential subdivisions) but also to recreationalists from the wider Central Oregon area and (perhaps even more importantly in terms of percentage of visitors) the southern Willamette Valley. The focus on recreational opportunities in the immediate vicinity contributes to the economies of area communities, and especially to Crescent Lake Junction, through the purchases of vehicle fuel, food, and other supplies at local establishments.

An extensive population of people who make a significant portion of their living through harvesting, buying, and selling mushrooms exists throughout the western United States. The road system within this analysis area provides access to several matsutake mushroom harvesting areas, and this access contributes to the opportunities for many of these individuals and families to engage in harvest activities for both commercial and cultural purposes. The annual influx of many hundreds of mushroom harvesters and the buyers to whom they sell their mushrooms brings an increase in commerce to the local communities in the same manner that the advent of hunting season does. In addition, the Forest Service collects tens of thousands of dollars in permit fees from commercial mushroom harvesters.

As stated previously, the primary original reason for the existence of a large part of the existing Forest Service road system was to provide access for timber harvest. The need to have access for vegetative management still exists today as a primary reason for the continued existence of the road system. Access for timber sales and other silvicultural contracts provides for local employment opportunities to support surrounding communities. Revenue for the federal government is also generated by the sale of timber, posts and poles, and firewood.

Road Densities within the Analysis Area

Overall road density within the Crescent Lake WUI analysis area is 4.63 miles per square mile. Within the private land in the analysis area, road density is 5.13 miles per square mile; this also represents the open road density because all roads within the private land are at least theoretically open to public travel. Total Forest Service road density is 4.5 miles per square mile, with open road density being 3.33 miles per square mile. The distribution of open roads is somewhat uneven, with the area between Road 6015 and the private land to the east has only a very few roads, while the remainder is relatively well roaded.

Desired Road System Conditions and Management Direction

The desired condition is to provide a road system that is safe, affordable, has minimal ecological impacts, and meets immediate and projected long-term public and resource management needs.

Current direction for road management is found in the 1990 Land and Resource Management Plan (LRMP) for the Deschutes National Forest. According to the LRMP the goal of the Forest's transportation system is "To plan, design, operate, and maintain a safe and economical transportation system providing efficient access for the movement of people and materials involved in the use and protection of National Forest Lands."

The road density was calculated for the project area is above Forest Plan standards and guidelines. At the watershed scale, however, the road densities are closer to the Forest Plan target open road density of 2.5 miles per square mile. The following table displays open road densities for the 6th field watersheds that overlap the analysis area:

The Project Area is divided into the following LRMP and NWFP Management Areas:

Table 1. LRMP Management Areas

LRMP Management Area	Acres
General Forest	4,158
Intensive Recreation	2,283
Wild and Scenic Rivers	1,506
Scenic Views	959
Bald Eagle	836
Old Growth	291
Oregon Cascades Recreation Area	21

Table 2. NWFP Allocations

NWFP Allocations	Acres
Matrix	6,048
Congressionally Reserved	1,409
Administratively Withdrawn	1,876
Late Successional Reserve	705
Riparian Reserves (overlaps other allocations)	4,220

The project lies within the area covered by the Northwest Forest Plan (NWFP), which amended the 1990 LRMP. All NWFP Land Allocations have standards and guidelines that address roads. Standards and Guidelines are requirements that must be met.

Late Successional Reserves:

- Road construction in LSRs for silviculture, salvage, and other activities generally is not recommended unless potential benefits exceed the cost of habitat impairment. If new roads are necessary to implement a practice that is otherwise in accordance with these guidelines, they will be kept to a minimum, be routed through non late-successional habitat where possible, and be designated to minimize adverse impacts.

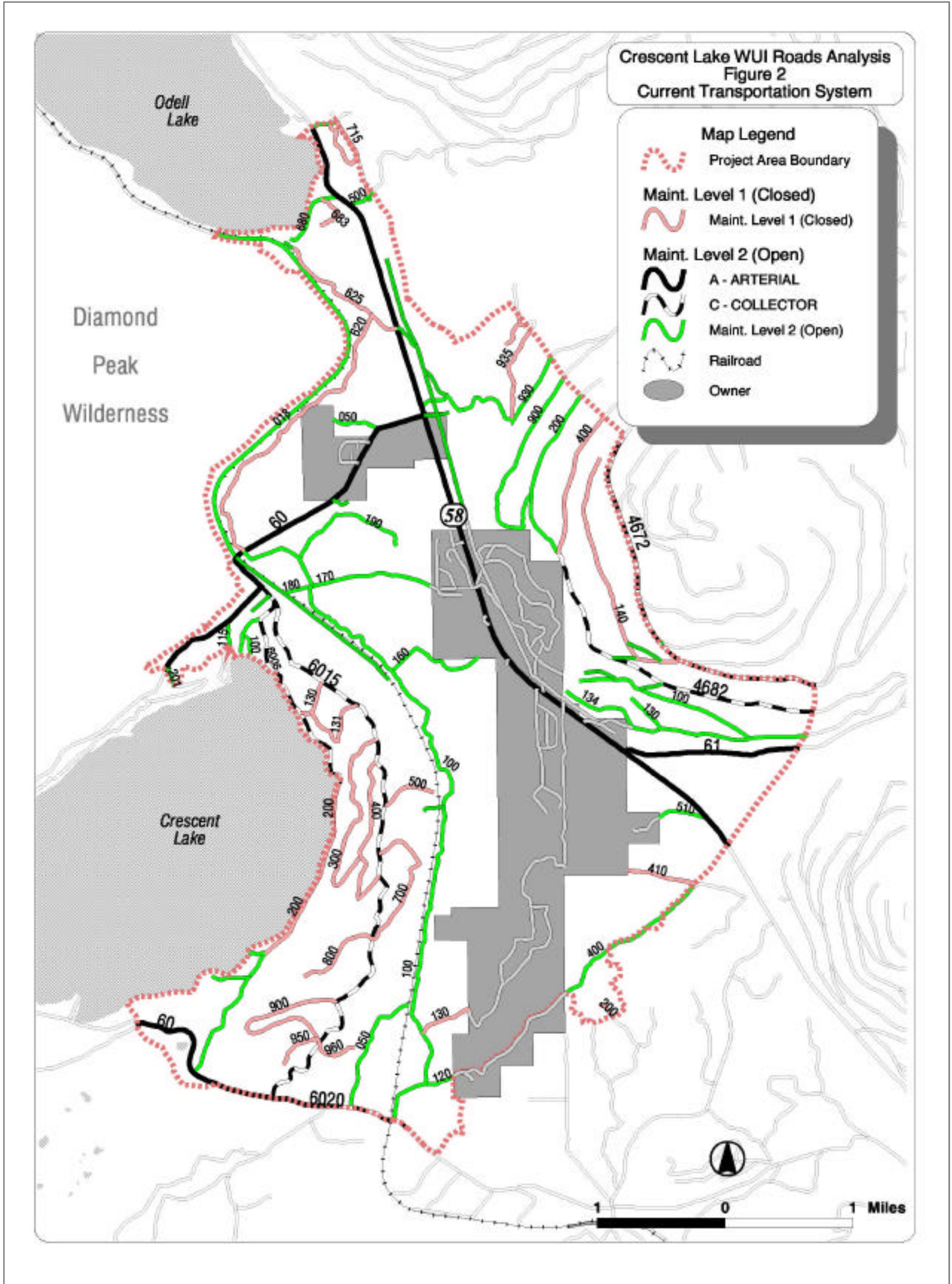
Key Watersheds (Odell Creek 6th field subwatershed is a Tier 1 Key Watershed):

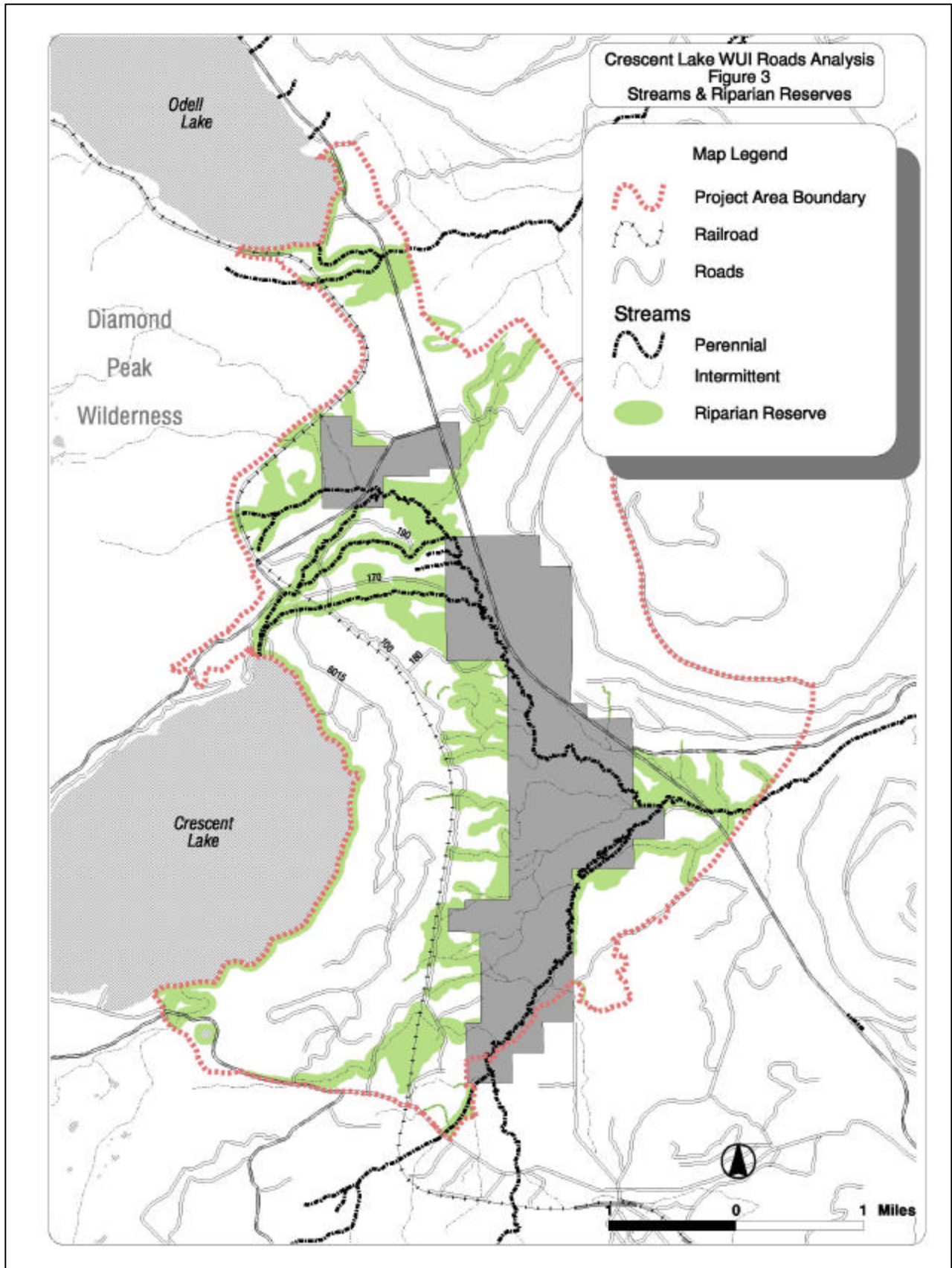
- No new roads will be built in remaining unroaded portions of inventoried roadless areas located in key watersheds.
- Outside roadless areas reduce existing system and non-system road mileage. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in key watersheds.
- Key watersheds are the highest priority for restoration.

Riparian Reserves:

- For each existing or planned road, meet aquatic conservation strategy (ACS) objectives by:

- Minimizing road and landing locations in riparian reserves
- Complete watershed analysis prior to new road construction
- Minimize disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface/subsurface flow.
- Avoid wetlands entirely.
- Determine the influence of each road on the aquatic conservation strategy through watershed analysis. Meet ACS objectives by:
 - Reconstructing roads that pose a substantial risk.
 - Prioritize reconstruction based on risk to riparian resources.
 - Decommission roads based on the affects to ACS objectives and considering short and long-term transportation needs.
- Road crossings that pose a substantial risk to ACS objectives will be improved to accommodate at least the 100-year flood. Priority for upgrading will be based on the potential impacts to riparian resources.
- Road Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of a crossing failure.
- Minimize sediment delivery from roads. Outsloping of the roadway is preferred. Route road drainage away from potentially unstable channels, fills, and hillslopes.
- Provide and maintain passage at all road crossings of existing and potential fish-bearing streams.
- Develop and maintain a transportation management plan that meets ACS objectives and which addresses:
 - Inspection/maintenance during and after storms
 - Road maintenance that identifies and corrects drainage problems that contribute to degrading riparian resources.
 - Develop road management objectives that documents the purpose of each road.





STEP 3**Identifying the Issues**

The purpose of this step is to identify the key questions and issues affecting road-related management. Issues arise when there is a point of debate or concern that cannot be resolved without some consideration of the trade-offs involved. When analyzing the road system, issues usually center around the debate over benefits of having roads versus the risk they may pose to the environment.

During scoping for the Crescent Lake WUI project, over 500 people were contacted. The scoping notice included discussion of access needs. The response to public scoping included a few comments on roads. Public concerns over the transportation system include:

- Impacts to wildlife and wetlands from proposed alternate route to 6020100
- Adequate access to and from private property (6020160 to 6020100 in particular)
- Costs of road closures, maintenance
- Forest Roads that may be crossing private property (6020160 and 4682)

Issue Summary

The most important road-related issues in the analysis area can be divided into two categories.

Social and Economic – roads and needed and/or desired for:

- Vegetation management and other administrative access
- Fire suppression
- Utilities maintenance
- Hunting, mushroom harvesting, firewood gathering
- Recreational driving

Environmental – roads can cause problems such as:

- Potential impacts to water quality, wetlands, and hydrologic function
- Introduction and spread of invasive species, including noxious weeds
- Big game screening

STEP 4**Assessing Benefits, Problems, and Risks****Key Analysis Questions**

The following analysis questions were adapted from Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643). The Interdisciplinary Team answered those questions they felt were relevant to the planning area and the project scale. Some questions were modified or combined. These questions were used to assess benefits, problems, and risks, and for identifying issues. The information will be used during project planning and to focus a project level analysis.

Ecosystem Functions and Process

To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?

Roads are major corridors for dispersal of noxious weeds and other invasive non-native plant species. All roads in the project area are primary areas for invasion by noxious weeds, with vehicles, equipment, and people that use the roads acting as vectors for dispersal. Roads that get the most traffic are the most likely for noxious weed invasion and spread. Users traveling from and through weed-infested areas have the potential to pick up and transport seeds and propagules to uninfested areas along roads and into project activity units in Crescent Lake project area. Noxious weed infestations are documented along Highway 58 and Road 60, and at Crescent Lake Junction, Odell Lake Resort, Crescent Lake Resort, and Simax Beach on Crescent Lake.

The current road system and number of stream crossings in the planning area has the potential for human-caused introduction of non-native amphibian species. An inadvertent or deliberate release of a non-native amphibian species by recreationists in the Crescent Creek or Refrigerator Creek drainage would have the potential over time to out-compete the largest known population of Oregon spotted frogs found in central Oregon. The Oregon spotted frog (a native species) is a federal candidate for listing, which means the species is being monitored because its population and habitat distribution is declining within its historic range. The decline is the result of non-native species now occupying the same habitats and the loss of wetlands to agriculture and urban development.

What are the adverse effects of noise caused by developing, using, and maintaining roads?

Adverse effects of noise to the human environment from roads are generally localized within the analysis area. Highway 58 generates the majority of road-related noise and the effect is primarily experienced by the nearby subdivisions and Crescent Lake Junction. Some occasional noise is created by traffic on Forest Service roads, but - absent administrative activities on these roads – the average daily traffic on these roads would generate insufficient noise to have an impact on either humans or wildlife, especially when compared to hourly rail traffic on the Union Pacific line, the major noise generator on the west side of the planning area.

Proposed planning area activities would result in short-term increases in traffic-generated noise, especially on the west and north sides of the planning area. Timber harvest activities would generate above-normal noise for a matter of weeks, while other fuels reduction activities would have durations of a few days. Noise increases would be expected with implementation of any access alternative relating to Road 6020100, with a greater effect on both humans and wildlife resulting from

construction of the proposed alternate (replacement) route 6020160A¹, which would be used for both fuels reduction activities and log haul. This greater effect would be due to a new road being in place and in closer proximity to residences than the existing route. Log haul on a stabilized 6020100 would lessen the direct noise effect attributable to traffic, but logging activity would still present a significant, though more localized, impact even though route 6020160A would not have been constructed. Route 6020160A, if allowed to remain open after administrative activities are completed, would present a continuing impact, especially to wildlife, but this effect would be limited primarily to the matsutake mushroom/hunting season and would be outweighed by the noise impact generated by the railroad.

Aquatic, Riparian Zone, and Water Quality

How and where does the road system affect wetlands?

Roads affect wetlands by disrupting the natural flow paths of surface and subsurface water. Roads that are constructed on the boundaries or directly through wetlands can alter natural flow regimes. This may cause ponds to develop or limit the natural development of aquatic vegetation. Roads located in these areas may also limit the movement of aquatic-dependent species by creating a barrier to them. There are few, if any Forest Service roads that are located in wetlands in the planning area. In forested lands of the central Cascades, modification of surface flow results from roadbeds being constructed perpendicular to natural water flow patterns. This occurs on hill slopes or in valley bottoms when soils are saturated with water or frozen, or when soil structure inhibits water absorption. Road interception of subsurface flow occurs mainly on steep hillside where the roadbed is cut deep enough into the hillside to intercept some or all of the subsurface flow. Ditches associated with these roads are an extension of the natural channel system and transport the water more efficiently, increasing the potential of storm runoff, magnitude of peak flows, and sediment delivery to larger stream channels.

There is relatively little overland flow in the project area due to the infiltration rates of the soils and the flat topography. Likewise, subsurface flow interaction with roads is rare for the same reasons, but might occur in isolated areas during extreme storm events. However, Forest Service Road 6020-100, which runs parallel to Union Pacific Railroad trending north to south, between main Forest Service Roads 6000 and 6020 crosses Crescent Creek and many small, unnamed tributaries to Crescent Creek, and numerous wet areas. The 6020100 road is approximately 5.7 miles long and has native surface. Construction of Road 6020100 originally affected wetlands by disrupting natural flow paths. However, due to the porous soils and the fact the road was constructed decades ago, stream flow paths have reestablished a natural flow pattern. There is one bridge that crosses Crescent Creek and several small culverts on both perennial and intermittent streams along its length. There are numerous wet areas where the roadbed is inundated with surface water all times of the year. Even though the 6020100 road has modified the surface and subsurface flow of the area, it is slight when compared to the railroad that it parallels.

User-made extensions off many system roads throughout the Crescent Lake WUI project area have allowed for dispersed sites to be created and also for user created OHV trail systems. This use affects the wetlands by direct encroachment or by possible changes in hydrology.

How and where do road-stream crossings influence local stream channels and water quality?

Culverts placed into stream channels cause the stream channel to be U-shaped immediately above and below the culvert, because the culvert is not as wide as the stream channel. During the time that culverts were placed into stream channels, little attention was given to the size needed to accommodate all possible flows. During high flow events culverts at stream crossings may produce

¹ As used in this document, the road number 6020100A is used to identify the possible alternate route parallel to the 6020100.

large sediment inputs to the streams if the culvert becomes plugged, if flows exceed the culvert capacity, and/or if the stream overtops the road causing the road fill to erode and causing it to fail. There are five road crossings on perennial streams that occur on seven-digit roads in the watershed. These are located on Forest Service Roads 6020100 and 58006252. Even though flows are low most of the time of the year the potential for over topping is high during large storm events or on a rain-on-snow event. On the 6020100 road there two major crossings of small tributaries to Crescent Creek. At both locations there are two twenty-four inch culverts that are under native road surface with minimal amount of fill over them. These two locations pose a high risk of failure and would degrade water quality if stream flows exceed culvert capacity or if culverts become plugged. OHV use in wet conditions at these two locations may generate sedimentation that directly enters Crescent Creek.

There is another culvert on the 6020100 road that is three feet in diameter located in the south portion near the junction of the 60 and 6020100 road. This culvert poses a moderate to low risk of failure to over topping or becoming plugged. This stream in this area is a small headwaters of an unnamed tributary to Crescent Creek.

The culvert on Resort Creek poses a moderate to low risk of failure due to the small size of the drainage area and high infiltration rate of the soils.

How and where does the road system generate surface erosion?

Surface erosion from road surfaces is dependent upon the erodibility of the soil, infiltration rates of the soil, slope of the road, and the amount of precipitation. In the Crescent Lake WUI, soils typically have high infiltration rates and water storing capacity. Slopes are generally flat and annual precipitation between 18 and 24 inches, with most falling as snow between October and May. These factors make surface erosion potential from roads in the Crescent Lake WUI limited to small-dispersed campsites, and Off Highway Vehicle (OHV) use that are adjacent to and cross Crescent Creek, Odell Creek and their tributaries. The soils in these areas have been compacted, decreasing soil infiltration rates and may increase overland flow that will generate surface erosion. OHV use in wet conditions on FS road 6020100 generates sedimentation directly to Crescent Creek. Surface erosion is also generated in wet areas that OHVs cross but are not connected to stream channels.

Located in Township 23 S, Range 6 E, Section 25, in the area immediately to the northwest of Odell Creek, hillside slopes are greater than fifty percent. Use of an unnumbered powerline access road at this location has removed most, and in some cases, all of the native vegetation and ground cover. This situation generates and delivers large amounts of sediment to Odell Creek during spring runoff. On the southeast side of Odell Creek on the power line road slopes are nearly flat adjacent to the stream channel. Associated with this flat area is a wide, well-vegetated riparian area that limits access and filters out sediment during dry periods of the year.

How and where does the road system affect mass wasting?

The factors that influence mass wasting are hill slope, bedrock geology, soil structure, vegetation, road construction and drainage, and precipitation. Due to the flat topography, infiltration rates of these soils, and precipitation amount, mass wasting is a rare occurrence in the project area.

How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides, to enter surface waters?

The potential for pollutants exists primarily at stream crossings and at those locations where roads or roadside dispersed recreation sites are in close proximity to streams. Most stream crossings in the analysis area are associated with arterial and collector roads and are therefore outside the scope of this analysis.

The largest potential for introduction of pollutants into surface water exists on Highway 58 at its crossings of Crescent and Odell Creeks. A lesser potential exists on Rd. 6005 at Crescent Creek and Rd. 5800680 at Odell Creek. A minor risk of pollutants being introduced to surface waters exists

on Rd. 6020100. The primary potential for pollutants presented by the road system is from chemical or oil spills resulting from accidents in the vicinity of the stream crossings.

Although Rd. 6020100 is in the proximity of at least seasonal surface water, it proposes a limited risk for delivery of pollutants into those waters because of the nature of the traffic it currently receives or would receive as a result of proposed actions. Construction of alternate route 6020160A would only afford a limited abatement of that risk, primarily because of the already low risk.

Dispersed sites and user-created OHV trails in the vicinity of the Crescent Lake subdivisions, along with system and private roads that cross Crescent Creek or its tributaries pose possible sources of contamination of Crescent Creek or its tributaries. Oils and fuels may enter the stream system at these locations from vehicles or other machinery that come in direct contact with the water. Due to the high recreation use in the area this could occur at any of the stream crossings mentioned previously.

The most likely mechanism for delivery of pollutants into surface waters would be the result of a vehicle or snow mobile accidents on roads near these surface waters. The privately controlled portion of the road system offers some indirect risk for pollutants as a result of its association with private home lots that, in some cases, have direct frontage on Crescent Creek.

Another high risk of pollutants entering Crescent Creek or its tributaries comes from the Union Pacific Railroad that runs through the analysis area and crosses Crescent Creek and its tributaries at numerous places. This could be a spill from the many railroad tankers carrying a variety of chemicals that travel the railroad system. There is currently a hazardous spill area located within the riparian area of Crescent Creek. It is within fifteen feet of forest Service road 6020100, and approximately two hundred feet from Crescent Creek. The material is Bunker C and is currently being planned for clean up by Union Pacific Railroad as directed by Oregon Department of Environmental Quality.

How and where is the road system “hydrologically connected” to the stream system? How do the connections affect water quality and quantity (such as, the delivery of sediments and chemicals, thermal increases, elevated peak flows)?

When there is a direct connection (roadside ditch) between the road system and the stream channel there is always a risk of affecting the water quality with rapid runoff. During rapid runoff, sediments, chemicals, and elevated peak flows may occur. As mentioned earlier in AQ (4), there are few seven-digit roads in this watershed that are “hydrologically connected” to the stream system. Stream channels in the project area appear to be stable. Stream crossings that are hydrologically connected to the stream system are on the 6020100 road where the road crosses perennial streams.

What downstream beneficial uses of water exist in the area? What changes in uses and demands are expected over time? How are they affected or put at risk by road-derived pollutants?

The downstream beneficial uses of water in the project area, as defined by Oregon Department of Environmental Quality are: public domestic water supply, livestock watering, irrigation, industrial water supply, water contact recreation, salmonid spawning and rearing, aesthetic quality, boating, aquatic life and private domestic water supply. Presently, the demand for water, both domestic and non-domestic, is low in the project area since the area is sparsely populated. However, the demand for instream water rights and increased demands on ground water in the lower Deschutes Basin is of a major concern. No known or expected uses are at risk from road-derived pollutants at this time.

How does the road system alter physical channel dynamics, including isolation of floodplains; constraints on channel migration; and the movement of large wood, fine organic matter, and sediment?

Due to the relatively flat topography and road locations in the Crescent Lake WUI, channel migration, isolation of floodplains, and the movement of fine organic matter is not an issue. Migration of woody

material downstream of road crossings may be restricted due to culvert placement on perennial stream crossings.

How does the road system affect shading, litterfall, and riparian plant communities?

Past primary considerations for road planning, construction, and maintenance were traffic levels and economics, with little concern for environmental effects (Gardner 1979, in Meehan 1991). This often resulted in construction of roads in valley bottoms, where the road system frequently infringes on the streambanks and floodplains. Vegetation, including riparian shrubs and trees, is removed during road construction and maintenance. Stream shade, potential nutrients to the stream system from litterfall, and the abundance and vigor of riparian vegetation are all reduced.

The road system effects to shading, litterfall, and riparian plant communities in the project area occur primarily where the road system crosses or is directly adjacent to streams. Many of the crossings are on intermittent streams where the effects to shade, litterfall, and riparian vegetation have less impact than on perennial streams such as the Crescent Creek. Off-road vehicles and other recreation activities affect riparian vegetation on Crescent Creek or its tributaries along the 6020100 road.

Roads that cross perennial streams are: 5800620, 6000018, 6005008, and 6020100. Roads that cross intermittent streams are: 1 culvert 6000280, 4 culverts on 6000018, 1 culvert 620050, and 7 culverts on 6020100. Less than 50 linear feet are affected at each crossing for a total of approximately 850 linear feet of stream affected in the Crescent Lake WUI.

Economics

How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?

The road system directly affects agency revenues by providing existing access to locations where revenue-producing activities occur. Commercial post-and-pole sales, commercial firewood sales, commercial mushroom picking, and timber sales all rely on the existing road system that is the subject of this analysis.

Direct agency costs generally derive from maintenance work and administrative activity:

Maintenance: Although few of the roads being analyzed receive recurrent maintenance, the need for maintenance accrues as time passes. The cost incurred by the agency for this deferred maintenance is most commonly presented when scheduled timber sale activity requires that the road be brought to a minimum standard suitable for log haul. This cost is represented in the timber sale appraisal as an overhead cost that reduces timber sale revenue.

Administrative Activity: Road closures implemented for the enhancement of other resource values result in adding time – and, consequently, cost – to activities such as timber sale layout and planning area reconnaissance because of increased complexity in gaining access to areas behind closures. Costs are also generated by the opening and reclosing of closed roads for administrative or contract access.

The low standard of the road system also results in a revenue reduction, although it is probably a minor cost and is one that is rather difficult to quantify. This reduction occurs as a result of the increased haul times for timber sale operators over what they might experience operating on higher standard roads.

Commodity Production and Timber Management

How does road spacing and location affect logging system feasibility?

Traditional logging practices in the area have dictated ground-based yarding systems to remove logs to landings. As a result, the existing road system is oriented to facilitate downhill yarding, roads are found generally at lower positions on slopes, and roads are spaced relatively close together in areas that have seen extensive harvest activity. This tends to lead to future use of similar tractor-based systems for future harvest activities, as cable yarding systems are disadvantaged by the extra cost necessary to construct properly positioned roads.

With particular respect to Rd. 6020100 and route 6020160A, the ground slopes and the type of proposed silvicultural treatments generally dictate feasibility of any particular system. While construction of route 6020160A would result in a route running through several stands proposed for treatment, suitable access could also be achieved by constructing temporary roads off of Rd. 6020100. In either case, the likely logging system would be a ground-based (tractor) system.

How does the road system affect managing the suitable timber base and other lands?

Access routes have been established throughout the managed portion of the analysis area because of past timber harvest. Access to the timber base, as well as to Crescent and Odell Lakes, resorts, private residences, utility corridors, and an important rail line are also provided by this road system. Management of the timber base is enhanced by the presence of the road system in that convenient access is provided; this reduces the monetary cost and time that would otherwise be required in the absence of roads. Also, harvest activities resulting from recent and pending environmental analysis efforts have been and will be done with greater practical and economic efficiency because little new permanent road construction was or will be required to gain access. However, some cost would need to be incurred to address the condition of Rd. 6020100 or its alternate route 6020160A. Absence of a suitable route in this area, coupled with the cost of construction or maintenance/stabilization to achieve such a route, has resulted in repeated deferral of any silvicultural efforts to address an increasing fire hazard in perhaps a marginal portion of the suitable timber base.

How does the road system affect access to timber stands needing silvicultural treatment?

As noted above, a well-developed transportation system has been established in the analysis area through past harvest practices. This system, when viewed without regard to whether the roads are open or closed, provides basic access to virtually every stand that may need future silvicultural treatment. Effective access through the various stages of planning and implementation can be variable because of current and proposed road closures; these closures increase the need for foot travel to certain stands during planning activities and add to the cost of implementing certain silvicultural practices such as precommercial thinning as a result of higher bid prices for "walk-in" units. Such issues can theoretically be dealt with by opening the road during periods when such administrative use is necessary, but as a practical matter funding and equipment availability or the capability of locally available equipment often results in roads being left closed during these administrative activities (except in the case of merchantable timber harvest, when capable equipment for opening and re-closing roads is readily available).

Special Forest Products

How does the road system affect access for collecting special forest products?

Road access is a key element in the collection of special forest products. The most commonly sought-after products within the analysis area are firewood, fence posts and poles, and matsutake mushrooms. In all three cases, but especially in the instance of wood products, immediate access to the material source controls the collection of these materials. The presence or absence of road access to the immediate vicinity of firewood/post and pole areas dictates whether these can be collected due to the physical necessity of getting the hauling vehicle to within feet of the material

supply. To a somewhat lesser degree, the collection of mushrooms is also controlled by the availability of roads, although mushroom harvesters tend to travel on foot farther afield away from roads in search of mushroom patches. The existing road system, absent consideration of maintenance levels, provides access to most areas where these special forest products can be collected. When maintenance levels and consequent road closures are considered, there can be some diminution in the available access to special forest products.

The most effective closure method in the terrain typically found in the analysis area is to physically barricade a road entrance and tear up the road surface for the visible distance back from that barricade to discourage efforts to defeat the barricade. While this sort of closure method can be removed with locally available equipment for the duration of a planned entry for firewood or post/pole collection, it would be much less practical and much more expensive (to the point of being prohibitive) to employ the same strategy for annual entry by mushroom harvesters. As a practical matter, therefore, non-administrative road closures implemented for general resource protection purposes do not necessarily preclude access to firewood or post/pole harvest areas; they do to some degree, however, limit access to those interested in mushroom collection.

In the specific instance of Road 6020100, road condition somewhat limits access by season and by amount of precipitation in a given year. Mudholes can, in wet years, be nearly impassable throughout the field season; on dryer years, it can be navigated with four-wheel-drive vehicles. Maintenance to make these muddy areas passable, as well as construction of alternate route 6020160A, would serve to improve access for extraction of special forest products in the analysis area.

General Public Transportation

How does the road system connect to public roads and provide primary access to communities?

Two subdivisions comprised of a mix of recreational and year-round residences are found within the watershed, along with the community of Crescent Lake Junction and other small collections of houses. The Royce Mountain subdivision has direct access to Highway 58 and has "fire escape" access to National Forest land to the west via Rd. 6020170. Diamond View Estates also is provided with direct access to Highway 58; there is no current access to National Forest roads, although a proposal has been made to construct a short spur road to gain access to Rd. 4682 to the east of the subdivision to serve as an escape route. Crescent Lake Junction resides directly astride Highway 58; Forest Service roads play no role in access.

How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, inholdings and so on)?

The two blocks of land in other ownership are accessed primarily by Highway 58 and route 60 under Oregon Department of Transportation jurisdiction. Road 6020170 provides secondary access to some of this other ownership, but it serves primarily as a back door to National Forest System land and as a fire escape route. Road 6020160 provides sole access to one private parcel of land along Crescent Creek with access to public highways by way of either 6020100 to State Route 60 or across 6020170 through Royce Mountain subdivision to Highway 58.

How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS 2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)

Highway 58 resides on a Department of Transportation easement held by the State of Oregon. Management is dictated by various memoranda of understanding that prescribe roles and responsibilities with regard to managing the road and adjacent land within the right of way.

How does the road system address the safety of road users?

There is a spectrum of roads within the analysis area, ranging from low standard native surface Forest Service roads to a high-speed controlled access highway. Consideration for safety of the road user spans a similar spectrum. While Highway 58, State Route 60, and 5800680 (to Odell Lake Lodge) are managed to meet the requirements of the Highway Safety Act, most of the other roads – in particular the Forest Service roads – provide moderate to little consideration for user safety. The private subdivision roads are maintained to provide a degree of safety that is comfortable to the primary users (residents).

Most of Forest service roads are assigned a low maintenance level and receive only the amount of maintenance necessary to prevent impacts on adjacent resources. User safety, in the sense that it is provided on the State highways, is not a consideration on these roads. There are no standards for roadside obstructions, road widths around corners are sometimes too narrow to allow two oncoming vehicles to pass, minimum stopping sight distances are not considered, and road surfaces are not maintained in a manner to facilitate safe high-speed driving. These roads were designed and built employing design standards that would make them safe to use at low speed (20 mph or less). When driven at an appropriate low speed by drivers familiar with the requirements of backwoods driving, these roads are sufficiently safe to drive; although they can sometimes comfortably be driven at faster than design speed, safety concerns for use at these speeds have not been addressed.

Protection

How does the road system affect fuels management? How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires? How does the road system affect risk to firefighters and to public safety? How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

The relationship between the road system and the fuels program is related in the ease of getting to a unit to perform fuels treatments, the type of equipment we can use, and the type of treatment we can accomplish. A closed road makes more work for fuels in getting resources to the unit for mechanical treatment and limits the types of resources we can get to an underburn, increasing our chances of escapes and raising the complexity of burns. We will need higher qualified people and more resources to accomplish burns. This will increase cost per acre and reduce accomplishment and in some areas will have to cancel reintroduction of fire to the forest.

The more roads we close the more time, effort and resources it will take to control a wildfire. The inability to get an engine to the scene and the longer hike into the fire by crews will cause fires to grow larger and be more difficult to fight. There will be a greater risk of fires growing larger and causing greater resource damage. In addition to providing access to fires, roads are a great control line and can speed up the containment of a wildfire, reduce fatigue of firefighters, and increase safety when used as escape routes and/or holding lines. In the wildland urban interface the risk of fires is significantly higher. The loss of forest resources, habitat, human life, and homes could increase significantly with the reduction of roads near these areas.

There are roads in the analysis area that are used for egress for the subdivisions. Some of these roads are in poor condition and need repair. In some areas there are no egress roads. In particular there is no egress from the north side of Diamond Peaks subdivision. Forest Service road 6000170 needs repair. Forest Service road 6000100 is another concern for fuels and suppression. This road is in very poor shape and some of our engines can't get down it because of potholes that turn into small mud bogs throughout the year. We need to have multiple well-maintained and marked egress routes for firefighter and public safety.

There are two effects of dust emissions created by emergency vehicles heading to fires: visibility and human concerns. The visibility concerns are temporary and can be mitigated with slow driving and watering roads. The health issues with dust aren't as critical as the added amount of PM2.5 and

PM10¹ emissions created by smoke because of the larger size, and longer mop up created by the extra time needed to get to the fire.

Special Uses

How does the road system affect managing special-use permit sites (concessionaires, communication sites, utility corridors, and so on)?

Various roads within the analysis area provide access to utility lines owned by Midstate Electric Company, Century Telephone, and Qwest Corporation. These lines provide electricity and communication to the various subdivisions on the western side of the District, as well as to residences, resorts, and local businesses in the Crescent Lake and Odell Lake areas. Since power outages, which can occur at any time of the year, are capable of creating hardships for area residences and businesses, access by the existing road system to any location along the utility corridors is important for crews seeking to expedite repairs.

There is some intermingled private and National Forest System lands within and adjacent to the analysis area. Access to private inholdings is generally by highway, county, or Forest roads. Forest roads may be used to access private property without a special use permit. A change in the status of a Forest road may require issuance of a special use permit and/or providing an alternate access to private inholdings.

Road 60 and various "tributary" roads provide the primary access to Crescent Lake Resort, Crescent Lake Recreation Residence Tract (72 cabins), Crescent Townsite (17 cabins), Crescent Lake Guard Station, Crescent Lake Dam, Crescent Lake State Airport, and Camp Makualla Boy Scout Camp. All are authorized to operate on National Forest System Lands under a special use permit.

Crescent Lake Resort operates year round and provides a variety of summer and winter recreation opportunities including; lodging, restaurant, boat rentals, moorage, marina gas and oil, boat launch, and snowmobile rentals. The level of activity around the resort is high in the peak summer season and is expected to remain or increase in the future.

Currently, The Crescent Lake Recreation Residence Tract has road access only during the summer season. A seasonal gate closure occurs December 1st and continues through the snow season. Cabin owners are permitted access via snowmobiles during the winter closure.

Crescent Lake Dam requires year round access. This access is important in monitoring the Dam facilities and lake level.

Road 6020 is a popular secondary access to Camp Makualla.

Roads 6020100 and 6020180 provide access to the Union Pacific Railroad mainline. The existing road system allows year round primary access for track maintenance.

Road 5800680 provides year round access to Odell Lake Resort and two Odell Lake Recreation Residences. All three operate on National Forest System Lands under a special use permit.

Odell Lake Resort operates year round and provides a variety of summer and winter recreation opportunities including: lodging, restaurant, boat rentals, moorage, marina gas and oil, boat launch, and cross country ski rentals. The level of activity around the resort is high in the peak summer season and is expected to remain or increase in the future.

¹ PM= Particulate Matter emissions limit visibility, absorb harmful gases, and aggravate respiratory conditions in susceptible individuals. Over 90% of the mass of particulate matter produced by fire is inhalable and respirable. Respirable suspended particulate matter is the portion of the total particulate matter that, because of its small size, has an especially long residence time in the atmosphere and penetrates deeply into the lungs. (NFES 1279, PMS 420-2, February 1985)

Terrestrial Wildlife

What are the direct and indirect effects of the road system on mule deer and Rocky Mountain elk?

The Crescent Lake WUI area (WUI) provides quality big game habitat because of the abundant streams, riparian habitats, stringer meadows, and well-distributed hiding and thermal cover forested stands. Calving and fawning areas include areas along Odell Creek east of Highway 58 and in riparian habitats of the tributary streams to Crescent Creek.

Open road densities within the WUI are currently 3.33 miles per square mile of land within the national forest portion of the planning area. This density currently exceeds the 2.5 miles per square mile recommended in the Deschutes National Forest Land and Resource Management Plan (LRMP, 1990). However, the road density for the watershed is only 1.68 miles per square mile. Additionally, approximately 280 acres of the WUI are within the 1,600-acre Maklaks Key Elk Area, identified in the LRMP. Current open road density within the Maklaks KEA is 0.78 miles per square mile, which is within the range of 0.5 to 1.5 miles recommended in the LRMP.

One of the most obvious effects of open roads on big game is the loss of animals to motor vehicle collisions. Within the WUI, the greatest impact would occur to animals crossing Highway 58 either during spring and fall migrations and to those animals that attempt to cross daily to reach water sources, prime forage areas, or cover habitats. Another effect of road construction is a direct loss of wildlife habitat that can range from 2.5 acres per mile of road to three or four times that amount depending on the road clearing width.

Indirect effects on big game use of roaded habitats can include displacement away from roaded areas. Recent research in northeast Oregon (Rowland 2000) show that cow elk consistently select areas away from open roads during the spring and summer months. They also found that the spatial distribution of roads could affect elk habitat use. Regularly spaced roads had the greatest negative impact on elk and a more randomly spaced pattern less impact. The primary impacts were forcing elk into habitats that may be less suitable to support daily activities including finding quality forage, adequate water intake for lactating cows, and possible decreased survival rate for elk calves. Another indirect effect of open roads is greater and easier access to animals during hunting seasons and/or those taken illegally.

The Crescent Lake WUI project is designed to reduce the risk of catastrophic wildfire to urban areas and to improve forest health by reducing the risk of large-scale tree mortality from insect outbreaks. To implement the proposed action, new road construction including temporary and/or specified roads may be needed to provide access to treatment areas. In addition, some currently closed roads may be needed to be re-opened for access. Any newly constructed or re-opened road(s) are likely to access forested stands that are currently providing hiding and thermal cover to deer and elk. The primary area of concern is east of the Union Pacific Railroad line easterly to the private land boundaries west of Highway 58. These concerns may be mitigated, at least partially by closing all temporary roads to vehicular traffic after project completion and by leaving cover blocks large enough to hide deer and elk from road induced human disturbance.

Is the road system having an effect on threatened, endangered, sensitive, management indicator species, or other wildlife species of concern?

Within the boundaries of the Crescent Lake WUI there are one northern bald eagle nest territory (a federally threatened species), one northern goshawk nest territory, and six osprey nest territories (Deschutes National Forest Indicator Species). In addition, there is one known great gray owl nest territory.

Open roads have the capability to negatively impact wildlife species as a result of human caused disturbance. Elevated noise levels from vehicular traffic and human access into nesting or denning sites have the potential to cause nest or den abandonment if conducted during sensitive times of the year. Most raptor species are very sensitive to human intrusion during the nesting season. Open roads increase the risk sensitive sites may be impacted.

Northern Bald Eagle At the present time vehicle access is blocked to the nest site and seasonal restrictions are in place to prohibit disturbance type activities within 0.25 miles of the nest. Any currently closed roads re-opened for access to treatment units would be re-closed after the completion of activities.

Northern Goshawk The one known nesting territory was first confirmed in 2002. The nest site is located approximately 500 feet from an open road in use from May through September each year. At the present time it is unknown if road/human use will negatively impact this pair. There is no opportunity to restrict vehicle access into this area because of a special use permit.

Osprey Two of the known osprey sites are located on the southeast side of Odell Lake, east of Highway 58. These pairs may be accustomed to vehicle traffic but human disturbance under the nest may be disruptive if it is occurring. Two additional nest territories are located south of Odell Lake in a regeneration harvest unit with road access to within 200-250 yards from the nests. A fifth nest territory is located adjacent to Crescent Lake but vehicle access to the public is blocked by a locked gate. Foot traffic past the nest site is assumed to be occurring but additional monitoring is needed to determine the impact to this osprey territory. The sixth nest territory is located just outside the project boundary south of Forest Road 6020 road. Disturbance by vehicles and/or humans is not thought to be an issue at this time to this site.

Great Gray Owl The one known great gray owl nest site within the WUI is located near the Southern Pacific Railroad line and human and/or vehicle related disturbance is not thought to be an issue at this time.

Passive Use Value

What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for areas planned for road entry or road closure?

Portions of the area are within the boundaries of land claimed by the Klamath Indians under the Treaty of October 14, 1864 (16 Stat., 707). Based on analysis of archaeological materials from nearby, there is the suggestion that other groups also used the area on an occasional or even regular basis. These would be the Molalla peoples of the western slopes of the central Cascades and the Paiute peoples of the northern Great Basin to the east.

Will constructing, closing, or decommissioning roads substantially affect passive-use value?

Possibly, yes. Until such areas are clearly identified, however, this question can not be adequately addressed. In general, it is presumed that loss of access would affect such values, in that a person would learn that in the future, they would have to find another way to access a particular area.

Social Issues

How does the road system affect access to paleontological, archaeological, and historical sites?

In many instances roads give good access to such sites. In others, access is less direct. And in other cases, access is too good, leading to site vandalism and damage.

How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

Presently, there is little information available with which to address this question. It is presumed that for those American Indians who exercise their treaty rights, the road system likely facilitates such practices as much as it hinders these same practices. This is because the better the access to hunting grounds or places where special plants are found, the better the ability of these persons to

reach and make use of them. The flip side of this ready access is that non-Indians have an equal level of access to the same places.

How are roads that constitute historic sites affected by road management?

Historic roads are affected in various ways by road management, depending on whether the new routes make use of the old routes, or whether the new routes cross over old ones only in a few spots. Effects on historic roads depend on what the actual road management activity entails. In most cases where the modern route is in the same corridor as the earlier routes, there is little original physical integrity remaining with which to evaluate the changes. Many times the only evidence of an historic route lies not on the ground, but in the historic record and on old maps. In other cases, however, where there is an intersection of the two routes, damage to the historic route is less severe. It could be argued in these latter cases that, even though the old route was compromised by a modern route crossing it, the rest of the earlier route remains intact from disturbance by the modern route.

What are the traditional uses of animal and plant species in the area of analysis?

Presently, there is inadequate information available with which to answer this question. It is presumed, based on the archaeological and historic record, that traditional uses include hunting large and small game animals and gathering economic plant species that would supplement a protein diet. Prehistoric archaeological evidence in the area suggests that early inhabitants hunted with bow and arrow, using mainly volcanic glass (obsidian) arrowheads. In limited cases there is evidence of an earlier projectile system that was also used, namely spears or darts hafted to long shafts and propelled with an atlatl, or spear thrower.

Traditional historic uses of animals are presumed to be the same, for food, as well as for their furs in some cases. Plant species were much more systematically exploited in the early historic period and continuing to the present. This is mainly the harvest of coniferous tree species for lumber, pulp, or other such uses. Some areas may have been exploited for grazing sheep and cattle as well, although not for the past decade or so.

Civil Rights and Environmental Justice

Is the road system used or valued differently by minority, low-income, or disabled populations than by the general population? Would potential changes to the road system or its management have disproportionate negative impacts on minority, low-income, or disabled populations?

The road system does not discriminate the type of use by subsets of the general population and would not necessarily impact the civil rights of an underrepresented population. Any closure, decommissioning, or construction of roads would affect all populations in an equal way. A primary purpose of road management is to provide for the health and safety in road use for all members of the public.

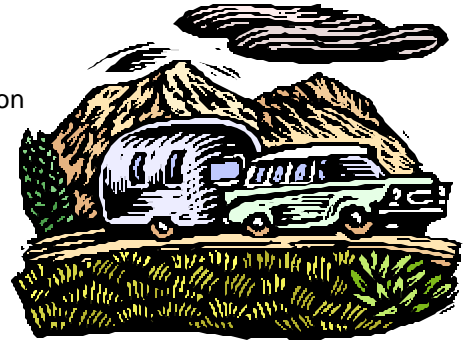
Benefits and Problems of the Current Road System

With the “Key Analysis Questions”, many of the benefits and problems of the road system are identified and discussed. The general themes can be divided into benefits (access and uses) and problems (where roads interact with ecosystems).

Access and Uses

Recreational Driving

Recreational driving is a popular past time on NFS Lands. The Crescent and Odell Watershed Analyses note increases in recreation and greater demand for access to public lands. The Crescent Lake area is readily accessible from Highway 58 and provides many opportunities for recreation.



Railroad and other Corridor Access

The Key Analysis Questions have identified many instances where roads provide the primary access to utility corridors and the Union Pacific Railway.

Administrative Access

There is a need to access areas of the forest for management purposes, such as fuels reduction. Because of the interface conditions, it is important that roads facilitate fire suppression efforts as well. Vegetation management, including timber sales and plantation thinning, is ongoing throughout the planning area and is expected to continue.

When roads are closed for resource protection, or otherwise not available, an indirect effect is the increased cost to access areas for administrative purposes or where contracts are being administered.

ANILCA Access to Private Inholdings (Forest Road 6020160)

The Alaska National Interest Lands Conservation Act of 1980 (16 U.S.C. 3210) requires that access be provided to non-federally owned land within the boundaries of the National Forest System for the reasonable use and enjoyment thereof. This situation occurs in one location in the analysis area: Township 24 South, Range 7 East, Section 7. Currently, Forest Road 6020160 provides access to the property owners in this location. There has been some disagreement with the County regarding the necessity for easements to be granted to property owners who access their land via National Forest System roads.

Fire Suppression and Emergency Egress

The ability to reach wildfires with engines greatly improves the ability to put them out quickly. Roads are a double-edged sword with regards to fire, though, as they increase the presence of ignition sources in the forest. Where residential areas, recreational facilities, and other developments are intermixed with forestland, there should be escape routes available in the event of a wildfire.

Input from the local fire protection agency, Walker Range RFP, indicated that a secondary egress from the Diamond View Estates subdivision would provide an escape route to the east, if needed in an emergency situation, such as a wildfire.

Roads and Ecosystem Interactions

Invasive Plants

Motorized vehicles and/or their cargo are the single most important vector for the introduction and spread of noxious weeds and other non-native plant species. Several types of noxious weeds are known to exist in the project area. All roads in the project area are primary areas for invasion by noxious weeds, with vehicles, equipment, and people that use the roads acting as vectors for dispersal. Roads that get the most traffic are the most likely for noxious weed invasion and spread. Users traveling from and through weed-infested areas have the potential to pick up and transport seeds and propagules to uninfested areas along roads and into project activity units in Crescent Lake project area. Noxious weed infestations are documented along Highway 58 and Road 60, and at Crescent Lake Junction, Odell Lake Resort, Crescent Lake Resort, and Simax Beach on Crescent Lake.

Aquatic Habitat

Roads have the capability of affecting populations of fish, amphibians, and invertebrates. Road crossings may affect the ability of fish populations and other aquatic species to migrate successfully into habitat, or to have upstream genetic interchange. During high flow events, culverts at stream crossings may produce large sediment inputs to the streams if the culvert becomes plugged, if flows exceed the culvert capacity, and/or if the stream overtops the road causing the road fill to erode and causing it to fail. Riparian vegetation can be impacted where roads crossing the riparian zone or by the road system by providing access to dispersed recreation sites. Compaction and/or sedimentation affect some sites in the project area on a small, localized scale.

The road system, road crossings, and dispersed recreation sites can provide dispersal sites for non-native riparian and aquatic plant species from seeds or vegetative propagules on vehicles, equipment, clothing, or animals (pet fur, for example).

In the analysis area, Crescent Creek is considered water quality limited by the Oregon Department of Environmental Quality because of stream temperatures that exceed State of Oregon water quality standards. A Water Quality Restoration Plan (WQRP) has been completed for the Crescent Watershed. The WQRP concluded that road crossings on Crescent Creek are not significantly or additively contributing to water temperatures (USFS 2002).

STEP 5 Describing Opportunities and Setting Priorities

This section describes options for modifying the road system that would achieve desirable or acceptable conditions. Refer to Figure 4 for a map of the recommendations.

Forest-Wide Roads Analysis

The Deschutes and Ochoco National Forests completed a Forest-wide Roads Analysis in January 2003. At such a large scale, it was limited to the two and four-digit roads (arterial and collector). No recommendations were made for local roads. The recommendations made in that analysis, that are located in the Crescent Lake WUI project area include:

- Noxious weed treatments along Roads 58, 60, and 61
- Replacing undersize culverts where necessary
- Pave stream crossing where Road 6020 crosses Refrigerator Creek.

Other Assessments

The project area is covered by two 5th Field Watershed Assessments. The Big Marsh Watershed Analysis was completed in 1997 and the Odell Watershed Analysis was completed in 1999. General recommendations for roads and access can be found in these reports. Site-specific recommendations that pertain the Crescent Lake project area include:

- Coordinate with ODOT to explore ways to reduce the entry of cinders into the water bodies and stream channels. Cinders from Highway 58 are reaching Odell and Crescent Creeks. These bridges are currently scheduled for repairs by ODOT. This would be a good opportunity to address this concern.
- Reduce open road densities on east side of Crescent Lake. This objective has been met by recent closures of numerous roads off of Forest Road 6015.

Recommendations for the Crescent Lake WUI Project Area

Overall Priorities

- Provide access for administrative use and fire suppression
- Provide access to inholdings, easements, rights of way, and special use permits
- Reduce the road system's ability to introduce and spread noxious weeds
- Reduce impacts to the aquatic system
- Address concerns about Forest Roads crossing private property

Specific Recommendations

1. **Open/Closed Roads** – The Team recommends that there be no change to the current maintenance level of all roads in the project area. Because of on-going and expected future forest management, roads will be opened as needed, and re-closed after work is completed.
2. **Forest Road 6020100** – Improve the condition of this road for use in timber hauling and fire access. Reduce its impact on the aquatic system.

- Fix encroaching right of way
 - Address issue of bridge strength at Crescent Creek
 - Repair stream crossings
 - Undertake repairs and improvements south of Forest Road 6020160
3. **Land Surveys** – Conduct land surveys at locations on Forest Roads 4682 and 6020160, to determine if these roads are crossing private property.
 4. **Diamond View Estates** – Provide secondary egress from north end of the subdivision. A non-maintained route currently exists. This could be added to the transportation system and improved by the homeowners or local fire district as they deem necessary.
 5. **Stream Crossings** – The crossing of Kaboom Creek by the Boy Scout Camp entrance road; Road 6020100; the crossing of Cold Creek by Forest Road 5800620 should be looked at further.
 6. **Odell Creek/Powerline Road** – Address sedimentation that is occurring near the powerline crossing on Odell Creek.
 7. **Noxious Weeds** - Prevent the introduction and spread of noxious weeds and invasive non-native plants in the project area by following guidelines in the Guide to Noxious Weed Prevention Practices (USFS 2001) and the Integrated Weed management Plant (Supplement to the Deschutes National Forest Noxious Weed Control Environmental Assessment 1998).

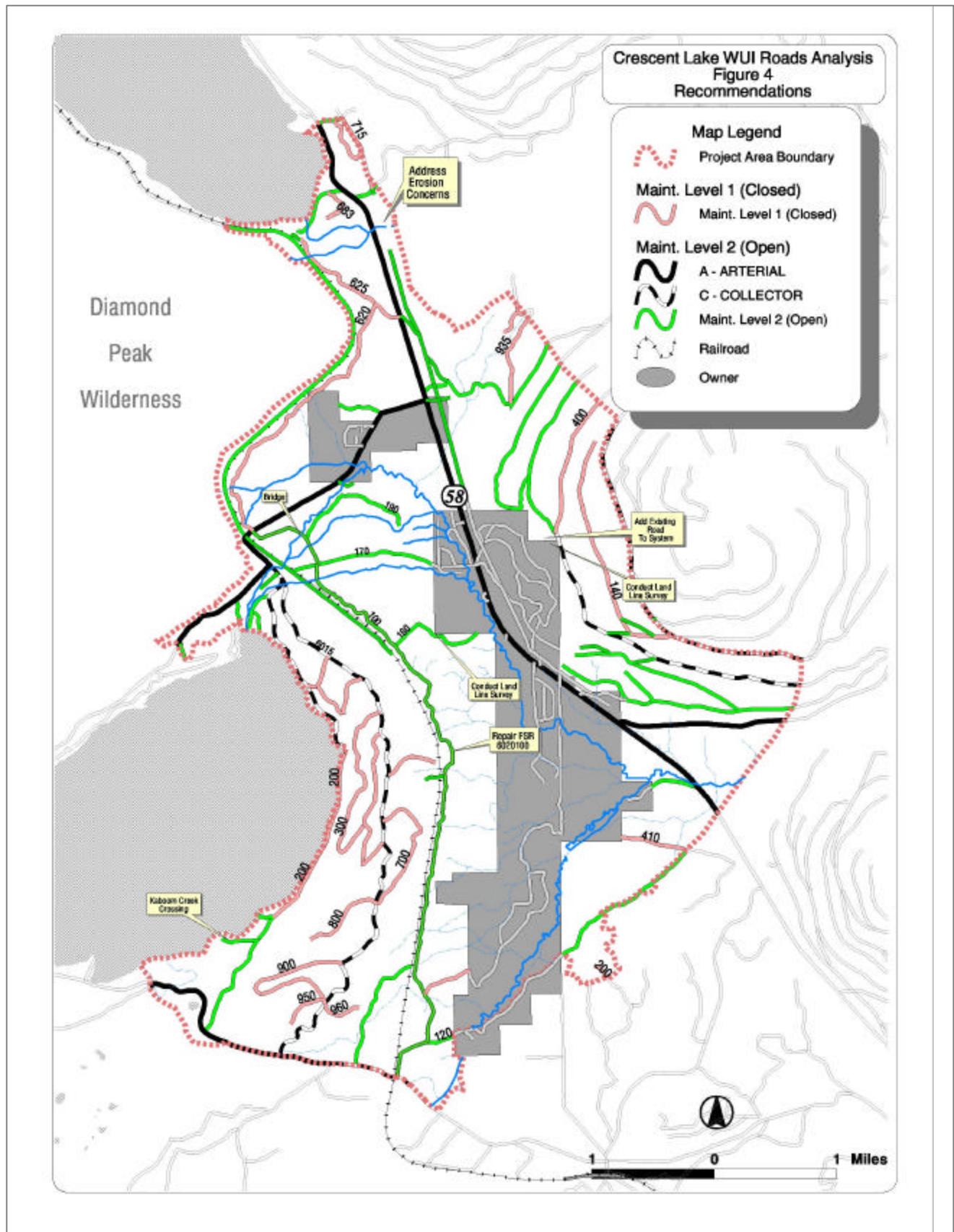
Road Maintenance Needs

According to the Forest-wide Roads Analysis, funding for road maintenance has declined substantially over the past decade. For the Deschutes National Forest, we need to spend approximately 33 million dollars to bring the Forest's **arterial and collector** road system back up to standard, followed by an additional 2.1 million dollars annually to keep it maintained in a safe and environmentally sound condition.

Roads in the analysis area that are under Forest Service jurisdiction are primarily classified as Maintenance Level 1 (closed) or 2 (intended for high clearance vehicles). Roads in these maintenance classifications generally receive the minimum amount of maintenance necessary to prevent impacts to adjacent resource values and, in the case of M.L. 2 roads, provide for minimum passage, although Road 6015, because of its proximity to Crescent Lake and associated recreation venues, does receive greater maintenance attention. These roads, when open for use, are intended for use primarily by administrative traffic or public travelers adequately experienced at operating motor vehicles on primitive roads and driving vehicles suitable for use on such roads. Road maintenance has been sufficient over the last several years to accomplish this limited mission in the analysis area, especially given the number of roads that are Maintenance Level 1 (physically closed) status. No changes in maintenance level or open/closed status are proposed related to maintenance funding levels or capabilities.

NEPA Analysis Needs

This roads analysis is being completed concurrently with the Crescent Lake WUI Fuels Reduction Environmental Assessment (EA). Opportunities identified can be incorporated into the EA process where they are connected to the purpose and need identified for that project. If there are opportunities that will not be analyzed in the EA, they will require a site-specific NEPA analysis in the future when the decision is made to implement them (other than maintenance and administrative decisions).



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