APPENDIX A

Roads Analysis Process, Step 4 and Key Questions

From USDA Forest Service publication FS-643

Roads Analysis: Informing Decisions about Managing the National Forest Transportation System

FS-643 outlines a six-step procedure. These steps are designed to be sequential with the understanding that the process may require feedback and iteration among steps over time as an analysis matures.

Setting up the analysis - includes setting objectives and planning the analysis.

Describing the situation - includes describing the current road management system and current road network.

Identifying issues - uses a list of 73 considerations described in FS-643 to help identify a subset of key issues specific to road management on the Forest.

Assessing benefits, problems, and risks - where each issue is viewed within the context of the road system with problems and benefits of the system assessed.

Describing opportunities and setting priorities - management opportunities and technical recommendations are developed to address the benefits, problems, and risks identified.

Reporting - documentation of the process, key findings, and recommendations. For the sake of clarity, in this report, steps 3, 4, and 5 have been blended into Chapter 4, Issue Analysis. The 73 considerations listed in FS-643 are addressed in this appendix (Appendix A). Key Recommendations are found in Appendix D.

ECOSYSTEM FUNCTIONS AND PROCESSES

EF(1): What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?

The presence of roads can be associated with distribution and spread of non-native plants and animals, changes in forest composition and structure including the loss of old forest characteristics, changes in fuel loading, and increased probability of human caused ignitions[A-1]. There can also be both direct and indirect effects on aquatic and terrestrial species and habitats, and effects on management activities including fire suppression and law enforcement. Road density, road class and management objective, road location, and types of habitats traversed by roads may influence the severity of those effects.

Reference Forest GIS for ecotype maps, land uses and allocations and ownerships, vegetation layers, unique and mosaic habitats, maps of risk of invasion by exotic species, and road density maps.

Project scale analysis is needed.

EF(2): 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 areas?

Noxious weeds are widespread throughout the Forest. Some species are well established and many treatments are impractical to control the spread of the weeds.

Roads are paths for both the introduction and spread of noxious weed species. Noxious weeds have the ability to take over entire riparian or upland habitats and change the characteristics of and threaten the existence of the native plant communities. This is also a real threat to wildlife that have evolved with those native plant communities and rely on them for food and shelter. Noxious weeds threaten the function of ecosystems and could out-compete native plant and animal species and thereby extirpating them from the Umpqua.

[1] Hann, W. J., J. L. Jones, and M. G. Karl. 1997. Landscape dynamics of the basin. Vol. II, Chapter 3. In: Quigley, T. M. and S. J. Arbelbide (Tech. Eds.). An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. General Technical Report PNW-GTR-405. Portland, Oregon: US Department of Agriculture, Forest Service, Pacific Northwest Research Station. P. 338-1055.

TABLE A-1. PRIORITY NOXIOUS WEED SITES.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Spotted knapweed	3113-110 MP 2.1 2900 MP 13.9		3825 Ridge 3800 Little Falls	2610 2800-600 3400-025 3400-072 3400-100 3700 3701 3703-210 3704-100 Hwy 138 Hwy 230 4795
Diffuse knapweed	3201-811 MP1.05		4714-148	4775-010
Meadow knapweed		130 (Site 1) 1745-108 Layng Cr Rd 17 1746-798		
Yellow starthistle	1610-210 MP0.45-0.5 3230-205 MP0-0.1 2810-100 MP0-0.1 2810-105 MP0.2-0.6 2900-050 MP0.23 1613-116 Unit 29-2 Co. Rd 1 MP27.5-29.6 3100 MP 2.65-2.7 3230-200 MP1.05-1.1 Rd 116 Threehorn Rd 200 Cowbell			3400-100
Rush skeletonweed	Co. Rd 46 MP3.5-4 Co. Rd 1 MP 29.65 Co. Rd 46 MP 3.5-4 Rd 116 Threehorn		Hwy 138 @ Soda Springs	2800-700
Italian thistle	3201-800 MP0.2-2.1 3201-811 MP0.9-1.9			
False brome	1721			
French broom			Hwy 138 near Forest boundary	
Gorse			3806-010	
Giant knotweed				4776 4776-100
Japanese knotweed	Brice Creek Road Co. Rd 2470			
Yellow Toadflax	Upper 22 Road		Illahee Flat	3700-010 3701-260 3704-500 4776-075 4780-170 4780-300 4790-906

Reference Diamond Lake GIS map (prior_nox_weeds.shp). Reference Hann and others (1997) for an example of developing a risk rating for exotic species invasion.

Project level scale of analysis is needed.

EF(3): To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

Roads provide a transportation network that may be important in managing pathogens, including plant diseases and pest insects. Transportation plans should evaluate the role of roads in maintaining these management functions in light of the risks present for the Forest or in the project area.

Project level scale of analysis is needed.

EF(4): How does the road system affect ecological disturbance regimes in the area?

Roads can affect the rates of flow of various disturbance processes, especially fire. Fire frequency and severity can be affected by the fragmentation of forest caused by roads creating fuel breaks. Unroaded areas may be subject to fires of greater extent and severity, which in turn may influence the representation of plant communities in relation to their adaptation to fire.

Project level scale of analysis is needed.

EF(5): What are the adverse effects of noise caused by developing, using, and maintaining roads?

Traffic on roads can be a disturbance both to people recreating and to sensitive wildlife. Such disturbances to wildlife may affect the breeding success and will tend to drive wildlife to congregate in unroaded areas to avoid human contacts.

Project level scale of analysis is needed.

AQUATIC, RIPARIAN ZONE, AND WATER QUALITY

AQ(1): How and where does the road system modify the surface and subsurface hydrology of the area?

Roads can interrupt the subsurface flow of water. Changes in flow routing can increase peak flows and change the timing of storm runoff[2].

[A-2] Wemple, B. C., J. A. Jones and G. E. Grant. 1996. Channel network extension by logging roads in two basins, Western Cascades, Oregon: American Water Resources Association, Water Resources Bulletin, v. 32, no. 6. p. 1195-1207.

The Jackson Creek road is highly susceptible to flooding and damage from flood events.

Reference Forest GIS.

Project level scale analysis is needed.

AQ(2): How and where does the road system generate surface erosion?

Native surface roads and roads with insufficient aggregate surfacing and high traffic volume that receive infrequent maintenance are vulnerable to surface erosion processes. Such roads can be a significant source of fine sediment that may enter streams. The amount of sediment that may be generated is largely dependent on a number of factors; such as the erodibility of the soil exposed in cut slopes and fill slopes, including the road surfacing material, the grade of the road, and the amount of surface water that is concentrated in ditch line and wheel ruts. The degree of surface erosions that may occur and the amount of sediment that ultimately reaches a stream or water body is also dependent upon the frequency and scheduling of road maintenance activities.

Roads that are most susceptible to surface erosion are located within areas underlain by granitic and schistose substrate associated with the Klamath Mountain Province or Mazama ash deposits related to the High Cascades sub-province. Refer to Appendix F for more detail.

Reference Forest GIS and INFRA database for road maintenance level.

The WEPP model (Water Erosion Prediction Program) can be a useful planning tool to model sediment transport resulting from roads. Information regarding WEPP can be found at the following website: forest.moscowfsl.wsu.edu/4702/road0.html.

A WEPP bibliography can be found at the following Internet website: soils.ecn.purdue.edu/~wepp/wepppubs/list.html.

Project level scale analysis and field investigation is needed to determine what road systems are at most risk for surface erosion and sediment generation.

AQ(3): How and where does the road system affect mass wasting?

Older roads, especially those located on steep slopes and constructed by side casting techniques, are prone to localized fill slope failure or settlement by mass wasting (landsliding) processes. Sediment generated from slop failure may either enter the aquatic environment and cause adverse impact to stream channel morphology and fish habitat.

Mass wasting processes consist of rapid-moving, shallow-seated landslides, such as debris avalanches and in-channel debris flows that occur principally in steep, well dissected terrain with granular soils; and slower-moving, deeper-seated landslides such as rotational slumps and earthflows that are more

prevalent in gently-sloping, weakly dissected landscapes that have cohesive soil[A-3].

Road failure results when driving forces exceed the resisting forces. This may occur when material that acts to buttress a slope is removed, as is the case with steep cut slopes; or additional material is placed on a slope causing it to become destabilized, as occurs when side cast material is placed on natural hill slopes. Water is a significant factor in slope stability. Highly saturated soils decrease the ability of the soil to withstand stress thereby decreasing the resisting forces. Roads intercept and concentrate ground water and convey surface flow via ditches across hill slopes into areas that may be sensitive to incipient slope failure.

Roads constructed in areas of active slump-earthflow are a continual maintenance issue and have cost the Forest a substantial amount of maintenance dollars over the years. Many of the primary and secondary road systems listed in Table A-2 as having high annual maintenance cost are located in areas of active earthflow terrain.

TABLE A-2. PRIMARY AND SECONDARY ROADS IDENTIFIED AS HIGH MAINTENANCE COST.

Tiller	Cottage Grove	North Umpqua	Diamond Lake
2800 So. Umpqua 2925 Black Canyon 3230 Callahan Creek 2929 Collins Ridge	1700 Layng-Patterson 1721 June Mountain 1746 Holland Meadows 1746-750 unnamed road 1746-763 Swastika 2200 Brice Creek 2241 Adams Mountain 2263 Cat Creek 2263-717 Dog Creek 2358 Canton Point	2500 MP 3.64 to 10.56 (Cavitt Cr) 2500-050 Tuttle Creek 2700 Little River 2701 MP 0 to MP 4.44 2719 Black Creek 2759 MP 7.03 to MP 11.63 3810 MP 7.56 to MP 12.22 3818 MP 7.7 to MP 9.84 4714 Panther Creek 4770 Wilson Creek	4775 Medicine Creek 2801 E. Copeland Cr 2800 Copeland Cr 3400-072 Burma Rd

Reference SHALSTAB digital terrain model and Forest GIS map products produced for various watershed analyses that delineate areas of earthflow terrain.

Project level scale analysis and field investigation is needed to identify roads that are at risk for localized landslides and sediment delivery to aquatic habitat.

AQ(4): How and where do road-stream crossings influence local stream channels and water quality?

Road-stream crossings may pose a significant risk for mass wasting (landsliding) and sediment delivery to the aquatic ecosystem. Road-stream

[A-3] Swanson, F. J. and D. N. Swanston. 1977. Complex mass-movement terrains in the western Oregon Cascade Range, Oregon: Geological Society of America, Reviews in Engineering Geology. v. III, p. 113-124.

crossings that pose the substantial risk have culverts that are undersized (insufficient capacity) to pass stream flow during a peak (Q100) storm event, have a high potential for plugging by sediment and woody debris, and have diversion potential, where the stream channel is diverted down the ditch and exits someplace else along the road onto the hill slope below. Site failure that precipitates from washout of the road at the road-stream crossing or diversion along the ditch and triggers massive slope failure elsewhere, can place large inputs of sediment directly into streams. Road-stream crossing failures are more apt to occur along steep mid-slope road and valley bottom roads. Failure of a road-stream crossing on a mid-slope road could propagate additional site failures on other road systems that cross the same stream channel further down the hill slope. This process is referred to as the 'cascading effect'.

Comprehensive road-stream crossing assessments have been made on the North Umpqua Ranger District at the scale of sixth and fifth field watersheds, including Upper Steamboat, Lower Steamboat, Little River Adaptive Management Area (AMA), and Middle North Umpqua. In addition, road-stream crossing assessments have also been made at the project scale as is the case of the roads analysis completed by the North Umpqua Ranger District in response to the Baked Apple Fire (Panther Creek).

Reference Diamond Lake map of stream crossings with a relatively high potential to plug, divert flow, or otherwise are at risk of failure (GIS road_stream_x.shp). Not shown on the Diamond Lake map are the crossings identified in the watershed analyses that have been upgraded or repaired since the watershed analyses documents were finished (Roads 2800, 3402, 3700-100, 3701, and 6000).

Reference corporate GIS map products produced for various watershed analyses and projects at a smaller scale that rank road-stream crossings for risk of site failure and sediment delivery to aquatic habitat. Reference Appendix H: Inventories and Assessment Protocols for protocols and methods used to document culvert conditions.

Reference Flanagan and others[A-4] for an extensive guide to designing inventory and risk analysis systems for road drainage structures.

Some activities in streams and lakes require permits from the US Army Corps of Engineers, or "Fill-Removal" permits from the Oregon Division of State Lands. You can find information on filing both kinds of permits at http://www.oregonstatelands.us/r-fintro.htm

AQ(5): 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?

Roads may create potential pollutants in several ways. Chemicals may be applied to roads for maintenance, safety, or other improvements. Roads also may become contaminated by material from vehicles, including the accumulation of small spills, such as oil, and hydraulic fluid, or from accidental spills of hazardous or harmful materials being transported over roads. Applied or spilled materials may have access to water bodies.

If hazardous wastes or accidental spills pose an environmental risk, notify the Oregon Emergency Response System (OERS) at 1-800-452-0311 or the local Oregon Department of Environmental Quality, Forest Hazardous Waste or Spill Coordinators, and the District Ranger or Forest Supervisor. Employees can contact Forest Dispatch to report hazardous wastes or accidental spills.

Reference Forest Spill Prevention Plan procedures (Appendix F: Aquatic Information). See the current Umpqua National Forest Fire Mobilization Guide for current telephone number, and the names of current Umpqua hazardous waste and spill coordinators.

AQ(6): 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)?

Some watershed analyses contain inventories of road-stream connectivity (an example is the Jackson Creek Watershed Analysis 1995). Use methods developed by Wemple[5] and summarized in Wemple and others[6] to inventory drainage features. Track the following:

- Drainage feature (road-stream crossing, cross-drain culvert, rolling dip, waterbar, landslide scar)

[A-4] Flanagan, S. A., M. J. Furniss, T. Ledwith, J. Ory, S. Thiesen, M. Love, and K. Moore. 1998. Methods for inventory and environmental risk assessment of road drainage crossings. Water/Road Interaction Technology Series. No. 9877 1809-SDTDC. US Department of Agriculture, Forest Service, Technology and Development Program: San Dimas, Calif. 46p. Available from Internet: www.stream.fs.fed.us/water-road/xingrisk.pdf

[A-5] Wemple, B. C. 1994. Hydrologic integration of forest roads with stream networks in two basins, Western Cascades, Oregon. MS Thesis, Oregon State University, Corvallis, Oregon. 88p.

[A-6] Wemple and others, 1195-1207.

- Are features connected to streams? Yes or No. If Yes, then:
  - ✓ Contributing ditch and road length
  - ✓ Gully or plume length below outlet to stream channel
- Stream length
- Road-stream proximity
- Total road length; and
- Percent increase in stream length represented by connected road segments.

See "Roads can intercept and re-route streamflow, increase peak flows, and change timing of storm runoff" in Chapter 3, Aquatic Issues.

Project level scale of analysis is needed.

AQ(7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

Beneficial uses that occur are fish habitat, habitat for aquatic organisms other than fish, recreational users, reservoirs, water supplies for households and industry (North Umpqua Hydropower Project and mining), visual values, ecosystem interaction value, and use by wildlife associated with riparian and aquatic habitats (both obligate and facultative).

Overall the Forest can expect the types of beneficial uses to remain near static, but the demand for these uses to either remain near static or to increase with time. Water quantity supplies for industry through the North Umpqua Hydropower Project are expected to decrease slightly over time, based on increased minimum instream flow releases, breaching diversions, and other types of aquatic reconnection agreed to in the North Umpqua Settlement Agreement.

The primary road-caused pollutant is fine sediment and when delivered to waterways can have negative effects to beneficial uses. Excessive fine sediment can lower primary productivity, increase turbidity, decrease substrate interstitial space, reduce spawning habitat, suffocate fish eggs, abrade fish gills, and reduce macro-invertebrate taxa richness.

Reference Forest GIS.

Reference Water Rights database (Oregon Water Resources Department, (Internet website) http://powder.wrd.state.or.us/waterrights/wrisuse.html).

See "Roads can affect water quality and the beneficial uses of water" in Chapter 3 Aquatic Issues. See "Roads can affect water quality and beneficial uses of water" in Appendix F: Aquatic Information for a procedure to document water quality conditions and protection measures for water quality limited waterbodies listed under section 303(d) of the Clean Water Act.

Reference the Umpqua National Forest Land and Resource Management Plan (1990) Chapter IV Standards and Guidelines for Water Quality and Riparian Areas Standard No. 21 (p. IV-63) for information about implementing and documenting the use of Best Management Practices to protect water quality.

AQ(8): How and where does the road system affect wetlands?

Roads can affect wetlands by direct encroachment or through changes in hydrology. Roads can modify both surface and subsurface drainage in wetlands, causing changes in wetland moisture regimes.

Reference Forest GIS.

Project level scale of analysis is needed.

Reference the Umpqua National Forest Land and Resource Management Plan Chapter IV Standards and Guidelines for Water Quality and Riparian Areas Standard No. 13[A-7] and the Forest Plan document "Umpqua National Forest Plan Standard and Guideline Procedures for Watershed Cumulative Effects and Water Quality" for suggested language to document and assess the effects of floodplain and wetland activities.

AQ(9): 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?

Stream channels are dynamic. They migrate within historic flood plains, eroding the bed and banks in one place while aggrading the bed and building new banks in other places. Streams also transport and deposit large pieces of wood and fine organic matter, providing physical structure and diverse aquatic habitat to the channel. In some places road encroachment can divert streamflows to the opposite bank, thereby destabilizing the hillslope and resulting in increased landsliding.

Reference Forest GIS.

Project level scale of analysis is needed.

See "Roads can alter the geomorphology of streams and floodplains" in Chapter 3, Aquatic Issues.

AQ(10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?

Road-stream crossings with culverts can sometimes block the migration of fish and other organisms in streams and riparian areas, which can have serious consequences on aquatic animal populations. Blockages at the stream crossing may be partial or total, they can affect adult spawners, migrating juvenile fish, or both. Consult the *Umpqua Fish Passage at Road Crossings Report FY 00-01.doc*[A-8] filed at:

[A-7] USDA Forest Service. 1990. Umpqua National Forest Land and Resource Management Plan. Umpqua National Forest: Roseburg, Oregon, IV-62.

[A-8] Chatel, J. C. and S. G. Hofford. 2001. Fish Passage at Road Crossings Assessment, Umpqua National Forest, FY2001. USDA Forest Service, Umpqua National Forest: Roseburg, Oregon.

J:\fsfiles\office\nat_res\water\7700roads\culvert_inventory

See "Road stream crossings restrict passage of fish and other aquatic life" in Chapter 3 Aquatic Issues, and Appendix F: Aquatic Information.

Reference Forest GIS.

Project level scale of analysis is needed.

AQ(11): How does the road system affect shading, litterfall, and riparian plant communities?

When roads are constructed adjacent to streams, riparian vegetation is often removed to accommodate the road right-of-way, improve visibility, and reduce the hazard of falling trees on the roadway. This action can reduce shading of the stream, however, causing increased stream temperatures, reduced potential for recruiting large wood in the stream, reduced leaf fall and riparian invertebrates, and loss of habitat for aquatic and riparian species.

Reference Forest GIS.

Project level scale analysis is needed.

See Issue AQ(7) "What downstream beneficial uses of water exist in the area?". See "Roads can affect water quality and the beneficial uses of water" in Chapter 3, Aquatic Issues, and Appendix F: Aquatic Information.

AQ(12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

Fishing generally occurs in close proximity to roads. The presence of road access to streams, lakes, and wetlands may place sensitive aquatic species at-risk. Roads that parallel anadromous streams are of particular concern for poaching. This concern is increased where dispersed camping occurs in close proximity to salmon/steelhead holding water.

Reference Diamond Lake GIS map themes "Hab_degrade" and "Poaching" in the fish_dist_dlrd map. Reference North Umpqua GIS map of fish distribution J:/fsfiles/ref/library/gis/ump/fauna/aquatic/fish_dist Significant poaching issues occur on Tiller and North Umpqua Ranger Districts, but no map reference is available at this time to display road access that influence this problem.

TABLE A-3. FISH AND HABITAT 'AT-RISK'.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Threatened, Endangered, Sensitive species "At Risk"			Hwy 138 Steamboat Rd 3800 Little River Rd 2700 Calf Creek Rd 4750 Cavitt Creek Rd 2500	North Umpqua River (below Soda Springs) Copeland Creek Boulder Creek
Heavy fishing use	2800 South Umpqua Road	Sharps Creek (Rd 2300 and lower section of Rd 2328)		Diamond Lake Lemolo Lake PacfiCorp forebays
Known areas of fish poaching problems			Hwy 138 Steamboat Rd 3800 Little River Rd 2700 Calf Creek Rd 4750 Cavitt Creek Rd 2500	2800 Rhododendron Ridge Road 2801 Copeland Cr 4775-011
Direct habitat loss	None known			2800 2801

AQ(13): How and where does the road facilitate the introduction of non-native aquatic species?

Introductions of non-native fishes, whether authorized or unauthorized, have the potential to affect the distribution and abundance of native fish, amphibians, and other aquatic organisms.

Non-native aquatic species: bullfrogs and non-native fish bullhead bass, tui chub, and bluegill. Non-native brook trout and rainbow trout have been stocked in many Umpqua lakes and streams.

TABLE A-4. NON-NATIVE AQUATIC AND RIPARIAN SPECIES.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Bullfrogs	Ash Pond Drew Lake So. Umpqua River Jackson Creek Shadow Pond	Unknown	Unknown	Unknown
Bullhead bass & bluegill	Ash Pond Drew Lake So. Umpqua River Jackson Creek Fish Lake Shadow Pond Skookum Pond Cliff Lake Carmine Lake Triangle Lake Podunk Pond Toad Lake Blue Bluffs Pond Elk Creek Cow Creek	N/A	N/A	"The "Stinkhole"
Tui Chub	N/A	N/A	N/A	Diamond Lake
Eastern brook trout	N/A	Upper Layng Creek	Twin Lakes Creek, A portion of Reynolds Creek, Bullpup and Bulldog Creeks (tributaries of Big Bend Creek)	N/A

Reference Diamond Lake GIS map fish_dist_dlrd and North Umpqua GIS fish distribution layer. Reference Forest GIS for fish distribution.

Project level scale of analysis is needed.

AQ(14): To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity, or areas containing rare or unique aquatic species or species of interest?

Reference INFRA database.

Scale of analysis is project level.

TERRESTRIAL WILDLIFE

TW(1): What are the direct affects of the road system on terrestrial species habitat?

Primary roads in the South Umpqua River and Jackson Creek watersheds are within the Riparian Reserves. The Riparian Reserves are of great importance to sensitive species such as western pond turtles and red-legged frogs, as well as threatened and endangered species such as bald eagles.

Roads bisect owl cores and create fragmentation that reduce interior habitat areas and create barriers, especially between riparian and upland areas. The wider and more frequently traveled the roads, the more effective the barrier to wildlife.

Culverts that are "shot gun", or are too small in diameter to allow organic materials (rocks, logs) inside will often keep small aquatic animals such as amphibians from utilizing culverts which then make the roads a barrier to those animals.

TABLE A-5. ROAD-ASSOCIATED FACTORS HAVING DIRECT NEGATIVE EFFECTS ON HABITAT FOR TERRESTRIAL INVERTEBRATES.

Road-associated factor	Effect of factor in relation to roads
Habitat loss and fragmentation	Loss and resulting fragmentation of habitat from establishing and maintaining of road and right-of-way.[A-9]
Negative edge effects	Specific case of fragmentation for species that respond negatively to openings or linear edges created by roads (such as "habitat-interior" species [[A-10]])[A-11,A-12]

[A-9] Forman, R. T. T., D. S. Friedman, D. Fitzhenry. 1997. *In:* Canters, K., A. Piepers, and D. Hendricks-Heersma, (Tech. Eds.). Ecological effects of roads: Toward summary indices and an overview of North America. Proceeding of the international conference "Habitat fragmentation, infrastructure, and the role of ecological engineering," 17-21 September 1995, Maastricht --- The Hague. Selft: The Netherlands: Ministry of Transport, Public Works, and Water.

[A-10] Marcot and others 1994

[A-11] Forman and others.

[A-12] Mader, H. J. 1984. Animal habitat isolation by roads and agricultural fields. Biological Conservation 29:81-96.

TABLE A-6. ROADS FRAGMENTING RIPARIAN AREAS.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Roads fragmenting riparian areas	No Input	1700 1700-751 1702 1790-744 2200 2213 2216 2232-790 2300	No Input	No Input

TABLE A-7. SENSITIVE WILDLIFE SPECIES HABITAT AREAS IMPACTED BY ROADS.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
These roads bisect peregrine falcon management areas and are also access roads for monitoring the species	2700 2700-900 2715 2715-700 2781 2800 2800-347 2800-348 2800-350 2800-365 2800-400 2814 2814-700 2823 2823-500 2830 2830-600 2835 2838 2838-800 2838-950 2900 2900-500 2900-700 2921 2924 2924-200 2924-260 2924-411 2924-711 2938	No input	No input	No input

TABLE A-7 (CONT'D). SENSITIVE WILDLIFE SPECIES HABITAT AREAS IMPACTED BY ROADS.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Elk habitat (winter, spring, fall)	No input	1700	No input	3704 (from 200 spur) 3400-500 3401 (3401-500 to 2610-200) 3700-500 3700-010 3700-480
Wolverine habitat	Not applicable	Not applicable	Not applicable	4793 (Hwy 138 east) 6000 (Kelsay Valley Campground northeast to District boundary)

Reference Forest GIS.

TW(2): How does the road system facilitate human activities that affect habitat?

Roads may facilitate human activities that result in habitat disturbances. Disturbances may include removing structures (snags and logs), losing habitat to fires resulting from human ignitions, and destroying habitat by trampling.

TABLE A-8. MECHANISMS OF HABITAT LOSS FROM HUMAN ACTIVITIES FACILITATED BY ROADS.

Road-associated factor	Effect of factor in relation to roads
Snag reduction	Reduction in density of snags and/or area where snags are present due to removal near roads, as facilitated by road access.[A-13,A-14]
Down log reduction	Reduction in density of logs and/or area where logs are present due to removal near roads, as facilitated by road access.[A-15,A-16]
Direct loss	Habitat loss from trampling in recreational areas and other direct disturbances.
Loss to fire	Habitat loss to fire resulting from increased incidence of human-caused ignitions.[A-17]

Reference Forest GIS.

[A-13] Hann and others.
[A-14] Quigley and others. 1996.
[A-15] Hann and others.
[A-16] Quigley and others.
[A-17] Hann and others.

TW(3): How does the road system affect legal and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the affects on wildlife species?

Roads provide access to forest users for both legal and illegal uses. Roads make it even easier for humans to trap, hunt, poach, harass and kill animals in the forest.

TABLE A-9. HUMAN ACTIVITIES FACILITATED BY ROADS THAT DIRECTLY AFFECT SPECIES POPULATIONS.

Road-associated factor	Effect of factor in relation to roads
Over-trapping	Nonsuitable or undesirable legal harvest by trapping, facilitated by road access.[A-18,A-19]
Poaching	Increased illegal take (shooting or trapping) of animals, facilitated by roads.[A-20,A-21]
Collecting	Collection of live animals for human uses (for pets), facilitated by road access.[A-22]
Harassing or disturbing at specific sites	Direct interference of life functions at specific use sites due to human or motorized activities, as facilitated by road access.[A-23,A-24]
Collisions	Death or injury resulting froma motorized vehicle running over or hitting an animal on the road. [A-25,A-26,A-27]
Movement barrier	Preclusion of dispersal, migration, or other movements as posed by a road itself or by human activities on or near a road.[A-28,A-29]
Displacement or Avoidance	Spatial shifts in populations or individual animals away from a road or road network in relation to human activities on or near a road or road network.[A-30,A-31]
Chronic, negative interactions with people	Increased mortality of animals. (shooting of bears or eagles) from increased contact with people, facilitated by road access. [A-32,A-33]

[A-18] Bailey, T. N., E. E. Bangs, M. F. Portner. 1986. An apparent overexploited lynx population on the Kenai Peninsula, Alaska. Journal of Wildlife Management 50: 279-290.

[A-19] Hodgman, T. P., D. D. Kratnik, and K. D. Elowe. 1994. Survival in an intensely trapped marten population in Maine. Journal of Wildlife Management. 58(4): 593-600.

[A-20] Cole, E. K., M. D. Pope, and R. G. Anthony. 1998. Effects of road management on movement and survival of Roosevelt elk. Journal of Wildlife Management 61: 115-1126.

[A-21] McLellan, B. N. and D. M. Shackleton. 1988. Grizzly bears and resources-extraction industries: Effects of roads on behaviour, habitat use, and demography. Journal of Applied Ecology 25(2): 451-460.

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[A-30] Forman, R. T. and A. M. Hersperger. 1996. Road ecology and road density in different landscapes, with international planning and mitigation solutions. In: Evink G, Ziegler D, and Berry J, Editors. Proceedings of the Florida Department of Transportation/ Federal Highway Administration Transportation-Related Wildlife Mortality Seminar. Orlando, Florida, April 30-May 2, 1996. p. 1-23.

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[A-32] Mace, R. D., J. S. Waller, and T. L. Manley. 1996. Relationships among grizzly bears, roads and habitat in the Swan Mountains, Montana. Journal of Applied Ecology 33: 1395-1404.

Reference Forest GIS.

Project level scale analysis is needed.

TW(4): How does the road system directly affect unique communities or special features in the area?

In addition to effects on species, roads may have both direct and indirect effects on rare communities and special habitat features.

Roads that divide the riparian areas from the uplands create barriers to wildlife. This is most critical to the smaller, less mobile animals. The higher the traffic pattern of the road, the more effective the barrier to wildlife.

Roads that bisect meadows often change the hydrology of the meadow and allow the introduction of non-native plants. The plants are often invasive and replace the native plants that are sources of food and habitat for wildlife.

[A-33] Thiel, R P. 1985. Relationship between road densities and wolf habitat suitability in Wisconsin. American Midland Naturalist 113: 404-407.

TABLE A-10. BISECTED UNIQUE AND MOSAIC HABITATS.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Roads that bisect Unique and Mosaic areas	1610 1615 1616 1632 2715 2715-700 2715-900 2715-950 2719 2719-800 2741 2781-100 2800, 2800-347 2800-348 2800-350 2810-200 2813 2813-100 2826 2838-950 2840 2900 2921 2924-260 2925-700 2925-800 2929 2980-100 2980-400 3100 3114 3200 3201 3201-300 3220 3230 3232 3242 6800	No input	No input	No input

Reference Forest GIS (caves, cliffs, talus, abandoned mines, wetland features, and other unique communities).

Project level scale analysis is needed.

ECONOMICS

EC(1): 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?

Financial efficiency analysis asks whether a project or program generates more revenue than it consumes. It also asks whether a proposed change in the status quo increases net revenue.

Reference INFRA database. Description of analysis methods, tools, and their sources are available at the USDA Forest Service Inventory and Monitoring Institute Intranet website: fsweb.ftcol.wo.fs.fed.us/imi.

Currently, the Umpqua requires far more funding than it receives to adequately maintain the road system in existence today. Further, the aging road system infrastructure requires periodic and cyclic replacement as part of the regular maintenance, and upgrades of culverts and road designs where construction is found to be inadequate for either the hydrology of the watershed, the increased traffic, or Threatened, Endangered or Sensitive plant and animal habitat protection.

Further analysis of this issue needs to occur at the Forest level; project level scale of analysis is too small to capture all significant costs, benefits, or impacts. If increasing the scale of analysis changes the conclusion, the scale is too small.

Recommendation: Complete a systematic inventory of road condition for each watershed to include (at a minimum): Threatened, Endangered and Sensitive plant and animal species habitat needs, hydrologic impacts and effects on roads, age of infrastructure and timing of replacements. Upgrade each watershed analysis to complete this assessment of roads and track needs and costs in a Forest database such as INFRA.

EC(2): How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

Economic efficiency goes beyond financial efficiency. Economic efficiency analysis measures net economic benefit to society in aggregate, including non-marketed and external costs and benefits, without regard for who gains and who loses.

Reference INFRA database. Description of analysis methods, tools, and their sources are available at the USDA Forest Service Inventory and Monitoring Institute Intranet website: fsweb.ftcol.wo.fs.fed.us/imi.

Further analysis of this issues needs to occur at the Forest level; project level scale of analysis is too small to capture all significant costs, benefits, or impacts. If increasing the scale of analysis changes the conclusion, the scale is too small.

EC(3): How does the road system affect the distribution of benefits and costs among affected people?

Economic efficiency by itself is an important but not sufficient criterion by which to evaluate programs. Equity, often an important concern, considers the distribution of costs and benefits among the people, but equity must be decided by policy negotiation and not by technical calculation. An important function of economic analysis is to describe the distribution of costs and benefits among geographical, political, social, ethnic, and economic sectors of society. Knowledge of the distribution allows the political and legal processes that judge equity to proceed fully informed.

Reference INFRA database. Description of analysis methods, tools, and their sources are available at the USDA Forest Service Inventory and Monitoring Institute Intranet website: fsweb.ftcol.wo.fs.fed.us/imi.

Further analysis of this issues needs to occur at the Forest level; project level scale of analysis is too small to capture all significant costs, benefits, or impacts. If increasing the scale of analysis changes the conclusion, the scale is too small.

COMMODITY PRODUCTION – TIMBER MANAGEMENT

TM(1): How does road spacing and location affect logging system feasibility?

Road spacing has direct effects on yarding cost of wood fiber. The location of a road is particularly important in an area planned for cable logging. Roads located at topographic “breaks” provide better cable deflection, which allows larger payloads and less ground disturbance.

Project level scale of analysis needed.

TM(2): How does the road system affect managing the suitable timber base and other lands?

Extensive forest management, as expected in Matrix land allocations, is less expensive to implement where there is road access to project areas for vegetation management.

Recommendation: Systematically assess each watershed for vegetation management treatment needs, current fuel model, and probable timing of next vegetation treatment based on Landscape Analysis. Add this Landscape Analysis assessment of vegetation treatment entry needs and timing to each watershed analysis report. Track needs for area entry and demand on road systems in a Forest database. Maintain roads needed in the near future (within 1 to 2 decades) for vegetation management needs. Manage the vegetation to manage fire risk. Reduce roads in areas of low fire risk and the need for the next vegetation management entry is 15 to 20 years or more in the future;

make priority to maintain roads needed to access areas of high fire risk even with vegetation treatment and for wildland/urban interface response.

TM(3): How does the road system affect access to timber stands needing silvicultural treatment?

The emphasis in silvicultural practices is shifting from even-aged management to managing for uneven-aged stands. Uneven-aged management to promote multi-layered canopies and "old growth" characteristics generally require treatments with greater frequency, thus needing road access more often. The value of salable wood products is in part sensitive to the transportation costs of moving materials to a market.

Recommendation: same as in TM(2) above.

COMMODITY PRODUCTION – MINERALS MANAGEMENT

MM(1): How does the road system affect access to locatable, leasable, and salable minerals?

The value of salable minerals is sensitive to the transportation costs of moving materials to a market.

Maintain linkages to roads with active minerals claims and patents.

Reference Forest GIS.

Project level scale of analysis needed.

COMMODITY PRODUCTION – RANGE MANAGEMENT

RM(1): How does the road system affect access to range allotments?

Range allotments generally need only limited road access for maintaining range improvement structures. Road access is of greater importance for hauling feed or shipping animals.

Reference Forest GIS.

Project level scale of analysis needed.

WATER PRODUCTION

WP(1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

Road access facilitates monitoring and operation activities.

Reference Water Rights database (Oregon Water Resources Department, (Internet) http://powder.wrd.state.or.us/waterrights/wrisuse.html). For the Special Use database contact Robin Duarte.

Reference Forest GIS.

WP(2): How does road development and use affect water quality in municipal watersheds?

TABLE A-11. MUNICIPAL WATERSHEDS.

	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Municipal watersheds	Forest lands	Layng Creek Prather Creek Forest lands	Forest lands	Forest lands

Road systems within municipal watersheds may impact the water quality. Communities rely on all lands within the Umpqua to contribute water to their water supply.

Reference Domestic Water Supply Act of May 28, 1940 --- revised by the Federal Land Policy and Management Act of 1976. Reference Forest GIS.

WP(3): How does the road system affect access to hydroelectric power generation?

Road access facilitates monitoring and operation activities.

Reference Water Rights database (Oregon Water Resources Department, (Internet) http://powder.wrd.state.or.us/waterrights/wrisuse.html). For the Special Use database contact Forest Special Use Coordinator (Robin Duarte).

Reference Forest GIS.

SPECIAL USE PERMITS

SP(1): How does the road system affect access for collecting special forest products?

Forest users rely on roads to access special forest products throughout the year.

TABLE A-12. SPECIAL FOREST PRODUCTS ACCESS.

Special Forest Product	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Firewood	District-wide	District-wide	District-wide	2610 network 3401 network 6000
Post & poles	No input	District-wide	No input	2610 network 3401 network 6000
Christmas trees	2700	No input	No input	District-wide
Yew wood	No input	Dinner Ridge Dinner Creek	No input	No input
Boughs	1615 network 1632 network 2810 network 2921 network 2924 Skookum Pond area 2980 network 2929 Collins Ridge area 3113-200 net 3113-300 net 3113-400 net 3113-500 net 3114 network	Patterson Mtn Alex Creek Silverstairs Holland Meadows Parker-Wyatt Dinner Ridge	Fall Creek Burnt Creek Fairview Cr 3810 network 3817 network 3850 network 4711 network 4714 network 4720 network Cavitt Cr area	No input
Transplants	No input	Brice Creek Layng Creek	Cavitt Cr area	2154 2154-100 3400 3402 3402-490 3402-500 3402-800; and roads south of Hwy 138 & east of Diamond Lake
Salal	No input	1700 1700-411 1721 1746-750 1751-400	Cavitt Creek area	No input
Mushrooms	No input	1721 1746 1751 1758 2232 2241 2263	District-wide	3703 3703-380 4785 4786 4786-440 4786-600 4790 network 4792 network 4795 network 6592 Hwy 138 Hwy 230

TABLE A-12 (CONTINUED). SPECIAL FOREST PRODUCTS ACCESS.

Special Forest Product	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Mineral material permits and free use	2840-400 2823 2814-820 2814-900 2838-800 2838-850 3114-380 3232-905 3232-609 2715-530 2700-111 2703-065 4750 4714 4711 3803 4760 4760-100	No input	No input	No input
Beargrass	Boulder Creek Ash Pond area East Fork Deadman 1610 network 2810 network 2814 network 2835 network 2924 network 2980 network 3113 network Skookum Pond area Buckeye Creek area Red Mtn area E. Fork Dismal Creek Callahan Ridge Granite Creek Green Butte Drew Creek Wildcat Ridge Rowey Mine area So. of Peavine Mtn. Wolf Ridge So. of Whisky Camp Eden Creek No. of Bunchgrass Meadows	Adams Mtn Crawfish Lake Alex Creek Swastika Mtn	Cavitt Cr area	No input

Reference Special Forest Products maps from each District.

Project level scale of analysis is needed.

SU(1): How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?

Access and easements are needed for utilities, communication sites, private land inholdings, and patented mining areas.

TABLE A-13. SPECIAL USE PERMIT SITE ACCESS NEEDS.

Access Need	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Power lines	X	X	X	X
Private land inholding access	X			
Household water lines	X			
Unpatented and patented mining claims	X	X	X	X
Range allotments	X			X

Reference Forest GIS.

Project level scale of analysis is needed.

GENERAL PUBLIC TRANSPORTATION

GT(1): How does the road system connect to public roads and provide primary access to communities?

Maintain linkages to State and County roads.

Road ID	Road Name	Beginning Milepost	Ending Milepost	Jurisdiction
1600	Tiller-Trail Highway	0	52.81	County
2200	County Road 2470 – Brice Creek Road	0	8.29	County
2400	Row River Road	12.32	19.78	County
2460	Sharps Creek Road	0	18.9	County
4300	State Route 230	20.41	23.9	State
4700	State Highway 138 – North Umpqua Highway	16.25	87.39	State
6900	Little River Road	11.33	26.5	County
6900-11	County Road 17A	0	1.18	County
7000	Tiller-South Umpqua Road	0	6.25	County
7100	Upper Cow Creek Road	0	19.13	County

GT(2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, inholdings and so on)?

Maintain road access for mineral claims and patents. Private land inholding are relatively small blocks of land, but maintaining access to these lands are important just the same.

GT(3): 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)

Currently, roads needed to access major utility easements are maintained as Primary or Secondary roads on the Umpqua.

GT(4): How does the road system address the safety of road users?

Roads not safe for public use are closed to public travel or are repaired to bring them to a safe condition for use. Periodic review is made of hazard tree felling needs to provide safety to forest road users.

ADMINISTRATIVE USE

AU(1): How does the road system affect access needed for research, inventory, and monitoring?

Access is needed for smolt trapping, monitoring of peregrine falcon, cougar studies by Oregon Department of Fish & Wildlife, strategic planning surveys and plots (Continual Vegetation Surveys), neotropical bird surveys, water quality monitoring, and for ongoing work in the South Umpqua Experimental Forest and Research Natural Areas (Squaw Flat (Road 6800-220) and Cougar Butte).

TABLE A-14. ACCESS NEEDS FOR ADMINISTRATIVE SITES

Activity	Tiller	Cottage Grove	North Umpqua	Diamond Lake
Smolt trapping	2800 2900	No input	No input	No input
Peregrine falcon monitoring	2814-500 2700-851	No input	No input	No input
ODF&W cougar study	Jackson Creek Rd	No input	No input	No input
Strategic Planning Surveys	Continual Vegetation Surveys	Continual Vegetation Surveys	Continual Vegetation Surveys	Continual Vegetation Surveys
DEMO areas	No input	No input	No input	Dog Prairie Watson Falls mycorrhizae root dip study
Fire Lookouts	No input	No input	No input	No input
Rental Cabins	No input	No input	No input	No input
Research & Research Natural Areas	Squaw Flat (6800-220) Cougar Butte	No input	No input	Watch Dog Long-term Site Productivity; White pine blister rust study; Bear Paw white pine pruning study; Matsutaki management study; Breaking Point, Laura, Wat-Gertsh, and Squeaky snag creation studies
Experimental Forest	South Umpqua 2924, 2924-600, 2924-610, 2924-620, 2924-630, 2924-631	No input	No input	No input
Water gauging sites	X	No input	No input	X

Hydrologist has book of all data collection sites (weather stations, weirs, gauging stations). See these file locations:
J:\fsfiles\office\nat_res\water\hydrology\Precipbook2001

Strmgauge.xls

Climo sites.xls

Snwcrs.xls

List of precip sites.xls

Reference Diamond Lake GIS map (*I:\gis_files\district_idt_projects\Forest Roads Analysis\au1_points*). Hydrologist has book of all data collection sites (weather stations, weirs, gauging stations).

Reference Forest GIS. A shape file of these streamgage, climatological, and snowcourse data collection sites is located at:

J:\fsfiles\office\nat-Res\gis\water\arcview\av_shapes\clim_stream_snow.shp

Project level scale of analysis is needed.

AU(2): How does the road system affect investigative or enforcement activities?

Expanded road access, particularly near communities, can add to problems with garbage dumping, vandalism, and other criminal activities.

Project level scale of analysis needed.

PROTECTION

PT(1): How does the road system affect fuels management?

Roads provide access for all fire management activities and can be considered fuel breaks as well as control lines and anchor points for wildland fire suppression. Priority areas for fuels treatments are those close to private property, those areas scheduled for prescribed burning, or have slash created by pre-commercial and commercial thinning.

Recommendation: Systematically assess each watershed for vegetation management treatment needs, current fuel model, and probable timing of next vegetation treatment based on Landscape Analysis. Add this Landscape Analysis assessment of vegetation treatment entry needs and timing to each watershed analysis report. Track needs for area entry and demand on road systems in a Forest database. Maintain roads needed in the near future (within 1 to 2 decades) for vegetation management needs.

Manage the vegetation to manage fire risk. Reduce roads in areas of low fire risk and the need for the next vegetation management entry is 15 to 20 years or more in the future; make priority to maintain roads needed to access areas of high fire risk even with vegetation treatment and for wildland/urban interface response.

Reference Forest GIS.

Project level scale of analysis is needed.

PT(2): How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

The probability of increased acreage burned increases with road closures and poor access. Roads provide access for rapid initial attack. Roads closed by

semi-permanent structures such as rocks or trenches have a significant effect on initial attack response time. Roads that are permanently closed can still provide travel ways for firefighters on foot, but decrease response time and prevent use of fire suppression equipment.

Roads that access private property, high-use recreation areas, and roads located in areas of high lightning occurrence are of the greatest importance to fire and fuels managers.

Ridgetop roads tend to be most useful for fuel breaks and defensible firelines, while mid-slope roads are of least value. Road location and slope position, relative to fuel hazards and values at risk, could form the basis for assigning incremental values to specific roads for fire suppression.

Reference Diamond Lake GIS pre-attack map (needs update). Reference Forest GIS.

Project level scale of analysis is needed.

PT(3): How does the road system affect risk to firefighters and to public safety?

Poor road access increases the difficulty of fire suppression by firefighters on the ground. Roads provide access for everyone, including emergency medical response.

Dead-end roads may allow firefighters to become entrapped. Poorly signed roads may cause forest road users to become lost. Road surface conditions, overgrown vegetation, poor sight distance/clearance, blind corners, and heavy traffic use affect safety of travel by both the public and emergency response vehicles.

The greatest fire safety concern associated with road access is at the interface of forest lands and rural or urban communities. Landowners sometimes build access roads that will not accommodate large emergency vehicles. Forest Service firefighters must at times attempt to protect privately owned structures from wildfire without the benefit of reasonable access.

Map a primary pre-attack road network and identify problem access roads. Reference Forest GIS.

PT(4): How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

Consult with Oregon Department of Environmental Quality.

U.S. Environmental Protection Agency (EPA) has developed a guide to calculating emission factors from most significant human sources. This document is known as AP-42. The document is available to be downloaded as individual chapter sections at (Internet website)

www.epa.gov/ttnchie1/ap42c13.html

Do not utilize rock sources from areas of serpentine rock as these contain a mineral form of asbestos, a known health hazard.

Project level scale of analysis needed.

RECREATION – UNROADED RECREATION

UR(1): Is there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?

Currently there is a demand for maintaining unroaded areas of the Umpqua.

This needs further analysis at the Forest scale.

UR(2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?

This needs further analysis at the Forest scale.

UR(3): What are the adverse effects of noise and other disturbances caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?

This needs further analysis at the Forest scale.

UR(4): Who participates in unroaded recreation in the areas affected by constructing, maintaining, and decommissioning roads?

Unroaded recreation use is primarily in the Rogue-Umpqua Divide Wilderness (estimated use of 5,000 visitors per year) and Unroaded Recreation Management Areas (UMP-MA-1) which include Donegan, Cow Creek, Skimmerhorn, and Castle Creek.

UR(5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

Since the majority of visitors reside in southwest Oregon, the participants have attachments to favorite places, some for generations. While they may not be vocal in large scale planning, they have very strong feelings when access is changed or roads are closed (especially to access dispersed recreation sites). Alternative opportunities and locations are not usually perceived as acceptable, at least not in the short term.

UR(6): How is developing new roads into unroaded areas affecting the Scenic Integrity Objective, SIO(s)? Note: Some forests are still using the Visual Management System (VMS). If that is the case, substitute Visual Quality Objective (VQO) for SIO. (Region 2 added this question. There is no corresponding National direction).

This needs further analysis at the Forest scale.

RECREATION – ROAD-RELATED RECREATION

RR(1): Is there now or will there be in the future excess supply or excess demand for roaded recreation opportunities?

Road constructing, maintaining, and decommissioning can change the type, quantity, quality, and accessibility of roaded recreation opportunities. Changing the maintenance level on existing roads, including closing roads and maintaining for high-clearance vehicles only, may have major effects on public access to recreation sites and on-road recreation opportunities provided by the road itself. The presence of roads and their maintenance levels also help determine which members of the public can or will want to have access to the opportunities served by the roads.

This needs further analysis at the Forest scale.

RR(2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of roaded recreation opportunities?

This needs further analysis at the Forest scale.

RR(3): What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?

This needs further analysis at the Forest scale.

RR(4): Who participates in roaded recreation in the areas affected by road constructing, changes in road maintenance, or road decommissioning?

An estimated 100,000 people visit the Tiller Ranger District each year. Most use occurs from May through November. Primary activities include driving for pleasure, camping, picnicking, swimming, hunting, and hiking. Most visitors reside within a 60-mile radius. The majority of visitors (estimated at 90%) participate in roaded recreation. There are 32 developed recreation sites and 50 popular dispersed recreation sites.

Reference 1988 Tiller R.D. survey of dispersed site users and 2001 National Recreation Use Monitoring Project survey.

This needs further analysis at the Forest scale.

RR(5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

Since the majority of visitors reside in southwest Oregon, the participants have attachments to favorite places, some for generations. While they may not be vocal in large scale planning, they have very strong feelings when access is changed or roads are closed (especially to access dispersed recreation sites). Alternative opportunities and locations are not usually perceived as acceptable, at least not in the short term.

This needs further analysis at the Forest scale.

RR(6): How does the road system affect the Scenic Integrity Objective, SIO(s)? Note: Some forests are still using the Visual Management System (VMS). If that is the case, substitute Visual Quality Objective (VQO) for SIO. (Region 2 added this question. There is no corresponding National direction).

This needs further analysis at the Forest scale.

RECREATION – PASSIVE-USE VALUE

PV(1): Do areas planned for road constructing, closure, or decommissioning have unique physical or biological characteristics, such as unique features and threatened or endangered species?

Passive-use value is a value or benefit people receive from the existence of a specific place, condition, or thing, independent of any intention, hope, or expectation of active use. Passive-use value is divided into two components: existence value and bequest value. Existence value is value or benefit people receive from the existence of a specific place, condition or thing, independent of any intention, hope, or expectation of their active use by the person receiving the passive-use benefit. Bequest value is value or benefit received because a place, condition, or thing is available for active or passive use by others.

This needs further analysis at the Forest scale.

PV(2): Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

This needs further analysis at the Forest scale.

PV(3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for area planned for road entry or road closure?

This needs further analysis at the Forest scale.

PV(4): Will constructing, closing, or decommissioning roads substantially affect passive-use value?

This needs further analysis at the Forest scale.

SOCIAL ISSUES

SI(1): What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

A specific area of importance to the local community is Sunrise Rock accessed by Road 3200-100.

Significant responses during public meetings indicated a strong desire to maintain all roads accessing trailheads, popular dispersed sites, and all developed recreation areas. Specific areas mentioned were:

- ✓ Fish Lake Trailheads accessed by Roads 2830, 2830-600, and 2840 (high clearance vehicle maintenance only would be accepted)
- ✓ Huckleberry Gap accessed by Road 2950 (turn into a hiking trail; except provide ATV access for physically challenged users)
- ✓ Twin Lakes Trailhead and area accessed by Roads 4770, 2801, and 2715-530.

Project level scale of analysis is needed.

SI(2): What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

This needs further analysis at both the Forest and project level scales.

SI(3): How does the road system affect access to paleontological, archaeological, and historical sites?

Project level scale of analysis is needed. Consult with Forest Archeologist.

SI(4): 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?

Consultation with the Cow Creek Band of the Umpqua Indians indicates the Tribe prefers all loop roads and through-routes remain open. If road closures must be made the Tribe prefers no graveled improved roads be closed. The preference is also that any closure be accomplished with gates, a dirt barrier or trenched, rather than "obliterating" the road bed[34]. Project level scale of analysis is needed. Consult with Tribal government through the Forest Archeologist.

SI(5): How are roads that constitute historic sites affected by road management?

Diamond Lake Ranger District has known routes with local historic interest: Roads 3401 Thorn Prairie Road, 4795, and 6000-700.

Project level scale of analysis is needed.

Reference Forest GIS. Reference 36 CFR 800 (protection of historic and cultural properties) also available at (Internet website)

www.access.gpo.gov/nara/cfr

SI(6): How is community social and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?

A significant number of responses from the public indicated strong feelings about maintaining access to areas for mining and timber management, as well as recreation and private land access. Specific areas mentioned:

[A-34] November 14, 2002 letter from Wayne Shammel, General Counsel for the Cow Creek Band of Umpqua Indians.

TABLE A-15. ACCESS IMPORTANT TO COMMUNITY SOCIAL AND ECONOMIC HEALTH.

Area or Road	Organization	Person Commenting	Reason Given
Black Creek Road Cavitt Creek Road Tuttle Creek Road Tiller-South Umpqua Road 1610 1610-300 2900 2929 2980 3113 3113-400 3113-500 Canton Creek area off Rd 3810	Seneca-Jones Timberlands	Bill Moore	Access roads critical to Seneca-Jones land management
Roads in the 6-mile radius of the Arlington mineral patent		Bruce Stewart	Arlington mine operations

Further project level scale of analysis is needed.

Consult Tribal government through Forest Archeologist.

SI(7): What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values?

This needs further analysis at the Forest scale.

SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

Public input from Francis Eatherington (Umpqua Watersheds, Inc.) emphasized a need to preserve currently unroaded areas of 1,000 or more acres and to never allow road construction in that area.

This needs further strategic planning analysis at the Forest scale.

SI(9): What are traditional issues of animal and plant species in the area of analysis?

Project level scale of analysis is needed.

Consult with Tribal government through Forest Archeologist.

SI(10): How does road management affect people's sense of place?

"Sense of place" describes the character of an area and the meaning people attaché to it. It integrates the interpretations of a geographic place, the

biological and physical setting, psychological influences (memory, choice, perception, imagination, emotion), and social and cultural influences. Changes in road management can affect access to these places or change the setting, affecting what people value.

Consult with Tribal government through Forest Archeologist when analyzing at the project level scale.

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CR(1): How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?

On the Umpqua, the main issue affecting groups of people is access. Consultation with the Cow Creek Band of the Umpqua Tribe of Indians is to be addressed during watershed/project level analysis.

Access for people with disabilities is also addressed at the watershed/project level. Currently there are two sites at Tiller Ranger District that have improved access for persons with disabilities: Cathedral Falls (County Road 46) and Camp Comfort Trail (access Road 2800-365).

Questions project planners may wish to ask potentially affected interests when analyzing at the project level scale:

- Does your cultural or ethnic group traditionally access particular sites by road in this project area?
- Is road use important because of a disability need?
- Do you rely on the Umpqua for your economic income?