



Forest ObML 3-5 Roads Roads Analysis Process

United States
Department of
Agriculture

**Forest
Service**

Pacific
Southwest
Region

July 28, 2006



Lassen National Forest



LASSEN NATIONAL FOREST

Forest RAP ML 3-5

JANUARY 2007

Acting Forest Supervisor

Jeff Withroe _____

**Steering Committee
Almanor District Ranger**

Al Vazquez _____

Ecosystems Staff Officer

Jeff Withroe _____

Forest Engineer

Jack Walton _____

**Prepared by
Forest Transportation Planner**

Tim Dedrick _____

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Introduction

In fulfillment of:

1. Forest Service Miscellaneous Report FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System, 1999.
2. Forest Service Manual Chapter 7700 – Transportation System – Zero Code 7700 – 7709.5 inclusive and specifically Federal Register Part 5 – Forest System Road Management Rule of January 12, 2001.
3. Forest Service Manual Chapter 7710 – Transportation System – Transportation Atlas, Records, and Analysis, 7712.1-7712.6 inclusive – Roads Analysis, December 16, 2003.

The Roads Analysis Process is a road management system set of recommendations that provides an integrated-science approach to Transportation Planning. The recommendations are specific dispositions for each road to guide the continued use, maintenance, improvements, and disposal of the Lassen N.F. transportation system in support of its administrative needs and functions.

This Forest roads analysis was directed to address the present, existing conditions of the transportation system, specifically the objective maintenance level 3, 4, and 5 roads within the Lassen National Forest. The product of this analysis effort is an interdisciplinary team's planning perspective, an inventory of the Forest's ML 3, 4, 5, roads which leads to a set of recommendations for each road. The inventory identifies risks (potential resource damage) and opportunities (resource enhancement) for improving the roads. At the Forest scale this inventory analysis will lead to the critique and review of road management objectives, but it will not identify the District specifics of a minimum transportation system. The District or Project level roads analysis process will determine recommendations for a minimum transportation system.

This area encompasses approximately 1,875 square miles or 1.2 million acres. The Lassen Volcanic National Park is situated within the central-western section of the Forest. The Forest Service administrative units occupied by this area include the Almanor, Eagle Lake, and Hat Creek Ranger Districts. The Lassen National Forest includes portions of Lassen, Plumas, Tehama, Shasta, Butte, Siskiyou, and Modoc Counties.

This roads analysis is based on the six-step scientific guideline format contained within publication – USDA Forest Service, Rocky Mountain Research Station FS-643, Roads Analysis: *Informing Decisions about Managing the National Forest Transportation System*, Washington DC 1999, and can be found in the project record.

The analysis is designed to be scaleable, flexible, and driven by road-related Resource Area concerns and opportunities. It uses a multiscale approach (subwatershed-project-forest) to ensure that these concerns and opportunities are examined in context. It provides a set of analytical questions to be used in fitting analysis techniques to individual situations. Roads analysis is intended to complement and integrate existing laws, policy, guidance, and practice into the analysis and

management of roads on the national forests. Roads analysis as described here is primarily a stand-alone procedure, but the conceptual framework and resources for analysis may be readily integrated into any analytical process in which roads are examined.

The detail of the analysis is appropriate to the intensity of the issues addressed. Where project specific ecosystem analyses or assessments are completed, roads analysis use that information rather than duplicating these efforts. Roads analysis is integrated as a component of watershed analysis, landscape assessments, and other analyses supporting the decision making processes.

Roads analysis neither makes decisions nor allocates lands for specific purposes. Line Officers, with public participation, make decisions. The roads analysis is not a NEPA analysis which requires a certain level of public scoping which will come later.

The Lassen National Forest Interdisciplinary Team for this Roads Analysis Process is composed of the following individuals:

Name	Responsibility
Brian Barns	Forest GIS Cartographer / SO
Susan Chappell	Fisheries Biologist / Aquatics / SO
Tim Dedrick	IDT lead – Report Production / SO
Dave Evans	Forest Silviculturist – Commodity / SO
Dan Ford	Forest Soils Scientist / SO
Terri Frolli	Forest Planner / NEPA Coordinator / SO
Tom Frolli	Forest Wildlife Biologist / SO
Jane Goodwin	Resource Officer-Alternate / Almanor Ranger District
Mike Holmes	Forest Fuels Planner / Officer SO
Melanie McFarland	Forest Fisheries Biologist / Aquatics SO
Elizabeth Norton	Forest Public Service Program Manager / SO
Chris O'Brien	Forest Archeologist / SO
Allison Sanger	Forest Botanist / SO
Mo Suarez	District Range Mgmt / Eagle Lake RD
Scott Tangenberg	Forest Hydrologist / SO
Al Vazquez	Almanor District Ranger/Steering Committee – ARD
Terrie Veliotos	Forest Road Manager / SO
Jack Walton	Forest Engineer / Steering Committee – SO
Christi Whitcome	Deputy Forest Fire Management Officer / SO
Jeff Withroe	Forest Ecosystem Officer / Steering Committee – SO

Roads analysis is intended to be based on science. Team members located, interpreted, and used relevant existing scientific literature in the analysis, disclosed assumptions made before/during analysis, and stated the sideboards on which the analysis was based.

The Six Steps of the Roads Analysis Process. Roads analysis comprises six steps aimed at producing needed information and maps. Line-Officer participation is

encouraged within the process. Although the analysis consists of six sequential steps, the process may require feedback and iteration among steps over time as the analysis matures. The amount of time and effort spent on each step will differ, based on specific situations and available information, including field season/time available or during which the roads analysis takes place.

The process produces a set of road-related concerns and questions, the answers to which can inform the recommendations made about future road systems. Line officers and interdisciplinary teams can determine the relevance of each question, incorporating public participation as deemed necessary.

Step 1 – Setting up the analysis. This roads analysis process was constructed to analyze all objective maintenance level 3, 4, and 5 roads which total 739 miles, within the Lassen National Forest's 3,375 miles of road.

Step 2 – Describing the situation. In compliance with FSM 7700, the thesis statement for this particular roads analysis process is to "analyze for a minimum optimum road system to serve a variety of users and Resource disciplines." The IDT has identified the following access-user needs by Resource:

- Recreation – campgrounds, water sports, recreation residences, trailheads, scenic corridors, driving for pleasure.
- Timber/Forest Products – capable, available, and suitable lands
- Range – facilities
- Fire Protection/suppression – wildland urban interface, defensible fuel profile zones, and lookouts
- Private Land – cost-share agreements
- Adjoining lands – county rights-of-way

The IDT has also identified the following Resource Area's which are affected by the existing road-access transportation system:

- Watershed
- Terrestrial Wildlife
- Soils
- Aquatics
- Visuals
- Safety
- Archeology
- Botany
- Forest Health

Step 3 – Identifying concerns. This interdisciplinary team developed and reviewed resource area indicators at the forest, project, and subwatershed analysis level. The ID Team reviewed and discussed each resource areas concerns and indicators in consecutive interdisciplinary group meetings. The developed indicators as shown in Appendix B were taken to the Steering Committee for review, discussion, revision and approved for use.

Step 4 – Assessing benefits, problems, and risks. After developing the resource-area specific indicators, each resource or a combination of resources, such as aquatics, hydrology, and soils, further processed the indicators into specifically

weighted factors for rating roads. The factors were weighted according to specific resource-sensitive factors within the environmental, social, economic, and political realms, and each road was given a combined opportunity and risk rating of high, medium, or low with associated Resource Area comments to explain the particular recommendation or combination recommendation. Each resource or resource combination rated and ranked each road within the project area for risk and opportunity by placing the word of high, medium, or low on a spreadsheet along with comments for resource area rationale. These spreadsheets represent the synthesis of each resource's ratings and rationale per road. Each resource utilized their spreadsheet for step 5 when the Interdisciplinary Team met to discuss and come to an agreement for a team road-rating for each road.

Step 5 – Describing opportunities and setting priorities. The interdisciplinary team met to review each team member's comprehensive resource-area road-rating spreadsheet from Step 4 above. Each road within the project area is represented on the spreadsheet by road number, length, and objective maintenance level, and each road has a rating of high, medium, or low by each resource area with associated rationale. The interdisciplinary team identified five primary road system considerations to analyze during this step, as listed below:

1. Redundant roads
2. Minimize resource impacts
3. Dollars spent on road deferred maintenance
4. Key roads to maintain and raise service level, commit to new maintenance level
5. Drop service level of those roads not key/essential to Forest management

Step 5 provides a recommendation for each objective maintenance level 3, 4, and 5 road in the Lassen N.F. transportation system, and included one of six recommendations;

- A) Retain as is with no change – predominance of low risk and high opportunity.
- B) Retain + Resource Area Concerns with no change - high risk identified and high opportunity, no viable alternative, budgetary constraints.
- C) Opportunity for Resource Area road maintenance reconstruction and retain road – high opportunity and some risk identified.
- D) Change maintenance level and retain road – raise or lower maintenance/service level.
- E) Realign – high opportunity and high risk, need access.
- F) Decommission – high risk identified and low opportunity.

Step 5 includes the attached map, Excel IDT road-rating spreadsheet and a table listing each road by identification number, segment length and team-consensus management recommendation.

Step 6 – Reporting. The interdisciplinary team produced this report that portrays management opportunities and supporting information important for making decisions about the future characteristics of the transportation system. This information sets the context for developing proposed actions to improve the road system and for future amendments and revisions of forest plans.

Key findings and recommendations -

The Lassen National Forest goal for this road analysis process is to provide each Resource Area Specialist with a vehicle to conduct an inventory of the transportation system within the affected area and how the roads interact with each resource's standards and guidelines as well as interrelated resources concerns. The interaction between the roads and the resource's management requirements has lead to Team recommendations for each road inventoried, determined by an assessment of risk and opportunity, tiered to a desired condition of the transportation system, displayed in Table 1, below.

- Table 1, lists the Interdisciplinary Team's Road Recommendations for all roads.
- Table 2 lists the road maintenance performed from 2001 – 2005 and value-added, by user-category.
- Appendix A displays the ID Team road-rating spreadsheet as a record, created by the ID Team during Step 5 – Describing Opportunities and Setting Priorities.
- Appendix B lists the ID Team Approved Indicators per Resource-Area.
- Appendix C lists the Glossary of Road Terms.
- Appendix D displays the Bibliography.
- Exhibit 1 is a GIS map displaying the ID Teams road recommendations.

Table 1

Synopsis of Interdisciplinary Team Road-Segment Recommendations

Type of Road	Miles
Retain road as-is with no change.	734.15
Change maintenance level and retain road, raise maintenance level.	3.20
Change maintenance level and retain road, lower maintenance level.	1.45
Total Miles of Forest Service ML 3,4,5 jurisdiction road	739.

Table 2

**Synopsis of road maintenance performed on ML 3-5 roads,
Years 2001 – 2005, by –
DFPZ contracts,
Road Use Permittees,
Co-Operators, and
Lassen National Forest road crew - force account**

Type of Road	Miles
DFPZ projects (45 projects)	212
Road Use Permittees (53 permits)	250
Co-Operators (3 Co-Operators)	113
Miles of ML 3-5 road receiving timber sale road-package maintenance	575 miles
Lassen Forest Road Crew	
Miles of ML 3-5 (2001-2006) road receiving annual maintenance	2,029 miles
Total ML 3-5 road miles maintained between 2001 and 2005	2,604 miles = 335% of ML 3-5

Road maintenance levels and rights-of-way are two critical components to factor into current fiscal year budgets and future project planning for ML 3-5 roads. Engineering and the Lands Officer have substantial records of rights-of-way for the Lassen

National Forest and have been combining the paper records with the GIS files for the previous eight years to build a database, many but not all records have been transferred to GIS. The acquisition of permanent easements for current and future projects is an agency priority and should be made a priority on the Lassen. Maintenance and the ability of the Forest to afford to maintain the current inventory of ML 3-5 roads has been an ongoing question. This IDT has researched Engineering Annual Road Reports for fiscal years 2001 – 2006 to determine that the Forest has been able to maintain 2,604 miles or 335% of the 739 miles of **objective maintenance** level 3, 4, and 5 **road miles** during the previous six years. The level to which the Forest has been able to maintain the roads is outlined below with brief definitions of the three different levels of road maintenance.

Engineering Design prepares a *road package* for all timber sale projects and the level of maintenance may include the following work; slide and slump repair – T801, ditch cleaning – T802, surface blading – T803, surfacing repair – T804, drainage structures – T805, dust abatement – T806, roadway vegetation – T807, miscellaneous structures – T808, waterbars – T809, barriers – T810, and surface treatment – T811. Road packages are for travel efficiency of commodity transportation and is associated on the Lassen NF with either DFPZ Fuel Reduction Project's, Road-Use Permittee's, or Co-operators, with the contractor conducting the actual maintenance. Between 2001 – 2005 the Lassen has prepared road packages for sale units on 575 miles of ML 3 – 5 roads. Road surface augmentation may be a component of this package and consists of a selected thickness of installed aggregate wearing surface as a remainder on the travelway when the sale is completed

The *annual* level of maintenance is generally defined as what can be accomplished through the cleaning of drainage ditches and catch-basins, culvert cleaning, sign maintenance/replacement, re-shaping the road surface material/surface aggregate, watering the road material/aggregate, compacting the road surface/aggregate, minor earthwork related to the road to clear debris-flows and slumps, and minor aggregate replacement or supplementation. Annual maintenance does incorporate basic resource area protection concerns and supports compliance to road management objectives. This work is performed by the Forest road crew. During the field seasons of 2001 – 2006 the Lassen NF road crew performed annual maintenance on 437, 483, 368, 325, 141, and 275 miles of ML 3 – 5 forest road, respectively.

The *Deferred* level of maintenance is defined as work that includes replacing drainage structures such as culverts, survey-work, bridge-work, sign construction/replacement, earth-work to correct debris-flows/slumps, earth work to rebuild storm-damage, aggregate replacement, road-surface paving with asphalt-cement, and road-surfacing with bituminous chip-seal. This is a more comprehensive level of road maintenance although it is performed with much less frequency and with a greater planned span-of-time which contribute to a planned maintenance schedule, which is tied-into the planned life-cycle of road components, (i.e., culverts life cycle 30 years, bridge life cycle 50 years, paving life cycle 20 years). Deferred maintenance is the level of maintenance that conforms to and supports the road management objectives and resource area protection. Deferred maintenance items are being performed on the Lassen NF by a combination of funding sources including

Capital Investment Projects, Fish Passage funds, Federal Highway Administration funds, and Storm Damage Restoration funds.

The following is a list of deferred maintenance road projects that received funding or were completed during fiscal years 2001 – 2006, (not including timber sale road maintenance, cooperators and permittees);

- 2006 – Swain Snowmobile Park, Eagle Lake Campground, North Antelope Arch, Deer Creek, Lockerman, Turner Mtn Loop, Battle Creek, Hole-in-the-Ground, Rocky Gulch, Fox Farm TS, Ursa TS, Castle TS, Yellow TS. 275 miles for a value of \$790,844.
- 2005 – Straylor, Warner, North 49, Merrill Campground, Potatoe Patch Campground, Mason Station, Fish Improvements, Browns Ravine, Waterhole, Eagle Lake Boatramp, Turner Mtn Loop, Pear Lake Loop, Cattleguards, Robbers. 141 miles for a value of \$1,069,826.
- 2004 – McClure Trailhead Parking, Robber, Cattleguards, Deer, Mill, Antelope, Colby Mdws, Battle Crk, Butte Crk. 325 miles for a value of \$810,465.
- 2003 – Corders Reservoir, Rd 28N97, Rd 28N29, Rock Crushing, 38N10-D-E, Wilson Lake Rd, Fredonyer-29N46, Willow Crk Fish Passage, Task Orders. 368 miles for a value of \$707,000.
- 2002 – Chester Air Attack Base, Hat Crk Trailer Dump, Tamarack, Roxie Peconom, Hat Crk Rim, Onion Summit, Blacks Ridge, Yellow Crk, North Coble, Wilson Lake Rd, Soldier Crk, Deer Crk Trailhead, Gaither Campground, Hole-in-the-Ground, Mill Crk, Swamp Crk, Rattlesnake Crk, Burney-Butte-Deer-Mill-Antelope-Yellow-Eagle Lake-Susan River-Lake Britton-Horse-Hat Creek Watersheds. 483 miles for a value of \$698,000.
- 2001 - Shanghai, Ruffa, Jonesville, Deer Creek, Blacks Ridge, Pegleg, Cattle Guards, Silver Lake, Turner Trailhead, Almanor Office, Coon Hollow, Deer Crk Mdws, Cold Springs, Hole in Ground, Keddie Ridge, Gurnsey Campground, Eagle Lake Office, Bogard Hole, Fredonyer Snowpark, Bizz Johnson Trail, Poison Lake, Murken HGP, Cypress Trailhead, Rock Crk, HC Work Center, Subway Cave, Corders Resv, Big Jacks Resv, Wiley Ranch, Jellico Pit, Diacolite Rd. 437 miles for a value of \$150,480.

Regarding deferred maintenance, when the planned life-cycle replacements are calculated, the cost of such is listed as a deferred item for maintenance, to be completed at the time of planned component replacement. This is the amortization of a capital-cost-component with its replacement cost pre-calculated for accounting and planning purposes. This is a misleading term that has come to be incorrectly-defined as a backlog of maintenance that was not performed on schedule and is a liability to the Forest. This is not the case, the deferred maintenance term is accurately used as an INFRA accounting term to represent the complete total cost to bring a road up to new standards and then requiring no maintenance of any kind, until that is, a new life-cycle is established for the components of that road, and it again will incur a deferred maintenance cost in INFRA. The inaccuracy of this system to accurately represent the needed maintenance dollars is inherent and becomes tangible when the fact that all roads are not created equal and all roads do not weather or age with the same intensity, (different design standards, different

contractors, different quality of road material and/or application, different weather regimens & etc.).

Therefore, the terms of road package, annual, and deferred maintenance are defined and represent different treatments and functions. With this in mind it is clear from the above Table that the Lassen National Forest is performing maintenance on 335% of the ML 3-5 roads within a frequency of 5 years, which meets the transportation industry standard for frequency but not for complete adherence to road management objectives. Deferred maintenance is being performed on the ML 3-5 roads on an on-going basis through the road-repair programs funded by ERFO for storm damage. The Lassen engineering road shop has submitted in July 2006, applications for road repair funding worth \$500,000 for the replacement of road culverts and the repair of road wash-outs. The Forest is also receiving funding through the Federal Highway Administration to reconstruct the Bailey Creek crossings on the 17 road, with a deferred maintenance value of approximately \$500,000.

Exhibit 1

Lassen National Forest
Roads Analysis Process (RAP)
Maintenance Level 3, 4, and 5 Roads



July 19, 2006

0 5 10 20 Miles

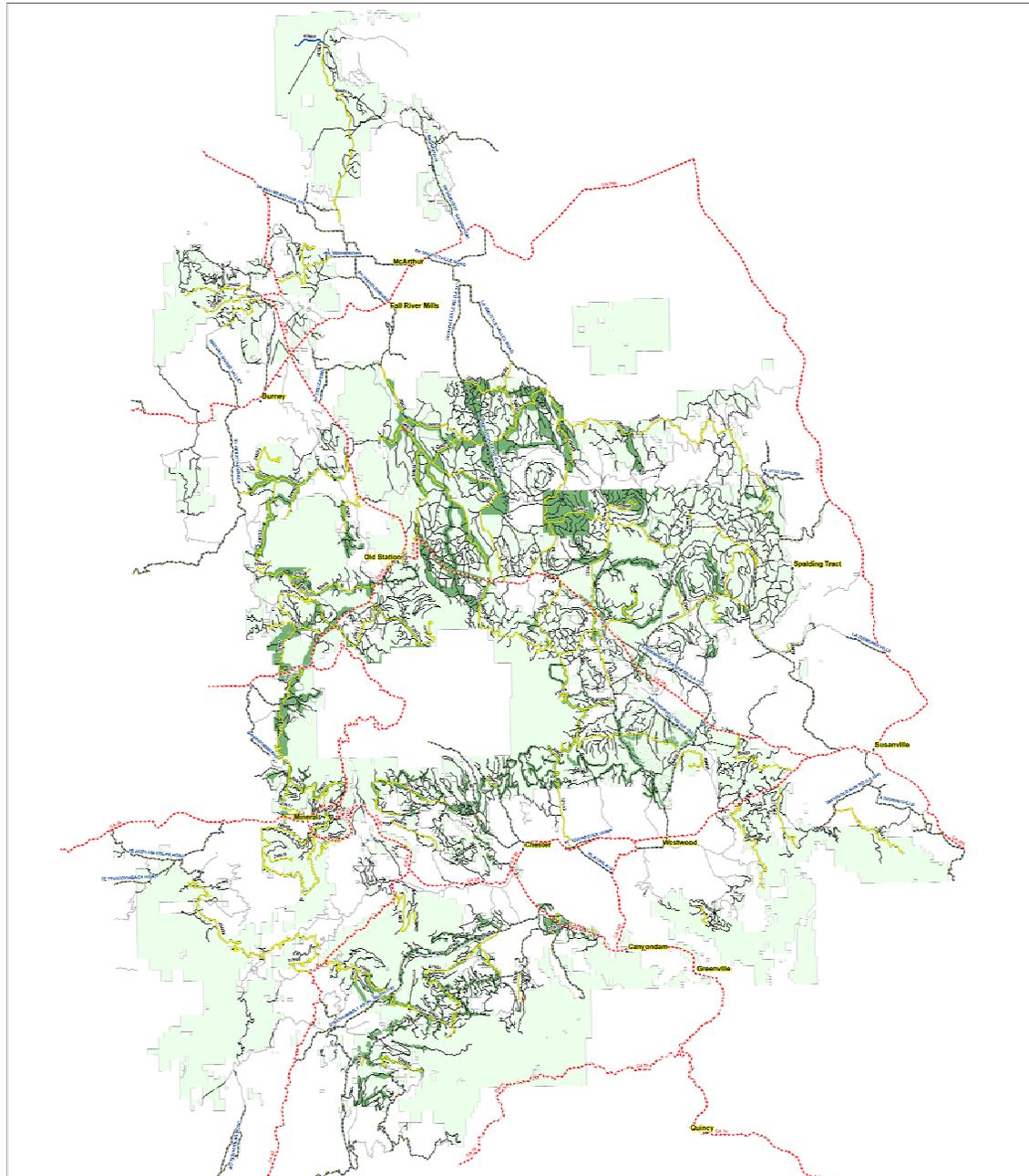
Source: INFRM Table 6, ROAD_LINEAR_EVENTS_0506_07_05_2006

OBJECTIVE MAINTENANCE LEVEL

- 1 - BASIC CUSTODIAL CARE (CLOSURE)
- 2 - HIGH CLEARANCE VEHICLES
- Not Maintained by US Forest Service
- State Highways
- County Highways

- 3 - SUITABLE FOR PASSENGER CARS
 - 4 - MODERATE DEGREE OF USER COMFORT
 - 5 - HIGH DEGREE OF USER COMFORT
- RAP Recommendation
- Lower to ML 2
 - Raise to ML 4

- LAND OWNERSHIP
- National Forest Land
- Defensible Fuel Profile Zones
- Planned & Accomplished



Final version manually insert spreadsheets here, pgs 13-18.

Appendix B Interdisciplinary Team Indicators Approved & Utilized per Resource Area

- *AQUATIC SPECIES - INDICATORS FOR ANALYSIS*

AQUATIC SPECIES –

Name of Indicator:

Presence of federally listed (Threatened or Endangered), and Forest Service Sensitive aquatic species habitat (current/historic).

Question Potentially Addressed:

How and where do roads affect federally listed and Forest Service Sensitive (TES) aquatic species and their habitat?

To what extent does the road system overlap with areas containing TES aquatic species?

How and where does the road system restrict the movement of TES aquatic organisms?

Description of Indicator:

This Indicator overlays the road system with TES aquatic habitat at the subwatershed level. This scale was selected, because (1 the extent of TES aquatic species occurrence/habitat is not easily defined at finer scales, and (2 cumulative effects of roads to aquatic habitats at the subwatershed scale can be analyzed. Presence of TES aquatic species within a subwatershed (7th field).

Units of measure:

Yes = High Risk, the road, or any portion thereof, is located within a subwatershed where TES aquatic species are known to occur (either currently and/or historically).

No = Low Risk, the road is located outside any subwatershed where TES aquatic species are known to occur.

Data Source:

GIS layer identifying subwatersheds (7th field) in which current/historic presence of TES species has been confirmed; GIS transportation layer identifying Forest ML 3-5 roads.

Note:

Professional judgment was used to interpret road risk within two subwatersheds. In both cases, the subwatersheds were relatively large, and the areas of TES aquatic species occurrences were limited to very small portions of the subwatersheds.

1. Subwatershed PR1 – This Pit River subwatershed encompasses the northernmost portion of the Forest. Road 40N04 is located within PR1, but miles away from where TES aquatic species occur, and on relatively flat, volcanic terrain. Risk of effects to TES aquatic species from this road is negligible; therefore, Road 40N04 was rated as “Low Risk” to TES aquatic species.
2. Subwatershed PR3 – This is another large Pit River subwatershed that encompasses a small portion of the Pit River where TES aquatic species occur. However, most of the subwatershed is located on the Hat Creek Rim, which is flat terrain with no direct hydrologic connectivity to the Pit River. All ML 3-5 roads within this subwatershed are also located on the Hat Creek Rim, miles away from the Pit River. These roads were therefore rated as “Low Risk” to TES aquatic species.

• ***BOTANY – RARE PLANT HABITAT - INDICATORS FOR ANALYSIS***
ECOSYSTEM FUNCTIONS AND PROCESSES (EF)

Name of Indicators:

The Lassen Roads Analysis Report contains three indicators for Ecosystem Function; Presence of Noxious Weeds/Insects vectors. Collectively, the indicators will be used for noxious weeds to compare the conditions for one road with the conditions of another.

Question Potentially Addressed:

How is the road system affecting the spread and invasion of noxious weeds into unoccupied areas on the Forest? Which species of noxious weeds appear to be using the road systems as a directional vector?

Rationale: Cleared road right-of-ways provide the predominant conduit for directional spread of noxious weeds. Vehicles and livestock transport weed seeds and vegetative parts onto and around the forest from infested areas off pavement.

Units of Measure:

- o Presence of individual species along roads, trailheads and stock unloading areas = High risk.
- o Relative abundance of particular noxious weed species = High risk.
- o Areas of low cover or high disturbance, which are vulnerable to the establishment of weeds = High risk.

Data Source:

- o GIS Weed layer
- o GIS layer of Forest 3,4, and 5 roads
- o Noxious weed occurrence forms

• ***COMMODITY PRODUCTION – INDICATORS FOR ANALYSIS***
COMMODITY PRODUCTION (TM)

(Indicator will be viable at Project Level analysis)

Name of Indicator:

1. Capable, Available, and Suitable (CAS) Forest Land

Question Potentially Addressed: How well does the existing road system serve commodity extraction (saw logs, chips, fuelwood, holiday trees, and special forest products)?

Description of Indicator:

1. CAS land denotes forest with a scheduled yield.

Rationale:

Level 3, 4, and 5 roads provide the primary access to a forest land for extraction purposes. The condition, grade, width, and road surface influence sale economics.

Each logging system has an “Achilles heal”, typically the largest piece of equipment needed for product extraction. Access for chip vans is often the most limiting feature of a transportation system. Given the heavy loads associated with commodity extraction, bridges, culverts, and paved surfaces must be capable of carrying the weight.

Data Sources:

Timber Sale Appraisal Handbook
Lassen National Forest Land and Resource Management Plan
SNFPA
Past Economic Analyses
Practical Experience

• ***ENGINEERING – INDICATORS FOR ANALYSIS***
ECONOMIC (EC)

In the Lassen Roads Analysis Report there are five indicators identified under Economics, Economic Efficiency, Annual Traffic Related Road Maintenance Costs, Deferred Road Maintenance Costs, Benefit of Surface Stabilization, and Annual Non-Traffic Road Maintenance Costs. In the evaluation of level 3, 4, & 5 roads all but one of the indicators has been combined. Benefit of Surface Stabilization, i.e. benefits by having a road rocked will be addressed in related indicators.

Question Potentially Addressed:

How does the road system affect the agencies direct costs and revenues and what if any changes in the road system will increase revenue to the agency by reducing costs, increasing revenue, or both?

Description of Indicator

Road maintenance costs will be analyzed as the most important item. The total costs for all ML 3-5 roads have been computed of annual traffic road maintenance, non-annual traffic road maintenance, and deferred maintenance costs to maintain the road to the current service/maintenance level. These costs will be used in conjunction with ADT, average daily traffic, which has also been mapped on the ML 3-5 network of forest roads, to determine the economic efficiency of the existing ML 3-5 roads.

Rationale:

Comparing the total cost of the maintenance per road against a forest average will show which roads are significantly higher and which if selected for reduction in service/maintenance level because of reduced resource need would reduce forest costs.

Units of Measure

We will measure both:

- the cost/mile (engineering produced spreadsheet for annual maintenance, non-traffic related maintenance, and deferred maintenance)
- cost/mile/ADT (engineering produced map of ML 3-5 roads average daily traffic 1990-2003)

Measuring by ADT will also show the effects of fixed costs.

- Roads < less than 25 ADT and High economic costs = Low opportunity rating
- Roads between 25 and 40 ADT and predominance of High to Medium economic costs = Medium opportunity rating
- Roads between 40 and 75 ADT and predominance of Medium to Low economic costs = High opportunity rating

Data Sources

INFRA costs gathered 1999 through 2003 for annual and deferred maintenance. ADT will be based on past traffic count data and professional judgment/observations.

INDICATORS FOR ANALYSIS

GENERAL PUBLIC TRANSPORTATION (GT)

Name of Indicator: Community Access

Question Potentially Addressed: How does the road system connect to communities, recreation residences, and public access?

Description of Indicator: Direct connection into communities and integration with public roads into a seamless system.

Rationale:

Roads providing the only access or supporting county or state road access will receive a High rating and others will receive a Low rating.

Units of measure: Yes = High opportunity
No = Low opportunity

Data Source: GIS visual & tabular.

Name of Indicator: Shared Road Use

Question Potentially Addressed: How does the road system connect other land ownership to public roads. How does the road system affect shared use and cost share?

Description of Indicator: Public and private shared use and cost share.

Rationale: Private land access requires use of Forest Service roads and in areas of “checker board land ownership” there is benefit in cost share roads.

Units of measure: High/Low opportunity

- Road use permits indicate a need to use roads and thus are a benefit or roads needed to access the roads under a road use permit – rated High opportunity
- Cost share agreements – rated High opportunity
- Easements granted to private landowners – rated High opportunity
- If none of the above - rated Low opportunity

Data Source:

Road use permit files, and cost share files.

- ***FIRE PROTECTION – PREVENTION - SUPPRESSION – INDICATORS FOR ANALYSIS -***

FIRE –

Name of Indicator:

Presence of DFPZ defensible fuel profile zones, WUI wildland urban interface, or LO lookout facility (current/planned).

Questions Potentially Addressed:

How and where do roads affect and effect the ingress and egress of Fire suppression, fuels management, protection, or prevention to a DFPZ, WUI, or LO?

To what extent does the road system overlap with these landscape features and facilities?

Description of Indicator:

These Indicators overlay the road system with planned and existing defensible fuel profile zones, wildland urban interface areas that surround recreation residences and rural forest communities, and the lookout facilities are located at the very end of road systems.

Units of Measure:

Presence of DFPZ’s, WUI’s, and Lookouts = High opportunity and Low risk.

High Opportunity – Low Risk:

The road provides critical access to one or more of these landscape features and the absence of this access is an unacceptable risk.

Low Risk – High Opportunity:

The road provides access to one or more of these landscape features already, and improvement to the road can improve fire and fuels management.

Data Used for Interpretation:

GIS layer identifying DFPZ’s, WUI’s, and Lookouts, as well as team member’s professional long-term Forest experience and judgment in conjunction with the GIS transportation layer identifying Forest ML 3-5 roads.

- ***HERITAGE - INDICATORS FOR ANALYSIS***

HERITAGE

(Indicator will be viable at Project Level analysis)

Name of Indicator:

Presence of cultural heritage site accessed by, on, or adjacent to road.

Questions Potentially Addressed:

Does presence of road offer access opportunity to site or to develop site for interpretation, or does presence of road present a risk to cultural site for destruction of site and cultural history?

Description of Indicator:

These indicators overlay the ML 3-5 road system at the Forest scale.

Units of Measure :

Road provides access to or adjacent to a cultural heritage site, Yes = High risk and/or High opportunity, No = Low risk and/or opportunity, must be dealt with on a case by case basis.

Units of measure:

Data Source:

GIS visual & tabular, as well as Lassen Forest archeology cultural heritage site records and professional experience/judgment.

- ***HYDROLOGY - INDICATORS FOR ANALYSIS***

HYDROLOGY

Name of Indicator:

Presence of RCA on road, and road located in a 7th field subwatershed with a specific road density.

Questions Potentially Addressed:

How and where do roads affect the RCA's and at what density do roads currently exist within 7th field subwatersheds?

Description of Indicator:

These indicators overlay the ML 3-5 road system at the Forest scale.

Units of Measure :

1. Road located within an RCA?, Yes = High-Medium risk, No = Low risk.
2. Road located in a 7th field subwatershed with overall Forest Service Road Density of 0. – 2.5 =Low risk to watershed values, 2.5 – 3.5 = Medium risk to watershed values, and 3.5 and above = High risk to watershed values.

Data Source:

GIS visual & tabular, as well as Lassen Forest hydrology road logs and professional experience/judgment.

- ***RANGE - INDICATORS FOR ANALYSIS***

RANGE USE –

(Indicator will be viable at Project Level analysis)

Name of Indicator:

Presence or absence of livestock facilities and ML 3-5 roaded access to them.

Question Potentially Addressed:

How does the road system affect semi-truck and trailer and stock-truck access needed for gathering, loading and disembarking of livestock?

Description of Indicator:

Is there a facility present on said road to support the viability of livestock operations and allotments?

Rationale:

Roads providing the only access or supporting county or state road access will receive a positive rating (High); others will be neutral (Low).

Units of measure:

Yes = High opportunity

No = Low opportunity

Data Source:

GIS visual & tabular, District Range Conservation Technician professional experience and judgment, and livestock allotment usage.

- ***RECREATION – INDICATORS FOR ANALYSIS***

RECREATION (UR) (RR)

Name of Indicator - Recreation Access

Questions Potentially Addressed:

How will opportunities for road-access dependent recreation activities such as camping, either dispersed or organized, hiking and trailheads, recreation residences, water sports, woodcutting, driving for pleasure, OHV/OSV travel, bird watching, fishing, and hunting, etc., be affected by road maintenance levels?

Description of Indicator:

A GIS mapping exercise is conducted to geographically map the locations forest-wide of Forest Service trailheads, campgrounds, recreation residences, and water sport access and the ML 3, 4, and 5 roads that serve these recreation opportunities.

Rationale:

Roads on the Forest NFS ML 3-5 transportation system that currently provide the sole access routes to the recreation opportunities listed above are critical to maintain for Forest users according to the LRMP and the ROS.

Units of Measure:

Ratings of High, Medium, and Low opportunity are given to each ML 3-5 road which currently provides recreation access, more correctly High = provides sole access, Low = multiple access or no recreation site.

Data Sources:

- National Forest Service GIS corporate database survey for recreation sites.
- Lassen Forest employee knowledge and experience.

• ***TERRESTRIAL WILDLIFE - INDICATORS FOR ANALYSIS***

TERRESTRIAL WILDLIFE

Name of Indicator:

Presence of Marten sightings, Bald Eagle territories, Spotted Owl nest, Goshawk nest.

Questions Potentially Addressed:

How and where do roads affect this four species and their habitat? To what extent does the road system overlap with areas containing TES species? How and where does the road system restrict the movement of TES species?

Description of Indicator:

These indicators overlay the road system with TES habitat at the Forest scale.

Rationale:

Presence within a road-corridor up to 100m and 200m distances from the road.
Within 100m = High risk,
200m =Medium risk.

Data Source:

GIS visual & tabular, as well as Lassen Forest field logs and professional experience/judgment.

Appendix C

Glossary of Road Terms

- **Annual Maintenance.** Work performed to maintain serviceability, or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
- **Area.** A discrete, specifically delineated space that is smaller and in most cases much smaller, than a Ranger District. (36 CFR 212.1, 261.2)
- **Average Daily Traffic.** The total number of vehicles passing a given point during a given time period divided by the number of days in that time period. (AASHTO, 2001, A Policy on Geometric Design of Highways and Streets)
- **Culvert.** A conduit or passageway under a road, trail, or other obstruction. A culvert differs from a bridge in that the top of a culvert does not serve as the road surface and is constructed entirely below the elevation of the traveled way. (Handbook of Steel Drainage & Highway Construction Products).
- **Decommission.** Demolition, dismantling, removal, obliteration and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates the deferred maintenance needs for the fixed asset. Portions of an asset or component may remain if they do not cause problems nor require maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
- **Deferred Maintenance.** This category is best described as the capital costs required to replace major road maintenance components which are on a scheduled life-cycle replacement and amortization schedule. Deferred maintenance needs may be categorized as critical or non-critical at any point in time. Continued deferral of non-critical maintenance will normally result in an increase in critical deferred maintenance. Code compliance (e.g. life safety, ADA, OSHA, environmental, etc.), Forest Plan Direction, Best Management Practices, Biological Evaluations other regulatory or Executive Order compliance requirements, or applicable standards not met on schedule are considered deferred maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
- **Forest Road.** A road wholly or partly within, or adjacent to, and serving the National Forest System that is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. (23 USC 101)
- **Forest Road or Trail.** A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary

for the protection, administration and utilization of the National Forest System and the use and development of its resources. (36CFR 212.1, 251.5, 261.2)

- **Forest Trail.** A trail wholly or partly within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. (23 USC 101)
- **Forest Transportation System Management.** The planning, inventory, analysis, classification, record keeping, scheduling, construction, reconstruction, maintenance, decommissioning, and other operations undertaken to achieve environmentally sound, safe, cost-effective, access for use, protection, administration, and management of National Forest System lands. (FSM 7705)
- **Four-Wheeled Drive Way (1).** A forest development road included in the Forest Development Transportation Plan and commonly used by four-wheel drive, high-clearance vehicles wider than 50 inches. (FSM 2353.05)
- **Heavy maintenance.** Work usually done by highway agencies in repairing damage normally expected from seasonal and occasionally unusual natural conditions or occurrences. It includes work at a site required as a direct result of a disaster which can reasonably be accommodated by a State or local road authority's maintenance, emergency or contingency program. (23 CFR 668)
- **Local Road (1).** A road that primarily provides access to land adjacent to collector roads over relatively short distances at low speeds. (AASHTO, 2001, A Policy on Geometric Design of Highways and Streets)
- **Local Road (2).** A forest road that connects terminal facilities with forest collector, forest arterial or public highways. Usually forest local roads are single purpose transportation facilities. (FSH 7709.54, no longer in print)
- **Maintenance (1).** The preservation of the entire highway, including surface, shoulders, roadsides, structures and such traffic-control devices as are necessary for its safe and efficient utilization. (23 USC 101)
- **Maintenance (2).** The upkeep of the entire forest transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization. (36 CFR 212.1)
- **Maintenance (3).** The act of keeping fixed assets in acceptable condition. It includes preventive maintenance normal repairs; replacement of parts and structural components, and other activities needed to preserve a fixed asset so that it continues to provide acceptable service and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than those originally intended. Maintenance includes work needed to meet laws,

regulations, codes, and other legal direction as long as the original intent or purpose of the fixed asset is not changed. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

- **Maintenance Levels.** Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria. (FSH 7709.58, 12.3)
 - o **Maintenance Level 3.** Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users. (FSH 7709.58, 12.3)
 - o **Maintenance Level 4.** Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times. (FSH 7709.58, 12.3)
 - o **Maintenance Level 5.** Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage." (FSH 7709.58, 12.3)
- **Motor Vehicle.** Any vehicle which is self-propelled, other than:
 - A vehicle operated on rails; and
 - Any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area. (36 CFR 212.1, 261.2)
- **National Forest System.** As defined in the Forest Rangeland Renewable Resources Planning Act, the "National Forest System" includes all National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system. (36 CFR 212.1)

- **National Forest System Land.** All lands, waters, or interests therein administered by the Forest Service. (36 CFR 251.51)
- **National Forest System Road.** A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, *county* or other local public road authority. (36 CFR 212.1, 251.51, 261.2)
- **National Forest System Trail.** A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a State, county or other local public road authority. (36 CFR 212.1)
 - **Critical Need.** A requirement that addresses a serious threat to public health or safety, a natural resource, or the ability to carry out the mission of the organization. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
 - **Emergency Need.** An urgent maintenance need that may result in injury, illness, or loss of life, natural resource, or property; and must be satisfied immediately. Emergency needs generally require a declaration of emergency or disaster, or a finding by a line officer that an emergency exists. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
 - **Health & Safety Need.** A requirement that addresses a threat to human safety and health (e.g. violations of National Fire Protection Association 101 Life Safety Code or appropriate Health Code) that requires immediate interim abatement and/or long-term permanent abatement. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
 - **Mission Need.** A requirement that addresses a threat or risk to carrying out the mission of the organization. Needs related to administration and providing services (transportation, recreation, grazing, etc.). Needs not covered by health and safety or natural resource protection. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
 - **Non-Critical Need.** A requirement that addresses potential risk to public or employee safety or health, compliance with codes, standards, regulations etc., or needs that address potential adverse consequences to natural resources or mission accomplishment. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
 - **Resource Protection Need.** A requirement that addresses a threat or risk of damage, obstruction, or negative impact to a natural resource. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)
- **Objective Maintenance Level.** The maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget

constraints, and environmental concerns. The objective maintenance level may be the same as, or higher or lower than, the operational maintenance level. (FSH 7709.58, 12.3)

- **Passenger Cars.** These include passenger cars of all sizes, sport/utility vehicles, minivans, vans and pickup trucks. (AASHTO, 2001, A Policy on Geometric Design of Highways and Streets)
- **Permit.** A special use authorization which provides permission, without conveying an interest in land, to occupy and use National Forest System land or facilities for specified purposes, and which is both revocable and terminable. (36 CFR 251.51)
- **Reconstruction.** To construct again. (Webster)
- **Right-of-Way (1).** Land authorized to be used or occupied for the construction, operation, maintenance and termination of a project or facility passing over, upon, under or through such land. (36 CFR 251.51)
- **Right-of-Way (2).** A privilege or right to cross over or use the land of another party for egress and ingress such as roads, pipelines, irrigation canals, or ditches. The right-of-way may be conveyed by an easement, permit, license, or other instrument. (FSM 5460.5)
- **Road (1).** A motor vehicle route over 50 inches wide, unless identified and managed as a trail. (36 CFR 212.1)
- **Road (2).** A general term denoting a facility for purposes of travel by vehicles greater than 50 inches width. Includes only the area occupied by the road surface and cut and fill slopes. (FSM 2355.05)
- **Road Construction or Reconstruction.** Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road. (36 CFR 212.1)
- **Road Maintenance.** The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective. (FSM 7705)
- **Road Management Objectives.** Defines the intended purpose of an individual road based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria. (FSH 7709.55, 33)
- **Roadway.** The portion of a highway, including shoulders and auxiliary lanes, for vehicular use. (AASHTO, 2001, A Policy on Geometric Design of Highways and Streets)

- **Routine Maintenance.** Work that is planned to be accomplished on a continuing basis, generally annually or more frequently. (FSH 7709.58, 13.41)

Other than Routine Maintenance. Work that can be deferred without loss of road serviceability, until such time that the work can be economically or efficiently performed. The frequency of such work is generally longer than a year. (FSH 7709.58, 13.41)
- **Service Life.** The length of time that a facility is expected to provide a specified service. (FSH 7709.56b, 05)
- **Special Use Authorization.** A permit, term permit, lease, or easement which allows occupancy, use, rights, or privileges of National Forest System land. (36 CFR 251.51)
- **Traffic Service Level.** Describes the significant characteristics and operating conditions of a road. (FSM 7705). See also FSH 7709.56, Chapter 4.
- **Trail.** A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail. (36 CFR 212.1)
- **Trailhead.** The transfer point between a trail and a road, lake, or airfield. The area may have developments that facilitate the transfer from one transportation mode to another. (FSM 2353.05)
- **Trucks.** These include single-unit, tractor-semitrailer combinations and tractor-semitrailer in combination with additional trailers. (AASHTO, 2001, A Policy on Geometric Design of Highways and Streets)
- **Vehicle.** Any device in, upon, or by which any person or property is or may be transported, including any frame, chassis, or body of any motor vehicle, except devices used exclusively upon stationary rails or tracks. (36 CFR 261.2)

Appendix D

Bibliography

The components of this document are derived from the following USDA Forest Service strategy and planning documents, as well as Executive Orders:

- Department of Agriculture, Forest Service, 36 CFR Parts 212, 261, and 295, RIN 0596-AB67, Administration of the Forest Development Transportation System; Prohibitions, Use of Motor Vehicles Off Forest Service Roads, Final Rule, 2005.
- Department of Agriculture, Forest Service, 36 CFR Parts 212, 251, 261, and 295, RIN 0596-AC11, Travel Management; Designated Routes and Areas for Motor Vehicle Use, Final Rule, 2005.
- USDA Forest Service Chief's Four Threats – Unmanaged Recreation.
- USDA Forest Service - Lassen National Forest – 2002 Road Analysis Report.
- USDA Forest Service – Sierra Nevada Forest Plan Amendment, FEIS, January 2001.
- USDA Forest Service – Herger Feinstein Quincy Library Group Forest Recovery Act of October 12, 1998.
- USDA Forest Service Lassen National Forest – Land Resource Management Plan.
- Executive Order 11989, May 24, 1977, as amended E.O. 11644.
- Executive Order 11644, February 8, 1972, Use of Off-Road Vehicles on the Public Lands.