Public Wheeled Motorized Travel Management

Plumas National Forest

Soil and Water Resources Report for the Draft Environmental Impact Statement

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1 Introduction

The Plumas National Forest (PNF) has managed the landscape as open to cross-country motor vehicle travel (motorized travel off of designated National Forest Service (NFS) roads, trails or areas). Repeated use has resulted in unplanned, unauthorized roads and trails. These routes generally developed without environmental analysis or public involvement, and do not have the same status as NFS roads and NFS trails included in the National Forest Transportation System (NFTS). This has resulted in unplanned roads and trails created without meeting Forest Plan standards and guides and Best Management Practices (BMPs). As a result impacts to soil and water resources have occurred in some locations.

The purpose of the "Soil and Water Resource Report" is to analyze the direct, indirect, and cumulative effects of the proposed alternatives of the Plumas National Forest Public Wheeled Motorized Travel Management EIS on soil and water resources, specifically long-term soil productivity and hydrologic function. The land management activities proposed under this project have the potential to affect soil and water resource in a beneficial, indifferent, or adverse manner. This report identifies mitigation measures needed to have a functioning trail system with minimal impacts to these resources.

The soil resource provides many essential functions for national forest lands. It sustains plant growth that provides forage, fiber, wildlife habitat and watershed protection. It absorbs precipitation, stores water for plant growth, and gradually releases surplus water which attenuates runoff rates. It sustains microorganisms which recycle nutrients for continued plant growth. The National Forest Management Act of 1976 and other acts recognized the fundamental need to protect, and where appropriate, improve the quality of soil. The proposed action alternatives could potentially affect soil productivity and its other ecosystem functions and is therefore addressed in this section.

Protection of water quantity and quality is an important part of the mission of the Forest Service (Forest Service Strategic Plan for 2007 to 2012, July 2007). Management activities on national forest lands must be planned and implemented to protect the hydrologic functions of forest watersheds, including the volume, timing, and quality of streamflow. The use of roads, trails, and other areas on national forests for public operation of motor vehicles has potential to affect these hydrologic functions through interception of runoff, compaction of soils, and detachment of sediment (e.g., Foltz, 2006). Management decisions to eliminate cross-county motorized travel, add new routes and areas to the national forest transportation system (NFTS),

and make changes to the existing NFTS could potentially affect watershed functions and is therefore addressed in this section.

2 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

2.1 Direction relevant to the proposed action as it affects soil resources includes:

2.1.1 National Forest Management Act of 1976

Renewable Resource Program. "recognize the fundamental need to protect and where appropriate, improve the quality of soil, water, and air resources."

2.1.2 National Soil Management Handbook

The Soil Management Handbook (USDA 1991) is a national soils handbook that defines soil productivity and components of soil productivity, establishes guidance for measuring soil productivity, and establishes thresholds to assist in forest planning.

2.1.3 Region 5 Soil Management Handbook Supplement

The Forest Service Region 5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1) establishes regional soil quality analysis standards and provides threshold values that indicate when changes in soil properties and soil conditions would potentially result in a significant change in . soil productivity (including soil loss, porosity; and organic matter), soil hydrologic function, or soil buffering capacity. The analysis standards are to be used for areas dedicated to growing vegetation. They are not applied to lands with other dedicated uses, such as developed campgrounds, administrative facilities or in this case, the actual land surface authorized for travel by the public using various kinds of vehicles.

2.1.4 Regional Forester's Letter (dated Feb 5, 2007)

This letter provided clarification to Forest Supervisors on the appropriate use of the R5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1). It states in part:

> *Analysis or evaluation of soil condition is the intended use of the thresholds and indicators in R5 FSH Supplement 2509.18-95-1. They are not a set of mandatory standards or requirements. They should not be referred to as binding or mandatory requirements in NEPA documents. Standards and guidelines in Forest Land and Resource Management Plans provide the relevant substantive standards to comply with NFMA.*

The thresholds and indicators represent desired conditions for the soil resource. Utilization of the thresholds and indicators provides a consistent method to analyze, describe and report on soil condition throughout the Region.

2.1.5 Plumas National Forest Land Management Resource Plan ("Forest Plan")

The 1988 Forest Plan establishes standards and guides to prevent significant or permanent impairment of soil productivity on page 4-44 (USDA 1988). The analysis standards are to be used for areas dedicated to growing vegetation. They are not applied to lands with other dedicated uses, such as developed campgrounds, administrative facilities or in this case, the actual land surface authorized for travel by the public using various kinds of vehicles.

2.2 Direction relevant to the proposed action as it affects water resources includes:

2.2.1 Clean Water Act of 1948 (as amended in 1972 and 1987)

Establishes as federal policy the control of point and non-point pollution and assigns the States the primary responsibility for control of water pollution. Compliance with the Clean Water Act by national forests in California is achieved under state law (see below).

2.2.2 Section 303(d) of the Clean Water Act.

This section requires the identification of water bodies that do not meet, or are not expected to meet, water quality standards or are considered impaired. The list of affected water bodies, and associated pollutants or stressors, is provided the State Water Resources Control Board and approved by the US EPA. The most current list available is the 2006 303(d) list (SWRCB, 2006). The Plumas National Forest has 3 streams listed: Dolly Creek and Little Grizzly Creek (both due to Walker Tailings) and the North Fork Feather River (mercury and temperature). The designation of routes to the NFS will not cause additional mine tailings or mercury to enter the stream course. The temperature concerns on the North Fork Feather River are due to the hydropower facilities and dams.

2.2.3 Non-point source pollution on national forests is managed through the Regional Water Quality Management Plan (USDA Forest Service, Pacific Southwest Region, 2000)

This plan relies on implementation of prescribed best management practices. The Water Quality Management Plan includes one BMP for OHV use (4-7) and 28 BMPs related to road

construction and maintenance (2-1 to 2-28) (See Appendix B for a complete list of BMPs that apply). All NFS roads and trails open to OHV use are required to comply with these BMPs.

Of particular relevance for motorized travel management, BMP 4-7 requires each forest to: (1) identify areas or routes where OHV use could cause degradation of water quality; (2) identify appropriate mitigation and controls, and (3) restrict OHV use to designated routes. This BMP further requires forests to take immediate corrective actions if considerable adverse effects are occurring or are likely to occur (See below Sections "Effects Analysis Methodology and "Affected Environment/Environmental Consequences" and Appendix B for a complete list of mitigation measures).

2.2.4 Regional Water Quality Control Board – Central Valley Region - Beneficial Uses and State Water Quality Objectives

Beneficial uses are defined under California State law in order to protect against degradation of water resources and to meet state water quality objectives. The Forest Service is required to protect and enhance existing and potential beneficial uses during water quality planning (California Regional Water Quality Control Board [CRWQCB] 1998). The Cumulative Off-site Watershed Effects analysis of the Motorized Travel Management is designed to include all effects on beneficial uses of water that occur away from locations of actual land use and are transmitted through the fluvial system (USDA Forest Service 1990). Beneficial uses of surface water bodies that may be affected by activities on the Plumas National Forest are listed in Chapter 2 of the Central Valley Region's Water Quality Control Plan (hereinafter referred to as the "Basin Plan") for the Sacramento and San Joaquin River basins (CRWQCB 1998). Existing and potential beneficial uses are defined for Lake Almanor, North Fork Feather River, Middle Fork Feather River, source to Little Last Chance Creek, Frenchman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lake, and Lake Oroville for the Feather River from the fish barrier dam in Oroville to the Sacramento River, for the watershed areas that are sources to Englebright Reservoir on the Yuba River, and for the Yuba River downstream of Englebright Reservoir. The defined existing beneficial uses are listed in the Riparian Conservation Objectives Analysis Appendix A.

2.2.5 The California Water Code

Consists of a comprehensive body of law that incorporates all state laws related to water, including water rights, water developments, and water quality. The laws related to water quality (sections 13000 to 13485) apply to waters on the national forests and are directed at protecting the

beneficial uses of water. Of particular relevance for the proposed action is section 13369, which deals with nonpoint-source pollution and best management practices.

2.2.6 The Porter-Cologne Water-Quality Act, as amended in 2006

This Act is included in the California Water Code. This act provides for the protection of water quality by the State Water Resources Control Board and the Regional Water Quality Control Boards, which are authorized by the U.S. Environmental Protection Agency to enforce the Clean Water Act in California.

2.2.7 The Sierra Nevada Forest Plan Amendment (SNFPA)

The Record of Decision (ROD) for the 2004 SNFPA includes a strategy for aquatic management which includes broad goals, Riparian Conservation Objectives (RCOs) and specific standards and guidelines for achieving the goals and objectives. The broad goals were created as endpoints toward which land management practices move ecosystem conditions towards restoring and maintaining the physical, chemical and biological integrity of the region's waters. The goal areas are Water Quality, Species Viability, Plant and Animal Community Diversity, Special Habitats, Watershed Connectivity, Floodplains and Water Tables, Watershed Condition, Streamflow Patterns and Sediment Regimes, and Stream Banks and Shorelines. These goals provide a comprehensive framework for establishing desired conditions at larger scales, including river basin, watershed, and landscape scales.

The 2004 ROD required the establishment of riparian conservation areas (RCAs) and critical aquatic refuges that delineate aquatic, riparian, and meadow habitats, which are to be managed consistent with the RCOs and associated standards and guidelines. A RCO report was generated for this DEIS and is included in Appendix A.

RCAs widths are defined as (1) *Perennial Streams:* 300 feet on each side of the stream, measured from the bank full edge of the stream; (2) *Seasonally Flowing Streams (includes intermittent and ephemeral streams)*: 150 feet on each side of the stream, measured from the bank full edge of the stream; (3) *Streams in Inner Gorge (stream adjacent slopes greater than 70 percent gradient):* top of inner gorge; (4) *Special Aquatic Features(includes lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs) or Perennial Streams with Riparian Conditions extending more than 150 feet from edge of streambank or Seasonally Flowing streams with riparian conditions extending more than 50 feet from edge of streambank:* 300 feet from edge of feature or riparian vegetation, whichever width is greater; and (5) *Other hydrological or topographic depressions without a defined channel:* RCA width and protection measures determined through project level analysis.

Specific Standards and Guides for soil and water resources in Appendix B Streamside Management Zone Plan.

2.2.8 Plumas National Forest Land Management Resource Plan ("Forest Plan")

The 1988 Forest Plan was amended by the 2004 SNFPA Record of Decision. The Forest Plan states "maintain or, where necessary, improve water quality using Best Management Practices (BMPs)." Subsequent Forest Plan standards and guides state: "implement BMPs to meet water quality objectives and improve the quality of surface water on the Forest." BMPs are procedures, techniques, and mitigation measures that are incorporated in all Plumas National Forest actions to protect water resources and prevent or diminish adverse effects to water quality (See Appendix B of the Soil and Water Resource Report for a complete list of BMPs that apply).

3 Effects Analysis Methodology

This section describes the methodology used for the effects analysis of the proposed project for soils and water resources. This section establishes indicators chosen to measure potential impacts, the analysis area, timeframe, methods used (including field survey methods), and assumptions made for the effects analysis to soil and water resources of all action alternatives.

The overall methodology used for effects analysis of soil and water resources is separated into two topics to be analyzed. The first topic is a site-specific analysis of each individual, existing unauthorized route that is proposed for addition to the current system of Plumas National Forest System (NFS) trails. The second topic is an analysis of each project alternative as a whole.

3.1 Site Specific Analysis Indicators for Existing Unauthorized Routes:

- Indicator #1: BMP Evaluation E08 Rating (Pass, Fail or At-Risk) for each segment of each route
- Indicator #2: Stream Diversion Potential at route / stream crossings

3.1.1 Geographic Scope of the Soil and Water Resource Analysis

All new proposed NFS routes under Alternatives 2 (Proposed Action), 4 and 5 have been field surveyed. These two alternatives include all unauthorized routes that are proposed to be added to the system under any of the action alternatives. The focus of these surveys is to determine the risk for potential soil and water resource effects, due to each individual unauthorized route. The goal of these surveys, and subsequent field visits and discussions, is to make one of four ratings of soil and water impacts for each proposed route:

1. Low: The route was considered, a field visit was made and the soil and water resource effects will not be adverse (assuming routine maintenance of the trail).
2. Moderate: The route was considered, a field visit was made and soil and water effects are currently less than adverse. Site-specific mitigation is prescribed to prevent future potential adverse effects to the soil and water resource. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts): addition or modification of existing route stream crossing structures; relocation of short segments of the existing route; and designation of acceptable seasons of use and vehicle class.
3. High: The route was considered, a field visit was made and soil and water effects are currently adverse. Site-specific mitigations for these routes are comprised of the same list of mitigations presented above for the Moderate rating. However, mitigations for routes rated High are necessary to reduce current soil and water resource effects to less than adverse. The watershed staff recommends that these routes may be designated with this EIS but not be legal for traffic until these critical mitigations are in place and proper installation is verified by Plumas National Forest staff.
4. Extreme: The route was considered, a field visit was made and a determination was made that the soil and water resource effects are currently adverse. The route is not recommended by the watershed staff for inclusion on the NFTS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse would not be economically feasible, meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams, frequent stream crossings, steep slopes, or highly erosive soils).

Field surveys performed in fall 2007 and summer 2008 were completed for all of the roughly 388 miles proposed for addition to the NFTS throughout all alternatives. Further, subsequent field visits to potentially problematic routes identified by the initial field surveys to discuss potential mitigations were performed in summer 2008. The proposed Sly Creek play area was surveyed in summer 2008. Approximately 20 miles of proposed or routes were not surveyed per the initial survey methodology because these routes are located within the perimeter of the 2008 Butte Lightning Complex wildfires and were generally unsafe to access in summer and fall 2008. However, abbreviated surveys of these routes were performed by Pete Hochrein, Travel Management ID Team Leader/Road Engineer whose fire safety training allowed access and whose knowledge of soil and water resource impacts due to roads and trails is extensive. The abbreviated surveys covered the entire lengths of the proposed routes but the full set of initial

field survey data was not gathered due to time and safety constraints. However, a determination of the soil and water resource impact level was made based upon key elements of the initial survey protocol. Mitigations were also formulated for these routes. See Appendix F of the Soil and Water Resources Report for more information. Abbreviated surveys were also conducted on the Beckwourth Ranger District (3.2 miles) and on the Mt. Hough Ranger District (1.8 miles).

The entire set of existing, unauthorized routes described in the no action alternative (totaling approximately 1,109 miles) was not surveyed for existing condition because actions are not proposed for all of these routes.

3.1.2 Timeframe for the Analysis

The site specific analysis establishes the existing condition of the routes. The analysis also indicates mitigations needed to reduce soil and water resource effects to less than adverse or to prevent future adverse effects.

Passive vegetative recovery of existing, unauthorized trails that are not proposed for addition to the NFTS is expected to occur within 20-30 years. Recovery depends upon soil type, precipitation amounts and level of disturbance to soil productivity and hydrologic function.

3.1.3 Field survey methodology

The methodology used to asses the existing condition of unauthorized routes stems from general direction for soil and water resources in the Forest Plan and from the standards and guides listed in the 2004 SNFPA ROD (see above Section “Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction” for specific information).

The Pacific Southwest Region has developed a “Best Management Practices Evaluation Program (BMPEP)”(1992, last updated in May 2002) to assess both the implementation of BMPs and BMP effectiveness Evaluation E08, “Road Surface Drainage and Protection,” is used to evaluate Practices 2-2, 2-4, 2-5, 2-10 and 2-23. While the surveyed routes are proposed not as NFS roads but as NFS trails, the chief difference between these two types of NFS facilities is simply the width of the traveled way (OHV trails, particularly motorcycle trails are narrower than roads). The surface drainage and protection BMPs that are evaluated by E08 are the same practices that are necessary to protect water quality impacts from OHV trails. While OHV trails may also be steeper than the NFS roads, the E08 evaluation allows flexibility in assessing whether the route drainage features adequately protect water quality. Mitigations prescribed in the field also take into account the steeper grades encountered on OHV trails. For example, prescribed waterbar or rolling dip spacing is shorter on the steeper OHV trails.

The E08 effectiveness evaluation criteria and rating scheme were used for the analysis of the field survey data collected on unauthorized routes proposed for addition to the NFS under this project's action alternatives. These unauthorized routes were old temporary roads used in past timber sales, old firelines, or user-created routes so evaluation of whether or not BMPs were implemented at the time of route creation is not appropriate. However, the E08 effectiveness evaluation criteria indicate whether the drainage features, and the surface and slope characteristics of the route template - as these route features currently exist on the ground - are effective in preventing adverse impacts to soil resources and water quality. The E08 effectiveness evaluation consists of objective measures of road surface rilling (rutting); erosion and/or failure of route fill slopes, cutslopes, and inside ditches; whether or not erosion from these features is delivered to stream channels; and scour and/or plugging of route cross drain structures (rolling dips, waterbars, or ditch relief culverts).

The full length of each unauthorized route proposed for addition to the NFTS was field surveyed and evaluated by dividing each route into a number of separate segments (see form in Appendix C). Beginning and end points of segments were defined at the points where road surface drainage left the road (at either a cross drain feature, a stream crossing, or a sag in road profile). The E08 effectiveness criteria were applied to each separate segment. The Pacific Southwest Region Best Management Practices Evaluation Program (BMPEP) scoring system was applied to each set of segment data, resulting in an objective rating of "Pass," "Fail" or "At-Risk." This scoring system emphasizes whether or not route-generated sediment is delivered to a stream channel; any one E08 criterion which indicated sediment delivery to a channel automatically results in a "Fail" rating for that segment.

Ratings of "Fail" or "At-Risk" for one or more segments of a proposed route indicated that further investigation of that route was necessary before rating the route as Low for soil and water impacts. Further investigation consisted of a subsequent field visit to investigate potential water quality impacts and possible mitigation measures or a closer look at other data collected during the initial survey, such as route slope, soil texture, frequency of cross drain structures, route location (near ridgetop or mid-slope), proximity to nearest stream channel, and route/stream crossing characteristics (including diversion potential).

Additional data collected during initial field surveys included route width, slope, and proximity to nearest stream channel. Effectiveness criteria for evaluation E09, "Stream Crossings" (evaluation used to assess Practice 2-1), were evaluated for every stream crossing on the proposed routes. "Pass," "Fail" or "At-Risk" ratings were not determined for the E09 data because most of the E09 criteria (such as road and fill slope rilling, fill slope failure, and drainage

ditch stability) are included in the E08 evaluation. However, four criteria are specific to stream crossings and are unique to the E09 evaluation (crossing scour at outlet, plugging and piping of crossing structures, and the crossing's potential to divert the stream down the road). Effectiveness deficiencies observed for these four crossing criteria were considered in rating each route for soil and water impacts. The diversion potential criterion is presented as an indicator for the direct and indirect effects analysis for each alternative. A minimum of two soil texture samples were collected on most routes to indicate erosion potential of the route and to verify soil survey map units. Additional soil texture samples were collected where ground conditions and ocular observations indicated that the soil texture had changed significantly.

Copies of the watershed Field Survey form and the BMPEP rating scheme are presented in Appendix C. A summary of E08 ratings for all proposed routes surveyed to date are presented for each district in Appendix F, G and H of the Soil and Water Resource Report..

3.1.4 The Field Survey Protocol Potential Impacts, Assumptions and Limitations

3.1.4.1 Soil Resource

The principal concern or effect to be assessed for the soil resource is the potential for soil erosion and subsequent effects on soil productivity or the ability of the soil to produce vegetation. The 1988 Forest Plan establishes standards and guides to prevent significant or permanent impairment of soil productivity and the Region 5 Soil Management Handbook establishes soil quality analysis standards (see above Section "Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction"). However both documents only apply to areas dedicated to growing vegetation. Erosion of trail system surfaces, fill slopes and cut slopes are not a concern in regards to soil productivity because all of the routes proposed for addition to the NFTS currently exist on the landscape and are no longer dedicated to growing vegetation. The proposed trail areas would be dedicated to motor vehicle use. Therefore, the soil quality analysis standards were not applied to the route areas proposed for addition to the NFTS. Erosion and sediment generated by system trail surfaces is a concern to water quality if there is potential for its delivery to a drainage feature and was included in the analysis for water resource concerns.

Secondary effects from erosion are the loss of soil depth, infiltration capacity and permeability or reduction in the soil hydrologic function. Erosion of Forest landscapes due to cross-country travel on previously untracked areas is a concern to the soil resource because that erosion can disturb the A-horizon (organic-rich topsoil) portion of soil profiles to the point where vegetative productivity in those disturbed areas is significantly reduced.

3.1.4.2 Water Resources

All road and trail templates that currently exist on the landscape, whether these templates are unauthorized routes or part of the NFTS, modify surface-water runoff timing and magnitude owing to interception of surface and subsurface runoff during rainfall and snowmelt events. Road and trail cutslopes can intercept subsurface spring flows, causing groundwater flows that would have percolated slowly through the hillside to become surface flows that run much more quickly over land (Figure 1). All road and trail surfaces intercept and concentrate precipitation and snowmelt to some degree. Runoff that would have been well dispersed and would have flowed slowly over well-vegetated hillsides is instead concentrated in roadside ditches or surface drains (rolling dips or waterbars), flowing much more quickly. The result is a modification of the natural watershed drainage regime that is created by nearly every road and trail on the landscape. This modification is frequently manifested as a network of unnatural, small drainage (i.e. stream) channels created by a road or trail.

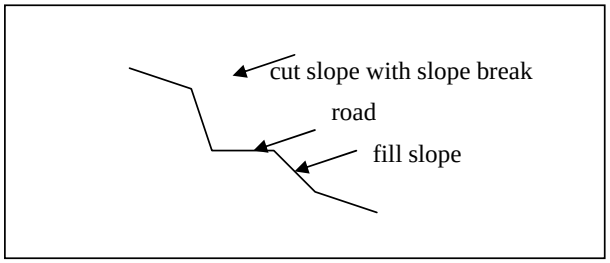

Figure 1: Typical cross section of road template

Cross-country travel on previously untracked areas can cause similar modification of surface water runoff timing and magnitude due to the vehicle track ruts that can occur. Such rutting occurs much more readily when ground conditions are wet in late fall and early spring.

The magnitude of effects to surface water runoff timing and volume caused by roads and trails may be insignificant for individual roads, particularly those located near ridge tops or in low-precipitation areas. However, even these individually insignificant effects can add up to cumulative impacts that can accelerate stream erosion processes, resulting in the alteration of physical processes in streams and potential loss or degradation of beneficial uses of water in those streams. Watersheds with high road densities can result in significant and long lasting degradation of water quality and aquatic habitat.

Figure 2: In 2002, Road 22N25 on Feather River Ranger District exhibits severe rutting as a result of a poorly drained surface that concentrates runoff. This road was reconstructed in 2003

A second potential impact to water resources of forest roads, trails, and cross-country travel is the generation of erosion that can be delivered as fine sediments to stream channels. Runoff on nearly all road and trail surfaces will result in mobilization of at least some amount of fine material that will eventually leave the surface. The mean amount of road-generated sediment for gravel-surfaced roads can be as much as 16 times less than for native surface roads. (Coe 2006) Sedimentation impacts are also substantially less for roads and trails that have been designed, constructed and maintained with quality drainage systems that disperse runoff effectively. However, roads and trails that are constructed with few or no surface drainage features (rolling dips or waterbars) or are entrenched, may result in runoff flowing down the surface for hundreds or thousands of feet. Other route templates that are sloped inward to the hillside will concentrate runoff in a roadside ditch that, if infrequently drained, may also run for hundreds or thousands of feet. Runoff that remains confined to a surface or ditch for long runs may gain enough flow magnitude to mobilize substantial amounts of fine material, resulting in surface ruts or eroding ditches (Figure 2).

This concentrated runoff from poorly drained roads and trails – and the sediment carried with it - will eventually flow off of the surface at the next down gradient cross drain feature, stream crossing, or natural sag in the road profile. The outlets of surface drains (rolling dips, waterbars, or ditch relief culverts) that are spaced too far apart are typically observed to be significant and continual sources of sediment (Figure 3). Oftentimes on uncontrolled or poorly drained roads, the runoff will leave the road at an inopportune location, such as down a steep slope that is not well vegetated, resulting in additional erosion from the road or trail fill slope (Figure 4). If the runoff

is concentrated on a surface or in a ditch for a great distance, even well vegetated slopes can be badly eroded where the runoff leaves the road, creating a perpetual source of erosion that can even cut through much of the road template width, resulting in tons of sediment mobilized and delivered downslope. Further, runoff that is concentrated in ditches for long runs can also lead to under-cutting of the road or trail cutslope, adding more sediment to the ditch flow. For steep, unvegetated cut slopes, such undercutting may result in slopes so steep that the slopes will not be stable again for decades, until the slope ravels to the ridgetop

Figure 3: Due to infrequent cross drain spacing, the outlet of this rolling dip on 22N25 was badly eroding and delivered sediment off of the road to the neighboring riparian area. This road was reconstructed in 2003. (Clipboard is shown for scale)

Road / stream crossings are significant sources of sedimentation on National Forest lands. Even well-drained roads and trails will deliver some amount of surface-generated sediment to stream channels at crossings. For the approximately 50 to 200 feet of a well desgined road or trail surface (length depending upon the slope of the terrain) that approaches the stream channel on both sides of the crossing, there is really no other place for surface-generated sediment to go but into the stream channel.

Apart from this inevitability, a second sediment impact frequently observed at stream crossings is diversion of the stream by the road or trail. Poorly designed, constructed, or maintained road or trail surfaces (e.g. rutted, entrenched roads or roads with berms created by poor grading practices) may capture the stream flow at crossings, sending the entire stream flow, including flood flows, down the road surface. Eventually, this flow may leave the surface at inopportune locations, resulting in the drastic erosion sites described in the paragraph above.

Figure 4: This bank erosion occurred on 22N25 during a normal precipitation year when concentrated surface drainage left the road at an inopportune location. The slump material was delivered to the RCA of Pinchard Creek, which is located less than 150 feet from the road. This road was reconstructed in 2003. (clipboard is shown for scale)

Culverts at road / stream crossings, even those that are properly sized and maintained, are susceptible to plugging during extreme flood events. Such plugging, usually initiated by woody debris caught across the span of the culvert inlet, may result in the flood flow over-topping the road and returning to the channel over the steep, and oftentimes unarmored, crossing fill slope. In large floods, over-topping can cut through the entire width of the road template at the crossing, resulting in tens to hundreds of tons of fine sediment delivered to the stream channel. Plugged stream crossings can also be captured and diverted down the road, resulting in the drastic erosion events described above.

Active restoration or obliteration of one or more unauthorized routes or areas is not part of any of this project's action alternatives. Without active restoration or obliteration of road and trail templates (including out-slope and re-contour of road and trail areas to closely match the natural topography and removal of culverts and other stream crossing structures), some amount of the potential water resource effects described above will persist for periods of years to decades following prohibition of public motorized vehicle use on the Plumas National Forest. Impacts to water resources will be reduced, however, over this period due to the vegetative recovery that will occur on routes in which traffic is prohibited.

Sediment production from motor vehicle use of native-surfaced NFTS routes is typically increased by higher levels of traffic and is reduced by proper design, installation, and maintenance of road drainage features (including out-sloping of the surface, rolling dips, waterbars, ditches, and ditch relief culverts).

3.2 Analysis Methodology for Each Project Alternative as Whole

As defined in the regulations for implementing NEPA, Code of Federal Regulations, Chapter 40, Sections 1500-1508, direct effects are those effects which are caused by the proposed action (or action alternative) and which occur at the same time and place as the action. Indirect effects are those caused by the action which are later in time or farther removed in distance from the location of the action.

Direct and indirect effects of each project alternative will be analyzed together for three separate action components:

1. The prohibition of cross-country motorized vehicle travel
2. The addition of facilities (unauthorized routes and/or areas) to the Plumas National Forest Transportation System (NFTS)
3. Changes to the existing NFTS, including deletions of existing facilities or changing the vehicle class and season of use for existing facilities

3.2.1 Direct and Indirect Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

3.2.1.1 Indicator # 1: Total Mileage of proposed routes and roads open to motorized traffic on Plumas National Forest Lands

Short-term timeframe: 1 year

Long-term timeframe: 25 to 30 years

Spatial boundary: Area of land managed by the Plumas National Forest.

Methodology: A GIS (Geographic Information System) data layer was created for the action alternatives. The route locations are based on information from the public (digitized from maps) and GPS (Global Positioning System) data from contractors and Forest Service Employees. This GIS data layer, the corporate NFTS roads GIS layer (created from PNF INFRA database), and the corporate GIS ownership layer were used to calculate the total miles of routes and roads open to motorized traffic by alternative. Limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or included roads that had been removed from the NFTS.

3.2.1.2 Indicator # 2: Total Mileage of proposed routes and roads open to motorized traffic on Plumas National Forest Lands that are situated in hydrologically sensitive areas

Short-term timeframe: 1 year

Long-term timeframe: 25 to 30 years

Spatial boundary: Hydrologically sensitive areas are Riparian Conservation Areas (RCAs) as defined by the 2004 SNFPA ROD (see Section "Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction")

Methodology: A GIS data layer was created for the action alternatives. The route locations are based on information from the public (digitized from maps) and GPS data from contractors and Forest Service Employees. A GIS layer for hydrologically sensitive areas was created using known information from cooperate GIS layers. The corporate GIS layers include information on streams, lakes, and meadows. The project GIS data layer, the corporate NFTS roads GIS layer, the hydrolgically sensitive layer, and the corporate GIS ownership layer were used to calculate the total miles of routes and roads open to motorized traffic within hydrologically sensitive areas by alternative. Limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or included roads that had been removed from the NFTS, and errors in the stream and meadow layers. The corporate stream layer is based on a crenulations model and some portions of the Forest are either over mapped or under mapped depending on the topography. The corporate stream type designation (perennial, intermittent, or ephemeral) was based on an office exercise, so the designations of these are not always accurate. The meadow and lake corporate layers only include the larger features identified on topographic maps.

3.2.1.3 Indicator # 3: Total Mileage of proposed routes and roads open to motorized traffic on Plumas National Forest Lands by Maximum Potential Erosion Hazard Rating (EHR)

Short-term timeframe: 1 year

Long-term timeframe: 25 years on the West side and 30 years on the East side

Spatial boundary: Area of land managed by the Plumas National Forest and maximum potential of EHR as defined by the Plumas National Forest Soil Resource Inventory (USDA Forest Service 1989), which is an Order 3 soil survey.

Methodology: EHR is a risk assessment of specific soil factors that induce accelerated erosion (USDA Forest Service 1990). The purpose of the EHR is to: (1) evaluate the likelihood of accelerated sheet and rill erosion from a specific soil disturbing activity, (2) evaluate the risk for adverse consequences, and (3) identify approximate soil cover amounts need to achieve an

acceptable risk. A cooperate GIS soil layer was created based on PNF Soil Resource Inventory, including the calculated maximum EHR for each soil map unit. The Plumas National Forest Soil Resource Inventory (USDA Forest Service 1989) was a broad survey and identifies general soil map units it does not delineate the exact location of each soil type. Map unit soil textures for routes proposed for addition to the NFTS were confirmed using the soil texture samples described in the Site Specific Analysis section above.

A GIS data layer was created for the action alternatives. The route locations are based on information from the public (digitized from maps) and GPS data from contractors and Forest Service Employees. The project GIS data layer, the corporate NFTS roads GIS layer, the soil layer, and cooperate GIS ownership layer were used to calculate the total miles of NFTS routes by EHR for each alternative. Limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or include roads that we were removed from the NFTS, and the fact that the soil layer only includes broad general information about soil map units.

3.2.2 Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class

Short-term timeframe: 1 year

Long-term timeframe: 25 or 30 years

Spatial boundary: Area of land managed by the Plumas National Forest

Indicator(s): (1) BMP Evaluation E08 Rating (Pass, Fail or At-Risk) for each segment of each route proposed for addition to the NFTS (emphasizes whether route-generated sediment is delivered to stream channels); (2) Stream Diversion Potential at stream crossings for each route proposed for addition to the NFTS

Methodology: In general, direct and indirect effects to soil and water resources of motorized travel on these previously unauthorized routes have already occurred. Water resource effects that have already occurred include modification of surface-water runoff timing and magnitude owing to interception of surface and subsurface runoff during rainfall and snowmelt events. Water resource direct effects that have already occurred also include the generation of erosion that can be delivered as fine sediments to stream channels. Indirect effects that have already occurred include potentially significant and long lasting degradation of water quality and aquatic habitat. Direct effects to soil resources that have already occurred include a loss of vegetative productivity for the routes and areas subjected to motorized vehicle traffic, due to loss of soil cover, soil compaction, and loss of soil hydrologic function.

3.2.3 Direct and Indirect Effects of Changes to the existing NFTS

None of the project alternatives propose deletion of existing NFTS facilities or change of season of use for existing NFTS facilities. Direct and indirect effects to soil and water resources due to changes in the vehicle class allowed on existing NFTS facilities are expected to be negligible. Allowing narrower, non-street legal vehicles to travel existing NFS roads would not lead to a change in the width of those roads.

3.2.4 Cumulative Effects of the Three Alternative Components as a Whole

As defined in Code of Federal Regulations, Chapter 40, Sections 1500-1508, cumulative effects are those impacts "on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time."

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 25 to 30 years

Spatial boundary: Road density calculations are based on watersheds created for the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act and Record of Decision. These watersheds are generally on a HUC -7 scale.

Indicator(s): Density (mi per sq mi) of proposed routes and roads open to motorized traffic on public and private lands within Plumas National Forest watersheds

Methodology: A GIS data layer was created for the action alternatives. The route locations are based on information from the public (digitized from maps) and GPS data from contractors and Forest Service Employees. Herger-Feinstein Quincy Library Group (HFQLG) watershed GIS layer, the project GIS data layer, and the corporate NFTS roads GIS layer, were used to calculate the total miles of routes and roads open to motorized traffic on both public and private lands by alternative. Limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or included roads that we were removed from the NFTS, and there isn't a HFQLG watershed identified in the Paradise area (see Watershed Maps in Appendix D).

As stated above, the combination of the three action components analyzed for direct and indirect effects will then be added to past, present and reasonably foreseeable actions to analyze the cumulative effects of implementing each alternative as a whole.

Past actions are represented by the existing condition of Plumas National Forest watersheds. The existing condition of Plumas National Forest watersheds and the sensitivity to disturbance of these watersheds were analyzed in Appendix N of the 1999 Final EIS for the Herger-Feinstein Quincy Library Group Forest Recovery Act (HFQLG FRA) (see Appendix E of the Soil and Water Resource Report). This analysis was performed for all watersheds containing Plumas National Forest Lands. The watersheds were analyzed at a scale that ranged between Hydrologic Unit Code 7 (HUC-7) and HUC-6. The watersheds range in size from 1,192 to 23,516 acres, with a mean of 8,536 acres. Watershed sensitivity ratings for each watershed were developed based upon Erosion Hazard Rating, the percent of the watershed in slopes greater than 60%, the percent alluvial stream channels, rain-on-snow or thunderstorm potential, and vegetative recovery potential. Watershed condition ratings for each watershed were developed based upon road density, road / stream crossing density, condition of alluvial stream channels, and percentage of land disturbed. The sensitivity rating and condition rating for each watershed were multiplied to derive a sensitivity condition rating, which determined a risk of cumulative watershed effects of low, moderate, high or very high.

The condition and sensitivity of these Plumas National Forest watersheds, i.e. the existing condition of these watersheds, has changed little since that 1999 FEIS analysis. More than 15 miles of alluvial channels have been restored since 1999, particularly eastside meadow channels that had been subjected to headcuts and gully erosion, but the length of these reaches total a relatively small amount of the total alluvial stream channels that exist on the Forest. Data presented in the 2007 HFQLG FRA Pilot Project Monitoring Report to Congress for “Question 17: What is the effect of activities on indicators of watershed condition?” indicate that little change in watershed condition has occurred since 1999 (Table 1). The full 2007 report for Question 17 is found in the HFQLG Status Report to Congress Fiscal Year 2006 (USDA Forest Service 2007). Road density decreased approximately 2.0%, primarily due to obliteration of more than 80 miles of road implemented by Plumas National Forest staff. The number of road / stream crossings decreased by nearly the same percentage (a total decrease of 54 crossings), again due primarily to the obliteration of roads mentioned above. Near-stream road density decreased by 5.5%, a larger percent decrease than the total road density decrease because the road obliteration projects were focused on roads that contributed significant volumes of sediment to stream channels.

Table 1: Summary of HFQLG Question 17 Monitoring Plan Results (2007)

Watershed Condition Indicator	Total acreage of sub-watersheds reporting	Unit of Measure	Pre-Project Condition	Post-Project Condition	Percent Change
Road Density	719,000 acres	miles per square mile	2.96	2.90	- 2.0%
Near-Stream Road Density	592,000 acres	miles per square mile	3.61	3.41	- 5.5%
Equivalent Roaded Acres (ERA)	1,154,000 acres	equivalent roaded acres	60,200 (5.2%)	78,100 (6.8%)	+ 22%
Near-Stream ERA	17,700 acres	equivalent roaded acres	472	489	+3.5%
Number of Road / Stream Crossings	564,000 acres	number	3,039	2,985	- 1.8%

The percentage of land disturbed in Plumas National Forest watersheds has increased since the 1999 EIS as reflected in the reported increase in Equivalent Roaded Acres (ERA). The ERA measure is derived from site disturbance coefficients used to track general changes in hydrologic function of watersheds. The coefficients have been developed by comparing the effect of a land use activity to that of a road in terms of altering surface runoff patterns and timing. For example, the Plumas National Forest has typically modeled one acre of single-tree selection harvest with tractor yarding as being equivalent to 0.15 to 0.2 acres of roaded landscape. The ERA increase of 17,900 acres across the entire HFQLG FRA pilot project area, as reported in the 2007 Monitoring Report, when expressed as a percentage of watershed area, results in a 1.6% average increase (from 5.2% to 6.8%). However, this average increase results when the ERA increase is applied to only the HUC-8 subwatershed areas in which work occurred (a total of 1.154 million acres). Much of the HFQLG watershed areas were devoid of work between 1999 and 2007. When the ERA increase of 17,900 is applied over the entire area of HFQLG watersheds in which work occurred (2.248 million acres), the resulting average increase is 0.8%.

The ERA increase for each HFQLG watershed that includes PNF ground is presented in the Appendix E. Between 1999 and 2007, work has occurred in 66 HFQLG watersheds. The data indicate that the change in ERA for these watersheds, expressed as a percentage of the HFQLG watershed area, ranges from -0.85% to 7.92% with an average increase of 0.94%. The median increase is 0.39%. The reported ERA increases are predominantly due to vegetation management actions (group selection and fuel reduction thinning treatments) that have occurred under the HFQLG FRA. Cumulative Watershed Effects (CWE) from these vegetation projects are closely

controlled by assuring that the resulting ERA model outputs for the project watersheds, when expressed as a percentage of total watershed area, do not exceed the prescribed Threshold of Concern (TOC). Predominately, the TOC for Plumas NF watersheds is prescribed to be 12 percent of the watershed area. Since 1999, none of the PNF vegetation management projects have resulted in an exceedance of the TOC for any of the project watersheds. In most cases, the ERA increase (0.8% on average, as stated above) is minor and leaves the analysis watershed well below threshold. For the remaining watersheds, including the one that experienced the 7.9% increase in ERA and several others that were close to the TOC under the pre-project condition, vegetation management activities are minimized or controlled so that the TOC is not exceeded as a result of PNF vegetation management.

The addition of unauthorized routes to the NFTS would not increase the percentage of land disturbed because these routes already exist on the landscape. The prohibition of cross-country travel would reduce future land disturbance on the Forest and would allow passive recovery of unauthorized route that have already disturbed the landscape.

For each alternative, the density of roads and routes that would be open to motorized vehicle traffic within each analysis watershed will be compared with a threshold road / route value. The threshold value does not represent an exact level at which a detrimental CWE will occur. Rather, it serves as a “yellow flag” indicator of increased risk of significant adverse cumulative effects occurring within a watershed. Analysis watersheds that exceed this threshold require additional, focused analysis. The exact level of road / route density that would result in a detrimental CWE is dependent upon a variety of factors that are specific to each analysis watershed. These factors include soil type, hillslope gradient and road location. Based upon past experience and observations on the Plumas NF, for the purpose of this project analysis, Forest watershed staff have determined a road / route density threshold of 4.0 miles per square mile. Watersheds with motorized road and route densities that exceed this threshold are at risk of detrimental cumulative watershed effects.

The 1999 HFQLG FRA EIS watershed sensitivity condition ratings and risk of cumulative watershed effects for each of the project watersheds are presented in Appendix E along with the calculated increase in percentage of land disturbed, represented by the ERA data from the 2007 HFQLG FRA Pilot Project Monitoring Report. These risk ratings and data will be used in conjunction with the calculated total road density for each project alternative to predict whether a cumulative watershed effect will occur for each of the HFQLG Plumas National Forest watersheds, particularly those that exceed a density of 4.0 miles per square mile.

A short-term timeframe is not applicable to the cumulative effects analysis. For existing unauthorized routes that are not proposed for addition to the NFTS, it will be assumed that passive recovery of soil cover and the vegetative productivity of soils, with concurrent reductions in erosion and sedimentation from road surfaces, will occur over a 25 year period on the West side and 30 year period on the East side. As stated above, effects to soil and water resources due to changes in the vehicle class allowed on existing NFTS facilities are expected to be negligible. As stated above, the vast majority of soil and water resource effects of the unauthorized routes and areas that are proposed for addition to the NFTS have already occurred since these routes currently exist on the landscape. It is assumed that all of the reasonably foreseeable actions presented in Appendix I of the Draft EIS will proceed in the future regardless of which project alternative is selected.

4 Affected Environment

4.1 Climate

Weather in the planning area follows a Mediterranean pattern of wet winters and dry summers. East of the Sierra crest, marine influence lessens and there is a greater range in daily and seasonal temperatures, lower precipitation and humidity, and rain from summer thunderstorms is normal. Most precipitation on both sides of the crest falls as winter frontal disturbances are lifted and cooled over the mountains.

Over 95 percent of the precipitation in the planning area occurs during winter months. Precipitation ranges from 15 inches on the east side of the Sierra crest, to 90 inches on the west side. Winter temperatures below 0°F and summer temperatures above 100°F have been recorded. Snowpack is common from December through May at elevations above 4000 feet, although individual winter storms may bring rain to the highest elevations. Thunderstorms generally occur during the summer months and most frequently on the east side of the range.

4.2 Watershed Condition

Streamflow in the planning area corresponds to seasonal precipitation, with low flows during summer and fall, and higher flows during winter and spring. Floods can occur throughout winter and spring, with large peak flows causing major flooding. Storm events that cause these peak floods occur approximately every 1 to 10 years. Warm mid-winter rainstorms on snowpack generate most large floods (USDA Forest Service 1999).

The watersheds of the planning area are composed of a variety of soil types that influence the timing of water movement to streams. Some soils contribute to rapid runoff and abrupt increases

in stream flow during storm events. Other soils moderate runoff and streamflow. Shallow soils usually generate quicker winter and spring runoff than deeper soils do. Deep soils not only absorb and store more water than shallow soils, they also release more to summer flows. The deep soils of large alluvial areas, such as meadows, not only store and release water, but moderate high flows and increase late season flows (USDA Forest Service 1999).

A combination of road construction, soil compaction, ground cover reduction, and degradation of stream channels and riparian conditions has generated "accelerated over natural conditions" runoff and sediment yields from many watersheds (USDA Forest Service, 1999).

Streams in the planning area range from high gradient (usually headwater channels that are sources and transporters of sediment, water, nutrients, and large wood), to low gradient channels (usually in riparian ecosystems), which can be very sensitive to changes in the amount of water and sediment delivered to them. Degradation of Sierra Nevada streams, and their aquatic and riparian ecosystems, has been linked to dams, reservoirs, water diversions, livestock grazing, invasive species, mining, water pollution, roads, logging, direct changes to stream channels and stream flows, and recreational and residential developments (USDA Forest Service, 1999).

The low gradient channels of the east and central areas generally flow through large, wide meadows. On the west side, channels more often flow through narrow valley bottoms. Most meadow streams were once a braided network of shallow channels that overflowed their banks each year and covered the meadows with water. The meadows remained wet most of the year, slowly releasing water to downstream reaches well into the dry season. Today, most of these meadow channels have been deeply gullied. Rather than holding water close to the surface of the meadow, gullied streams are deep and wide enough to contain most flood flows and subsequently drain much of the water from meadows early in the dry season. Through this process, wetland areas have evolved into dry lands that foster dry land conditions and species (USDA Forest Service, 1999).

5 Environmental Consequences

5.1 Alternative 1

As described in Chapter 2 of the Draft EIS, under the No Action alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross country travel prohibition would be put into place. The Travel Management Rule would not be implemented and no MVUM would be produced.

1. **Cross Country Travel:** For Alternative 1, no prohibition would be established for wheeled motorized vehicle travel off designated NFS roads, NFS trails and areas by the public. Motor vehicle travel would not be limited to designated routes.
2. **Routes and Areas Added to the Existing National Forest System:** No new NFTS facilities would be added. The agency would take no affirmative action on any unauthorized routes and they would continue to have no status or authorization as NFTS facilities.
3. **Class of Vehicles:** For Alternative 1, no changes to the existing NFTS are proposed, including deletions of existing facilities or changing the vehicle class and season of use for existing facilities.

5.1.1 Direct and Indirect Effects:

5.1.1.1 Action Component 1: Prohibition of Cross-Country Vehicle Travel

Under Alternative 1, cross-country motorized travel would be permitted on Plumas National Forest areas beyond the authorized NFTS. Approximately 5,027 miles of existing routes and roads on PNF lands would be available to motorized traffic (Table 6), including 2,174 miles situated in the hydrologically sensitive areas described above in Section 3.2.1.2. Motorized traffic would be prohibited on none of the miles of existing, unauthorized routes (totaling 1,109 miles) that are currently open to motorized traffic, including 455 miles of existing routes situated in hydrologically sensitive areas. As described above in section 3.1.4.2 and 3.2.1.2, direct and indirect effects to water resources due to motorized travel on these routes include increased peak flows and sediment loads. For miles situated in the hydrologically sensitive areas by HFQLG watershed refer to Appendix E.

Past cross-country motorized travel on these unauthorized routes has resulted in soil compaction and erosion of the A-horizon portion of soil profiles to the point where vegetative productivity in those disturbed areas is significantly reduced. Certain soil types are more susceptible to erosion. For Alternative 1, Table 6 below displays the number of miles of NFTS routes on PNF lands available to motorized traffic within the different Erosion Hazard Rating categories. Direct and indirect effects to soil resources due to the continuation of cross-country traffic include a continuation of these soil compaction and erosion impacts.

In the short term (considered to be a 1-year timeframe for the purpose of this analysis), the unauthorized routes disturbed by motor-vehicle use would not change because these routes would still be open to motorized traffic. The short term reductions in sediment delivery to stream systems in the vicinity of these routes predicted for Alternatives 2-5 would not occur.

Restoration of soil vegetative productivity will potentially not occur on the 1,109 miles of unauthorized routes as a result of Alternative 1 because motorized traffic would not be prohibited on these areas. Vegetative recovery will presumably occur on some of these routes if public members are not interested in traveling upon them over a long term. However, without a defined prohibition, it is difficult to predict how many routes will experience vegetative recovery. Without vegetative recovery, these unauthorized routes would not regain their hydrologic and geomorphic functions over the long term (considered to be a 25 to 30 year timeframe for the purpose of this analysis).

With continued motorized traffic, the increased peak flow effect that has occurred to date as a result of these unauthorized routes will remain over the long term because the road templates will continue to intercept subsurface runoff and concentrate surface runoff. Additionally, without vegetative recovery, unauthorized routes with continued motorized traffic will not experience the decreased amounts of erosion sediment delivery to area stream channels that would be experienced under Alternatives 2-5.

Cross-country traffic on areas that are currently untracked would not be prohibited under Alternative 1. The potential would exist for proliferation of new unauthorized routes with the same type of impacts to soil and water resources that are observed on existing, unauthorized routes. Erosion and disturbance of the A-horizon (organic-rich topsoil) portion of soil profiles in areas that are currently untracked could occur, impacting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas could occur, impacting water resources downslope of those areas.

5.1.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFS

Direct and indirect effects for this component are not applicable to Alternative 1 because no facilities are proposed to be added to the NTFS.

5.1.1.3 Action Component 3: Changes to the existing NFS

Direct and indirect effects for this component are not applicable to Alternative 1 because no changes to the existing NFTS are proposed.

5.1.2 Cumulative Effects

When compared with Alternatives 2-5, no apparent long-term (25-30 year) benefit to soil and water resources would occur under Alternative 1 because motorized traffic would be allowed on all 1,109 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic. Additionally, potential risks to long-term watershed condition are apparent under

Alternative 1 as a result of the potential for further proliferation of cross-country traffic on areas that are currently untracked. Erosion and disturbance of the A-horizon portion of soil profiles in areas that are currently untracked would likely occur, potentially impacting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas would likely occur, potentially impacting water resources downslope of those areas.

The net effect of past, present and reasonably foreseeable actions on each subwatershed is indicated by the total mileage and density of proposed routes and roads open to traffic on public and private roads within the watershed (Table 6). Appendix E lists road densities for each HFQLG subwatershed. Road and route density would remain unchanged under Alternative 1 but would decrease significantly under Alternatives 2-5. It is possible that some existing unauthorized routes could revegetate due to lack of motorized traffic on routes that no longer hold interest to the public. This would decrease cumulative impacts to Forest soil and water resources. However, there is a greater possibility that the number of unauthorized routes would increase without a prohibition on cross-country motorized travel, resulting in an increased cumulative impact to Forest soil and water resources.

5.2 Alternative 2

As described in Chapter 2 of the Draft EIS, the Proposed Action is the proposed changes to the NFTS and the prohibition of cross country travel as described in the NOI published January 3, 2008 (Volume 73, Number 2):

1. **Cross Country Travel:** Wheeled motorized vehicle travel off designated NFTS roads, NFS trails and areas by the public except as allowed by permit or other authorization will be prohibited.
2. **Routes and Areas Added to the Existing National Forest System:** For Alternative 2, a total of 367 miles of existing, unauthorized trails are proposed to be added to the NFTS and open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. Also, the 36-acre Sly Creek area will be open year-round to motorized vehicles with widths that do not exceed 50".
3. **Class of Vehicles:** For Alternative 2, no changes to the existing NFTS are proposed, including deletions of existing facilities or changing the vehicle class and season of use for existing facilities.

5.2.1 Direct/Indirect Effects

5.2.1.1 Action Component 1: Prohibition of Cross-Country Vehicle Travel

The effect of the prohibition on cross-country motorized travel would be to end traffic on Plumas National Forest areas beyond the authorized NFTS. For Alternative 2, 4,289 miles of routes and roads on PNF lands would be available to motorized traffic (Table 6), including 1,854 miles situated in the hydrologically sensitive areas described in section 3.2.1.2. Appendix E lists total miles situated in the hydrologically sensitive area by HFQLG watershed. Motorized traffic would be prohibited on at least 714 miles of existing, unauthorized routes that are currently open to motorized traffic, including 320 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

Past cross-country motorized travel on these routes has resulted in soil compaction and erosion of the A-horizon portion of soil profiles to the point where vegetative productivity in those disturbed areas is significantly reduced. Certain soil types are more susceptible to erosion. For Alternaitve 2, Table 6 displays the number of miles of NFS routes on PNF lands available to motorized traffic within the different Erosion Hazard Rating categories. Direct and indirect effects to soil resources due to prohibition of cross-country traffic include cessation of these soil compaction and erosion impacts.

In the short term (considered to be a 1-year timeframe for the purpose of this analysis), the unauthorized routes and areas disturbed by motor-vehicle use would not change much because removal of vegetation, compaction of soils, and alteration of drainage patterns require time to heal without active restoration. Thus, short term reductions in peak flows will be small and unquantifiable since the routes will continue to intercept and concentrate surface flows. However, short term reductions in sediment delivery to stream systems in the vicinity of these routes will be realized. Erosion of native-surfaced roads and routes is typically higher for routes with active motorized traffic.

Due to the highly compacted condition and the loss of A-horizon for soils in many of these areas, this analysis assumes that full restoration of the original soil productivity will not occur as a result of traffic prohibition alone. However, analysis indicates that, by prohibiting traffic, all of these routes hold the potential to substantially revegetate and regain much of their hydrologic and geomorphic functions over the long term (considered to be a 25 to 30-year timeframe for the purpose of this analysis). Vegetation growth on lands throughout the Forest is typically vigorous, due to favorable climate and precipitation. Additionally, needle scatter and litter fall from nearby trees is usually sufficient to provide seed source and the soil cover and organic input necessary to

facilitate re-growth of vegetation. Recent experience in closing and obliterating roads on all three Forest districts indicate that for the vast majority of the obliterated road areas the addition of straw mulch is not necessary to provide the cover necessary to protect and keep soils in place or to restore sufficient organic concentrations in the soils. Needle scatter and placement of slash is typically sufficient to provide soil cover.

Active restoration or obliteration of unauthorized road and trail templates (including out-slope and re-contour of road and trail areas to closely match the natural topography and removal of culverts and other stream crossing structures) is not a part of any of the project alternatives. Much of the increased peak flow effect that has occurred to date as a result of these unauthorized routes will remain over the long term because, without active restoration, the road templates, including any cut slopes, ruts, ditches, or culverts that currently exist, will continue to intercept subsurface runoff and concentrate surface runoff. However, the long term establishment of vegetative growth on these routes will somewhat reduce area peak flows. More significantly, this vegetation will substantially decrease the amount of erosion from these areas and the amount of sediment delivered to area stream channels. The vegetative canopy will intercept precipitation and significantly reduce detachment of soil particles from the former route surface due to rainsplash erosion. Stems that grow on the route surface will intercept surface runoff, slowing and lengthening the runoff flow path to reduce the occurrence of concentrated runoff that generates erosion. Roots of vegetation that re-grows on these routes will act to hold vast areas of soil in place. Re-established vegetation will transpire a significant portion of precipitation that formerly ran down and off the road surface.

In addition to soil and water improvements realized by the prohibition of motorized traffic on these 738 miles of existing, unauthorized routes, prohibition of cross-country traffic on areas that are currently untracked will prevent the same type of impacts to soil and water resources that are observed on existing, unauthorized routes. Erosion and disturbance of the A-horizon (organic-rich topsoil) portion of soil profiles in areas that are currently untracked would be prevented, protecting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas would be prevented, protecting water resources downslope of those areas.

Unauthorized use of these routes by nonmotorized traffic following prohibition could delay or prevent recovery.

5.2.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFS

Alternative 2 proposes to add 367 miles of existing, unauthorized routes to the NFTS. Additionally, Alternative 2 would allow year-round motorized vehicle traffic within the 36-acre Sly Creek area. In general, any direct and indirect effects to soil and water resources of motorized travel on these previously unauthorized routes have already occurred. Water resource effects that have already occurred include modification of surface-water runoff timing and magnitude owing to interception of surface and subsurface runoff during rainfall and snowmelt events. Water resource direct effects that have already occurred also include the generation of erosion that can be delivered as fine sediments to stream channels. Indirect effects that have already occurred include potentially significant and long lasting degradation of water quality and aquatic habitat. Direct effects to soil resources that have already occurred include a loss of vegetative productivity for the routes and areas subjected to motorized vehicle traffic, due to loss of soil cover, soil compaction, and loss of soil hydrologic function.

PNF watershed staff have performed initial or abbreviated field surveys of the full length of every existing, unauthorized route that is proposed for addition to the current NFTS under Alternative 2. Subsequent field visits to potentially problematic routes identified by the initial field surveys were performed in summer 2008 to assess water quality impacts and to formulate mitigations. Survey methodology is described above in Section 3.1.3.

The focus of these surveys was to determine whether the route was causing adverse soil and water resource effects or had the potential to cause future adverse effects and, if so, whether these adverse effects could be mitigated within the scope of the proposed actions. For Alternative 2, E08 evaluation data indicates that 188 miles (51% of the 367 miles proposed for addition to the NFTS) contain at least one segment that rates as “Fail” for effectiveness in protecting water quality. Typically, these segments “fail” because of delivery of route-generated sediment to stream channels or because the route has captured a stream channel. Over half of these impacts can be mitigated within the scope of the proposed actions. For Alternative 2, 126 route/stream crossings were observed to either be currently diverting stream flow down the route surface or having the potential to divert stream flow if the route / stream crossing plugged. Moderate, High or Extreme ratings for soil and water resource impacts were rated for 331 proposed miles of trails, meaning that soil and water effects are currently adverse or have the potential to be adverse in the future. A summary of the of the analysis ratings is included in Table 2 and site specific information by route is included in Appendixes F, G, and H. For the explanation of analysis ratings refer to Section 3.1.1 above.

Table 2: Alternative 2 Summary of Routes by Rating

Low	Medium	High	Extreme
36 miles	176 miles	70 miles	85 miles

Routes rated as High are currently adverse soil and water effects but can be mitigated. Routes rated as Extreme are currently adverse soil and water effects and mitigation of these effects is not economically feasible, would not meet safety standards, would not be effective due to physical constraints, or are not within the scope of the proposed actions because it would require relocation and/or reconstruction. For example, many of the Extreme routes are located along stream channels on steep, erosive soils and are entrenched, a combination that results in no viable alternative for adequately draining the route to prevent sediment from entering the channel without relocation. Other Extreme routes are located within active stream channels and would require a new location, a mitigation that is beyond the scope of the proposed public wheeled motorized travel management.

Alternative 2 proposes to add a 36-acre area near Sly Creek to the NFTS. This area would be open year-round to motorized vehicles with widths that do not exceed 50". This area is rated as High for soil and water resource impacts. The current access approach to the area is too steep, causing excessive rutting and erosion that will, in the near future, preclude this location's use as an access approach to the play area. Additionally, an ephemeral channel is currently used as access to the play area from Sly Creek Campground. Traffic in this channel is causing discharge of traffic-related sediment to and beyond the downstream paved road drainage system. Mitigations are prescribed for this area. Watershed staff recommends that this area not be open to motorized traffic until these mitigations are in place.

By prohibiting traffic on other unauthorized routes on the Forest, facilities added to the NFTS under Alternative 2 may experience increased traffic levels resulting in a slight increase in road generated erosion. However, increased maintenance attention, along with mitigations installed to prevent adverse effects to water quality, for these added facilities will reduce erosion to a greater degree.

5.2.1.3 Action Component 3: Changes to the existing NFS

Direct and indirect effects for this component are not applicable to Alternative 2 because no changes to the existing NFTS are proposed.

5.2.2 Cumulative Effects

As stated in section 3.2.4, the combination of the three action components analyzed for direct and indirect effects are added to past, present and reasonably foreseeable actions to analyze the cumulative effects of implementing each alternative as a whole.

As described in section 3.2.4, past actions are represented by the existing condition of PNF watersheds. The existing condition of PNF watersheds is represented by the watershed condition sensitivity rating and risk of cumulative watershed effects from the 1999 Final EIS for the Herger-Feinstein Quincy Library Group Forest Recovery Act, with further indication of the condition provided by results from the 2007 HFQLG FRA Pilot Project Monitoring Report to Congress (see Appendix E). The 2007 Monitoring Report to Congress indicates that watershed condition has changed little since the 1999 FEIS analysis. The most significant potential change to watershed condition observed in the report is reflected in increases in ERA values due to HFQLG FRA projects implemented since 1999. Those ERA changes are presented for each analysis subwatershed in Appendix E.

Alternative 2 proposes to add 367 miles of existing, unauthorized routes to the NFTS. Additionally, Alternative 2 would allow year-round motorized vehicle traffic within the 36-acre Sly Creek area. This addition of unauthorized routes to the NFTS would not increase the percentage of land disturbed and would not increase adverse effects to soil and water resources because these routes already exist on the landscape. Alternative 2 would result in prohibition of travel on 738 miles of unauthorized routes that are open to motorized traffic under the No Action alternative. The prohibition of cross-country travel would reduce future land disturbance on the Forest and, over the long-term timeframe for this analysis (25-30 years), would allow passive recovery of unauthorized route that have already disturbed the landscape. Reasonably foreseeable actions are presented in Appendix I of the Draft EIS. It is assumed that each of these actions will potentially occur regardless of which alternative for this project is selected.

The long-term, net effect of these past, present and reasonably foreseeable actions on each HFQLG watershed is indicated by the total mileage and density of proposed NFTS routes and roads open to traffic on public and private roads within the HFQLG watersheds (see Appendix E). As described above in Section 3.2.4, the road / route density is compared with a threshold value of 4.0 miles per square mile. This threshold value does not represent an exact level at which a detrimental CWE will occur but serves as a “yellow flag” indicator of increased risk of significant adverse cumulative effects occurring within a watershed.

Under the existing condition (represented by Alternative 1), 19 of the 178 analysis watersheds (11%) have road / route densities that exceed the threshold of 4.0 mi / mi2 (see Table

3). For these 19 watersheds, the mean density is 4.73 mi / mi2 and the median is 4.56 mi / mi2. Two of these watersheds were determined to have a High risk of CWE in the 1999 HFQLG EIS and the remaining 17 watersheds rated as Moderate risk. Since 1999, watershed condition has changed little in these 19 watersheds, as demonstrated by the 2007 HFQLG FRA monitoring report. The percent change in ERA for those watersheds averages 0.7% with a median change of 0%. No change in ERA from 1999-2007was reported for 11 of the 19 watersheds.

The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 2. A net total of 128 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 2, with watershed 110192 experiencing the largest decrease (over 22 miles). The average decrease in road / route density for these 19 watersheds would be 0.77 mi / mi2 with a median decrease of 0.61 mi / mi2. As a result, the density for 9 of the 19 watersheds would be less than the analysis threshold under Alternative 2. For the remaining 10 watersheds, the effects of Alternative 2 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road / route density.

Table 3: Summary of Cumulative Soil and Water Resource Effects for Watershed Exceeding Road Density Threshold

Watershed ID Number	Watershed Area, (sq mi)	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Reasonably Foreseeable Actions to occur in this Watershed - c
110067	14.16	72.0	M	N/A	6.53	5.24	3.81	4.15	5.08	Basin Project
110114	6.00	77.0	H	N/A	5.84	4.49	3.96	3.96	4.06	Meadow Valley Project (d)
110054	8.05	54.0	M	N/A	5.49	4.63	3.58	3.58	4.38	None
110034	11.04	60.0	M	0	5.44	4.88	4.58	4.58	4.80	None
110051	16.55	72.0	M	0.5	4.99	4.68	4.60	4.51	4.62	Basin Project, Hardquartz Mine Hazard Abaterment
110042	13.12	72.0	M	0.9	4.84	4.24	2.92	3.49	3.68	Sugarberry, Winkeye Mining Claim
110124	6.29	60.0	M	N/A	4.77	3.33	2.68	3.00	3.31	Empire Veg Mgmt Project
110021	8.10	60.0	M	1.8	4.61	4.30	4.30	4.30	4.30	Sugarberry Project
110041	4.29	66.0	M	4.7	4.57	3.83	2.93	3.75	3.75	Sugarberry Project
110069	1.86	50.0	M	N/A	4.56	3.14	3.14	3.14	3.14	None
110030	14.83	50.0	M	0.1	4.43	4.39	4.39	4.39	4.39	None
110038	17.41	60.5	M	N/A	4.40	4.25	4.23	4.23	4.23	Watdog Project
110053	12.42	60.0	M	N/A	4.30	3.77	3.31	3.31	3.66	None
110159	6.93	77.0	H	0.7	4.29	3.40	2.68	3.16	3.35	None
110113	8.99	45.0	M	N/A	4.28	3.55	2.85	3.05	3.12	Meadow Valley Project (d)
110055	7.19	55.0	M	N/A	4.22	4.01	3.59	3.83	3.99	None
110023	17.49	60.0	M	1.1	4.13	3.75	3.70	3.75	3.75	Sugarberry Project
110192	9.88	71.5	M	3.5	4.08	1.81	1.75	1.90	1.90	Camp 14 Salvage
110033	10.29	55.0	M	0	4.03	3.56	3.10	3.10	3.33	None

a – from Appendix N, "Herger Feinstein Quincy Library Group Forest Recovery Act FEIS" (August 1999)
b – from "Monitoring Report Fiscal Year 2007, Herger Feinstein Quincy Library Group Forest Recovery Act Pilot Project"
c – from Appendix I
d – Meadow Valley project effects are included in "Precent ERA Change" column
N/A – Not Applicable. No HFQLG FRA work reported in this watershed for 1999-2007

For the two watersheds with the greatest increase in past ground disturbance from 1999 – 2007, watersheds 110041 and 110192 (respectively situated on the Feather River Ranger District in the Lower North Fork Yuba River HUC-5 drainage and on the Beckwourth Ranger District in the Last Chance Creek HUC-5 drainage), Alternative 2 would produce significant reductions in road / route density, resulting in densities of 3.83 and 1.81 mi / mi2, respectively. While Alternative 2 would add to the NFTS 3.9 miles and 0.7 mile of trails to the watersheds (respectively), these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 7.1 and 23.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159 (both situated on the Mount Hough Ranger District in the Spanish Creek and Seneca HUC-5 drainages, respectively), Alternative 2 would produce significant reductions in road / route density, resulting in densities of 4.49 and 3.40 mi / mi2, respectively. While Alternative 2 would add to the NFTS 3.1 and 5.0 miles of trails to the watersheds (respectively), these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 11.2 and 11.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

The cumulative effect for each watershed as a result of Alternative 2 is generally beneficial (173 of 178 or 97% of the analysis watersheds), as observed by a decrease in density of roads and routes open to motorized traffic (see Appendix E). For these watersheds, prohibition of motorized traffic on the portion of the 738 miles of unauthorized routes within that watershed results in a decrease in road / route density. The density decrease in each watershed ranges from 0.01 to 2.27 mi per sq mi with a mean of 0.33 and a median of 0.25 mi per sq mi. Additionally, long-term watershed condition would improve and risk of cumulative watershed effects will decrease under Alternative 2 as a result of prohibition of cross-country traffic on areas that are currently untracked. Erosion and disturbance of the A-horizon portion of soil profiles in areas that are currently untracked would be prevented, protecting soil vegetative productivity. Modification of surface water runoff timing and magnitude due to vehicle track ruts on currently untracked areas would be prevented, protecting water resources downslope of those areas.

Comment [kw1]: These numbers didn't change?

The road / route density for the remaining 5 subwatersheds (3% of analysis watersheds) indicates no change in the risk of cumulative soil and water resource effects. These subwatersheds are not affected by the prohibition of motorized traffic on the 738 miles of

unauthorized routes. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked will also be realized within these subwatersheds, resulting in a long-term improvement of watershed condition and a long-term decrease in the risk of cumulative watershed effects.

Reasonably foreseeable actions that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities that are described above in the Methods section. As previously stated, these actions predominately result in minor increases in ERA values such that watersheds remain below the TOC. For example, Table 3 identifies that the Watdog vegetation management project is a planned project for watershed 110038 (situated on the Feather River Ranger District in the Lower Middle Fork Feather River HUC-5 watershed). The watershed effects analysis for the Watdog project divided 110038 into 9 subwatersheds (USDA Forest Service 2008 Watdog Hydrology Report). The total ERA increase for watershed 110038 due to the Watdog Project is 87 acres, or 0.8% of the 11,140 acre watershed. This is a minor increase when applied to watershed 110038. The resulting ERA percent for the 9 subwatersheds averaged 4.1% of subwatershed area, well below the TOC of 12 percent. While Alternative 2 would add 0.3 miles of trail to the NFTS within 110038, these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 2.9 miles of routes that currently exist on the landscape. This improvement in road / route density (a decrease of 0.15 mi per sq mi) is typically larger for all of the 178 watersheds under Alternative 2 (average decrease of 0.33 mi per sq mi). The improvement in road / route density under Alternative 2, considered along with the minor increases in ERA indicated for the reasonably foreseeable actions, will result in no increase in risk of detrimental cumulative watershed effects and will, by and large, decrease this risk.

While the cumulative effect of Alternative 2 is predicted to be beneficial at the watershed scale for all 179 watersheds (as indicated by decreases in road / route density and / or prohibition of cross-country travel on untracked areas), adverse impacts are indicated at a smaller scale per the Action Component 2 analysis above. Alternative 2 proposes to add to the NFTS 137 miles of routes that are rated as High or Extreme for soil and water impacts, meaning that all of these routes are currently having adverse effects on soil and water resources. Of these 137 miles, 85 miles are rated Extreme, meaning that these adverse effects cannot be feasibly mitigated and will persist in the future. Mitigations are prescribed for the 52 miles of proposed trail that are rated as High.

5.3 Alternative 3

Alternative 3 responds to the issues of cost, inventoried roadless areas and natural resource impacts by prohibiting cross country travel without adding any additional facilities to the NFS. None of the currently unauthorized roads, trails, or areas would be added to the National Forest System.

1. **Cross Country Travel:** Wheeled motorized vehicle travel off designated NFS roads, NFS trails and areas by the public except as allowed by permit or other authorization will be prohibited.
2. **Routes and Areas Added to the Existing National Forest System:** No roads, trails, or areas would be added to the NFS.
3. **Class of Vehicles:** For Alternative 3, no changes to the existing NFS are proposed, including deletions of existing facilities or changing the vehicle class and season of use for existing facilities.

5.3.1 Direct and Indirect Effects

5.3.1.1 Component 1: Prohibition of Cross-Country Vehicle Travel

The direct and indirect effects to soil and water resources of the prohibition on cross-country motorized travel would be similar to Alternative 2. For Alternative 3, 3,922 miles of roads and routes on PNF lands would be available to motorized traffic (Table 6), including 1,719 miles situated in the hydrologically sensitive areas described in section 3.2.1.2. Motorized traffic would be prohibited on all 1,109 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic, including 455 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

When compared with Alternative 2, greater long-term (25-30 year) benefit to soil and water resources would occur under Alternative 3 because an additional 367 mile of unauthorized routes would be prohibited from motorized traffic. This would allow the passive re-vegetation of an additional 367 miles of unauthorized routes, resulting in these areas attaining much of their original hydrologic and geomorphic functions. The long term establishment of vegetative growth on these routes will substantially decrease the amount of erosion and the amount of sediment delivered to area stream channels from 1,109 miles of unauthorized routes and will somewhat reduce area peak flows.

Benefits to soil and water resources due to prohibition of cross-country traffic on areas that are currently untracked would be the same as Alternative 2. These benefits associated with

prohibition of cross-country traffic on areas that are currently untracked would be identical for all action alternatives (Alternatives 2-5). Unauthorized use of these routes by nonmotorized traffic following prohibition could delay or prevent recovery.

5.3.1.2 Component 2: Addition of Facilities (Routes and Areas) to the NFTS

Direct and indirect effects for this component are not applicable to Alternative 3 because no facilities are proposed to be added to the NFTS.

5.3.1.3 Component 3: Changes to the existing NFTS

Direct and indirect effects for this component are not applicable to Alternative 3 because no changes to the existing NFTS are proposed.

5.3.2 Cumulative Effects

General cumulative effects to soil and water resources for Alternative 3 would be the same as Alternative 2. When compared with Alternative 2, greater long-term benefit to soil and water resources would occur under Alternative 3 because motorized traffic would be prohibited on all 1,109 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic resulting in an additional 367 mile of unauthorized routes to be prohibited from motorized traffic.

Under the existing condition, 19 of the 178 analysis watersheds (11%) have road / route densities that exceed the threshold of 4.0 mi / mi2 (see Table 3). For these 19 watersheds, the mean density is 4.73 mi / mi2 and the median is 4.56 mi / mi2. The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 3. A net total of 216 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 3, with watershed 110067 experiencing the largest decrease (over 38 miles). The average decrease in road / route density for these 19 watersheds would be 1.2 mi / mi2 with a median decrease of 1.4 mi / mi2. As a result, the density for 14 of the 19 watersheds would be less than the analysis threshold under Alternative 3. For the remaining 5 watersheds, the effects of Alternative 3 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road / route density.

For the two watersheds with the greatest increase in past ground disturbance from 1999 – 2007, watersheds 110041 and 110192, Alternative 3 would produce significant reductions in road / route density, resulting in densities of 2.93 and 1.75 mi / mi2, respectively. Alternative 3 would add no new trails to the NFTS and would prohibit motorized traffic and allow for the passive

restoration of 7.1 and 23.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159, Alternative 3 would produce significant reductions in road / route density, resulting in densities of 3.96 and 2.68 mi / mi2, respectively. Alternative 3 would add no new trails to the NFTS and would prohibit motorized traffic and allow for the passive restoration of 11.2 and 11.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

Long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 3. The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed routes and roads open to traffic on public and private roads within the subwatershed (see Appendix E), is generally beneficial. Over 99% of the analysis subwatersheds (177 out of 178) indicate a decrease in road / route density. The density decrease for each watershed ranges from 0.01 to 2.72 mi per sq mi with a mean of 0.48 and a median of 0.34 mi per sq mi. The road / route density for the remaining one subwatershed (less than 1% of the analysis watersheds) indicates no change in the risk of cumulative soil and water resource effects. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked will be realized in all analysis subwatersheds. This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical to the effect for Alternative 2. Indeed, the beneficial cumulative effect of prohibiting motorized traffic on areas that are currently untracked is identical for all action alternatives (Alternatives 2-5).

Reasonably foreseeable actions that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities that are described above in the Methods section. The cumulative result of these foreseeable actions and Alternative 3 are generally the same as stated above for Alternative 2. For example, for watershed 110038, the total ERA increase due to the Watdog Project would still be 0.8%, a minor increase in relation to the watershed's Threshold of Concern. Alternative 3 would allow for the passive restoration of 2.9 miles of routes that currently exist on the landscape. This improvement in road / route density (a decrease of 0.15 mi per sq mi) is typically larger for all of the 178 watersheds under Alternative 3 (average decrease of 0.33 mi per sq mi). The improvement in road / route density under Alternative 3, considered along with the minor increases in ERA indicated for the

reasonably foreseeable actions, will result in no increase in risk of detrimental cumulative watershed effects and will, by and large, decrease this risk.

5.4 Alternative 4

Alternative 4 responds to issues of inventoried roadless areas and natural resource impacts. This alternative adds no motorized routes to inventoried roadless areas (IRAs), citizen inventoried roadless areas (CIRAs), This Alternative does not add routes where resource concerns require extensive or critical mitigation (those routes rated as High for soil and water resource impacts). This alternative also does not propose routes that are rated Extreme for soil and water resource impacts.

1. **Cross Country Travel:** Wheeled motorized vehicle travel off designated NFS roads, NFS trails and areas by the public except as allowed by permit or other authorization will be prohibited.
2. **Routes and Areas Added to the Existing National Forest System:** For Alternative 4, a total of 141 miles of existing, unauthorized trails are proposed to be added to the NFS and open motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. Also, the 36-acre Sly Creek area will be open year-round to motorized vehicles with widths that do not exceed 50".
3. **Class of Vehicles:** Alternative 4 proposes to change the class of vehicles for 11.50 miles of existing NFS roads, allowing all motorized vehicles on these roads that currently allow only highway-legal vehicles.
4. **Motorized Trails Converted to Non-Motorized Trails:** Alternative 4 proposes to delete 28.21 miles of motorized trail from the NFS. Non-motorized traffic would be allowed on these trails.

5.4.1 Direct and Indirect Effects

5.4.1.1 Component 1: Prohibition of Cross-Country Vehicle Travel

The direct and indirect effects to soil and water resources of the prohibition on cross-country motorized travel would be similar to Alternatives 2 and 3. For Alternative 4, 4,058 miles of roads and routes on PNF lands would be available to motorized traffic (Table 6 and Appendix E), including 1,719 miles situated in the hydrologically sensitive areas described in section 3.3.1.2. Motorized traffic would be prohibited on 969 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic, including 414 miles of existing routes situated in

hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

When compared with Alternatives 2 and 3, long-term (25-30 year) benefits to soil and water resources under Alternative 4 would be greater than Alternative 2 because an additional 226 miles of unauthorized routes would be prohibited from motorized traffic. Long-term benefits to soil and water resources under Alternative 4 would be less than Alternative 3 because an additional 114 miles of unauthorized routes would be available for motorized traffic. Alternative 4 would allow the passive re-vegetation of 969 miles of unauthorized routes, resulting in these areas attaining much of their original hydrologic and geomorphic functions. The long term establishment of vegetative growth on these routes would substantially decrease the amount of erosion and the amount of sediment delivered to area stream channels from 969 miles of unauthorized routes and would somewhat reduce somewhat area peak flows.

Benefits to soil and water resources due to prohibition of cross-country traffic on areas that are currently untracked would be identical for all action alternatives (Alternatives 2-5). Unauthorized use of these routes by nonmotorized traffic following prohibition could delay or prevent recovery.

5.4.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFS

Alternative 4 proposes to add 141 miles of existing, unauthorized routes to the NFTS. Additionally, Alternative 4 would allow year-round motorized vehicle traffic within the 36-acre Sly Creek area. In general, as with Alternative 2, any direct and indirect effects to soil and water resources of motorized travel on these previously unauthorized routes have already occurred.

PNF watershed staff has performed initial or abbreviated field surveys of the full length of every existing, unauthorized route that is proposed for addition to the current NFTS under Alternative 4. Subsequent field visits to potentially problematic routes identified by the initial field surveys were performed in summer 2008 to assess water quality impacts and to formulate mitigations. Survey methodology is described above in Section 3.1.3.

The focus of these surveys was to determine whether the route was causing adverse soil and water resource effects or had the potential to cause future adverse effects and, if so, whether these adverse effects could be mitigated. For Alternative 4, E08 evaluation data indicates that 27 miles (19% of the 141 miles proposed for addition to the NFTS) contain at least one segment that rated as “Fail” for effectiveness in protecting water quality as a result of initial field survey data, indicating a potential for adverse soil and water effects. However, subsequent site visits indicated that impacts are currently less than adverse and mitigations are feasible for all of these segments.

For Alternative 4, 47 route/stream crossings were observed to either be currently diverting stream flow down the route surface or having the potential to divert stream flow if the route / stream crossing plugged. All of these crossings can be mitigated. A summary of the completed survey data is included in Table 4 and site specific information by route is included in Appendixes F, G, and H.

Table 4: Alternative 4 Summary of Routes by Rating

Low	Medium	High	Extreme
26 miles	115 miles	0 miles	0 miles

All routes which rated High or Extreme have been excluded from Alternative 4, meaning that soil and water effects are not currently adverse for any of the routes proposed for addition to the NFTS. Moderate routes have the potential to present adverse soil and water impacts in the future but mitigations are included to prevent these potential impacts.

Alternative 4 proposes to add a 36-acre area near Sly Creek to the NFTS. This area would be open year-round to motorized vehicles with widths that do not exceed 50". This area is rated as High for soil and water resource impacts. The current approach to the area is too steep, causing excessive rutting and erosion that will, in the near future, preclude this location's use as an access approach to the play area. Additionally, an ephemeral channel is currently used as access to the play area from Sly Creek Campground. Traffic in this channel is causing discharge of traffic-related sediment to and beyond the downstream paved road drainage system. Mitigations are prescribed for this area. Watershed staff recommends that this area not be open to motorized traffic until these mitigations are in place.

5.4.1.3 Action Component 3: Changes to the Existing NFTS

Direct and indirect effects to soil and water resources due to allowing all motorized vehicle classes on 11.3 miles of existing NFS roads currently open only to highway-legal vehicles are expected to be negligible. Allowing narrower, non-street legal vehicles to travel existing NFTS roads would not lead to a change in the width of those roads.

5.4.2 Cumulative Effects

General cumulative effects to soil and water resources under Alternative 4 would be the same as cumulative effects for Alternative 2. Detailed differences from the Alternative 2 cumulative watershed effects analysis are presented below

Long-term (25-30 year) benefits to soil and water resources would occur under Alternative 4 because motorized traffic would be prohibited on 969 miles of inventoried existing, unauthorized

routes that are currently open to motorized traffic. Long-term benefits to soil and water resources under Alternative 4 would be greater than Alternative 2 because an additional 226 miles of unauthorized routes would be prohibited from motorized traffic. Long-term benefits to soil and water resources under Alternative 4 would be less than Alternative 3 because an additional 141 miles of unauthorized routes would be available for motorized traffic.

Under the existing condition, 19 of the 178 analysis watersheds (11%) have road / route densities that exceed the threshold of 4.0 mi / mi2 (see Table 4). For these 19 watersheds, the mean density is 4.73 mi / mi2 and the median is 4.56 mi / mi2. The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 4. A net total of 191 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 4, with watershed 110192 experiencing the largest decrease (over 33 miles). The average decrease in road / route density for these 19 watersheds would be 1.1 mi / mi2 with a median decrease of 1.0 mi / mi2. As a result, the density for 13 of the 19 watersheds would be less than the analysis threshold under Alternative 4. For the remaining 6 watersheds, the effects of Alternative 4 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road / route density.

For the two watersheds with the greatest increase in past ground disturbance from 1999 – 2007, watersheds 110041 and 110192, Alternative 4 would produce significant reductions in road / route density, resulting in densities of 3.75 and 1.90 mi / mi2, respectively. While Alternative 4 would add to the NFTS 3.6 miles and 1.5 miles of trails to the watersheds (respectively), these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 7.1 and 23.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159, Alternative 4 would produce significant reductions in road / route density, resulting in densities of 3.96 and 3.16 mi / mi2, respectively. While Alternative 4 would add no routes to the NFTS in 110114 and 3.4 miles of trails to the 1100159 watershed, these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 11.2 and 11.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

Long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 4. The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed routes and roads open to traffic on public and private roads within the subwatershed (see Appendix E), is generally beneficial. More than 98% of the analysis subwatersheds (175 out of 178) indicate a decrease in road / route density. The density decrease for each watershed ranges from 0.01 to 2.38 mi per sq mi with a mean of 0.42 and a median of 0.32 mi per sq mi. The road / route density for the remaining three subwatersheds (less than 2% of the analysis subwatersheds) indicates no change in the risk of cumulative soil and water resource effects. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked will be realized in all analysis subwatersheds. This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical for all action alternatives (Alternatives 2-5).

Reasonably foreseeable actions that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities that are described above in the Methods section. The cumulative result of these foreseeable actions and Alternative 4 are generally the same as stated above for Alternative 2. For example, for watershed 110038, the total ERA increase due to the Watdog Project would still be 0.8%, a minor increase in relation to the watershed's TOC. Alternative 4 would add no trails to the NFTS within 110038 and would prohibit motorized traffic and allow for the passive restoration of 2.9 miles of routes that currently exist on the landscape. This improvement in road / route density (a decrease of 0.15 mi per sq mi) is typically larger for all of the 178 watersheds under Alternative 2 (average decrease of 0.33 mi per sq mi). The improvement in road / route density under Alternative 4, considered along with the minor increases in ERA indicated for the reasonably foreseeable actions, will result in no increase in risk of detrimental cumulative watershed effects and will, by and large, decrease this risk.

Alternative 4 does not propose to add any routes that are rated as High or Extreme for soil and water impacts (routes that are currently having adverse effects on soil and water resources).

5.5 Alternative 5

Alternative 5 responds to the issue of access and motorized recreation opportunity. This alternative adds to the proposed action additional routes and alternative routes suggested during public scoping that would improve access and motorized recreation opportunity. This alternative

also removes all proposed routes from the proposed action that have an Extreme rating for soil and water resource impacts.

1. **Cross Country Travel:** Wheeled motorized vehicle travel off designated NFS roads, NFS trails and areas by the public except as allowed by permit or other authorization will be prohibited.
2. **Routes and Areas Added to the Existing National Forest System:** For Alternative 5, a total of 251 miles of existing, unauthorized trails are proposed to be added to the NFTS and open motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. Trails that require extensive or critical mitigations to protect water quality (trails rated as High for soil and water impacts) would be designated with this EIS but not placed on the motor vehicle map until the mitigation has been completed. Also, the 36-acre Sly Creek area will be open year-round to motorized vehicles with widths that do not exceed 50".
3. **Class of Vehicles:** Alternative 5 proposes to change the class of vehicles for 11.3 miles of existing NFS roads, allowing all motorized vehicles on these roads that currently allow only highway-legal vehicles.
4. **Motorized Trails Converted to Non-Motorized Trails:** Alternative 5 proposes to delete 6.00 miles of motorized trail from the NFS. Non-motorized traffic would be allowed on these trails.

5.5.1 Direct and Indirect Effects

5.5.1.1 Action Component 1: Prohibition of Cross-Country Vehicle Travel

The direct and indirect effects to soil and water resources of the prohibition on cross-country motorized travel would be similar to Alternatives 2, 3 and 4. For Alternative 5, 4,172 miles of roads and routes on PNF lands would be available to motorized traffic (Table 6 and Appendix E), including 1,803 miles situated in the hydrologically sensitive areas described in section 3.2.1.2. Motorized traffic would be prohibited on 855 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic, including 371 miles of existing routes situated in hydrologically sensitive areas. Direct and indirect effects to water resources due to prohibition of motorized travel on these routes include reduced peak flows and sediment loads.

When compared with Alternatives 2, 3 and 4, long-term (25-30 year) benefits to soil and water resources under Alternative 5 would be greater than Alternatives 2 because an additional 116 miles of unauthorized routes would be unavailable for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 3 because an

additional 251 miles of unauthorized routes would be available for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 4 because an additional 110 miles of unauthorized routes would be available for motorized traffic. Alternative 5 would allow the passive re-vegetation of 855 miles of unauthorized routes, resulting in these areas attaining much of their original hydrologic and geomorphic functions. The long term establishment of vegetative growth on these routes would substantially decrease the amount of erosion and the amount of sediment delivered to area stream channels from 855 miles of unauthorized routes and would somewhat reduce somewhat area peak flows.

Benefits to soil and water resources due to prohibition of cross-country traffic on areas that are currently untracked would be identical for all action alternatives (Alternatives 2-5). Unauthorized use of these routes by nonmotorized traffic following prohibition could delay or prevent recovery.

5.5.1.2 Action Component 2: Addition of Facilities (Routes and Areas) to the NFS

Alternative 5 proposes to add 251 miles of existing, unauthorized routes to the NFTS. Additionally, Alternative 5 would allow year-round motorized vehicle traffic within the 36-acre Sly Creek area. In general, as with Alternative 2 and 4, any direct and indirect effects to soil and water resources of motorized travel on these previously unauthorized routes have already occurred.

PNF watershed staff have performed initial or abbreviated field surveys of the full length of every existing, unauthorized route that is proposed for addition to the current NFTS under Alternative 5. Subsequent field visits to potentially problematic routes identified by the initial field surveys were performed in summer 2008 to assess water quality impacts and to formulate mitigations. Survey methodology is described above in Section 3.1.3.

The focus of these surveys was to determine whether the route was causing adverse soil and water resource effects or had the potential to cause future adverse effects and, if so, whether these adverse effects could be mitigated within the scope of proposed actions. For Alternative 5, E08 evaluation data indicates that 100 miles (40% of the 251 miles proposed for addition to the NFTS) contain at least one segment that rates as “Fail” for effectiveness in protecting water quality as a result of initial field survey data, indicating a potential for adverse soil and water effects. Typically, these segments “fail” because of delivery of route-generated sediment to stream channels or because the route has captured a stream channel. However, subsequent site visits indicated that potential impacts are currently less than adverse and mitigations are feasible for 35 miles that contain these “fail” segments. For Alternative 5, 83 route/stream crossings were

observed to either be currently diverting stream flow down the route surface or having the potential to divert stream flow if the route / stream crossing plugged. All of these crossings can be mitigated. Trails that rated as Extreme for soil and water resource impacts are not proposed for addition to the NFTS under Alternative 5.

Moderate or High ratings for soil and water resource impacts were rated for 216 miles of proposed trails, meaning that soil and water effects are currently adverse or have the potential to be adverse in the future. A summary of the completed survey data is included in Table 5 and site specific information by route is included in Appendixes F, G, and H.

Table 5: Alternative 5 Summary of Routes by Rating

Low	Medium	High	Extreme
35 miles	153 miles	63 miles	0 miles

Routes rated as High are currently have adverse impacts to soil and water and mitigations are necessary to reduce current soil and water resource effects to less than adverse. Alternative 5 proposes to designate these routes as part of the NFTS but these routes will not be placed on the motor vehicle map until the critical, prescribed mitigations are in place. Motorized traffic will not be legal on these routes until proper installation of the mitigations is verified by PNF staff. If the mitigations are not installed for a number of years, these routes will begin to re-vegetate and regain their hydrologic and geomorphic functions. If the mitigations do not occur within 5-10 years, it is doubtful that the resource analyses provided in this Report will still be valid and a new NEPA document would likely be required to designate the routes for addition to the NFTS.

Alternative 5 proposes to add a 36-acre area near Sly Creek to the NFTS. This area would be open year-round to motorized vehicles with widths that do not exceed 50”. This area is rated as High for soil and water resource impacts. The current approach to the area is too steep, causing excessive rutting and erosion that will, in the near future, preclude this location’s use as an access approach to the play area. Additionally, an ephemeral channel is currently used as access to the play area from Sly Creek Campground. Traffic in this channel is causing discharge of traffic-related sediment to and beyond the downstream paved road drainage system. Mitigations are prescribed for this area. Watershed staff recommends that this area not be open to motorized traffic until these mitigations are in place.

By prohibiting traffic on other unauthorized routes on the Forest, facilities added to the NFS under Alternative 5 may experience increased traffic levels resulting in a slight increase in road generated erosion. However, increased maintenance attention, along with mitigations installed to

prevent adverse effects to water quality, for these added facilities will reduce erosion to a greater degree.

5.5.1.3 Action Component 3: Changes to the Existing NFS

Direct and indirect effects to soil and water resources due to allowing all motorized vehicle classes on 11.3 miles of existing NFS roads currently open only to highway-legal vehicles are expected to be negligible. Allowing narrower, non-street legal vehicles to travel existing NFS roads would not lead to a change in the width of those roads.

5.5.2 Cumulative Effects

General cumulative effects to soil and water resources under Alternative 5, would be the same as cumulative effects for Alternative 2. Detailed differences from the Alternative 2 cumulative watershed effects analysis are presented below.

Long-term (25-30 year) benefits to soil and water resources would occur under Alternative 5 because motorized traffic would be prohibited on 855 miles of inventoried existing, unauthorized routes that are currently open to motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be greater than Alternative 2 because an additional 116 miles of unauthorized routes would be unavailable for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 3 because an additional 251 miles of unauthorized routes would be available for motorized traffic. Long-term benefits to soil and water resources under Alternative 5 would be less than Alternative 4 because an additional 110 miles of unauthorized routes would be available for motorized traffic.

Under the existing condition, 19 of the 178 analysis watersheds (11%) have road / route densities that exceed the threshold of 4.0 mi / mi2 (see Table 3). For these 19 watersheds, the mean density is 4.73 mi / mi2 and the median is 4.56 mi / mi2. The density of roads and routes open to motorized traffic would decrease for all of these watersheds under Alternative 5. A net total of 152 miles of unauthorized routes within these 19 watersheds would be made unavailable to motorized traffic under Alternative 5, with watershed 110192 experiencing the largest decrease (over 21 miles). The average decrease in road / route density for these 19 watersheds would be 0.9 mi / mi2 with a median decrease of 0.8 mi / mi2. As a result, the density for 11 of the 19 watersheds would be less than the analysis threshold under Alternative 5. For the remaining 8 watersheds, the effects of Alternative 5 on watershed resources would also be beneficial, including improved surface water runoff timing and magnitude and reduced sediment delivery as a result of decreased road / route density.

For the two watersheds with the greatest increase in past ground disturbance from 1999 – 2007, watersheds 110041 and 110192, Alternative 5 would produce significant reductions in road / route density, resulting in densities of 3.75 and 1.90 mi / mi2, respectively. While Alternative 5 would add to the NFTS 3.6 miles and 1.5 miles of trails to the watersheds (respectively), these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 7.1 and 23.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

For the two watersheds that were determined to have a high risk of CWE in the 1999 HFQLG EIS, watersheds 110114 and 110159, Alternative 4 would produce significant reductions in road / route density, resulting in densities of 4.06 and 3.35 mi / mi2, respectively. While Alternative 5 would add to the NFTS 0.6 and 4.7 miles of trails to the watersheds (respectively), these routes already exist on the landscape and the alternative would also prohibit motorized traffic and allow for the passive restoration of 11.2 and 11.1 miles of routes (respectively) that currently exist on the landscape. None of the reasonably foreseeable actions presented in Appendix I are proposed within these two watersheds.

Long-term watershed condition would improve and risk of cumulative watershed effects would decrease under Alternative 5. The net effect of past, present and reasonably foreseeable actions on each subwatershed, as indicated by the total mileage and density of proposed routes and roads open to traffic on public and private roads within the subwatershed (see Appendix E), is generally beneficial. More than 97% of the analysis subwatersheds (174 out of 178) indicate a decrease in road / route density. The density decrease for each watershed ranges from 0.01 to 2.18 mi per sq mi with a mean of 0.37 and a median of 0.27 mi per sq mi. The road / route density for the remaining five subwatersheds (less than 3% of the analysis subwatersheds) indicates no change in the risk of cumulative soil and water resource effects. However, the benefits of prohibition of cross-country traffic on areas that are currently untracked will be realized in all analysis subwatersheds. This long-term improvement of watershed condition and long-term decrease in the risk of cumulative watershed effects due to protection of untracked areas is identical for all action alternatives (Alternatives 2-5).

Reasonably foreseeable actions that would affect soil and water resources at a cumulative, watershed scale are chiefly the HFQLG FRA vegetation management activities that are described above in the Methods section. The cumulative result of these foreseeable actions and Alternative 5 are generally the same as stated above for Alternative 2. For example, for watershed 110038, the total ERA increase due to the Watdog Project would still be 0.8%, a minor increase in relation

to the watershed's Threshold of Concern. While Alternative 5 would add no trails to the NFTS within 110038 and would prohibit motorized traffic and allow for the passive restoration of 2.9 miles of routes that currently exist on the landscape. This improvement in road / route density (a decrease of 0.15 mi per sq mi) is typically larger for all of the 178 watersheds under Alternative 5 (average decrease of 0.33 mi per sq mi). The improvement in road / route density under Alternative 5, considered along with the minor increases in ERA indicated for the reasonably foreseeable actions, will result in no increase in risk of detrimental cumulative watershed effects and will, by and large, decrease this risk.

The cumulative effect of Alternative 5 is predicted to be beneficial at the watershed scale for all 178 watersheds (as indicated by decreases in road / route density and / or prohibition of cross-country travel on untracked areas). Additionally, adverse impacts are not indicated at a smaller site scale per the Action Component 2 analysis above. Alternative 5 does not propose to add any routes that are rated as Extreme for soil and water impacts (routes that are currently having adverse effects on soil and water resources that cannot be feasibly mitigated). Alternative 5 proposes to add to the NFTS 63 miles of routes that are rated as High. Mitigations are prescribed for these routes to reduce the effects to less than adverse and the trails would remain prohibited from motorized traffic until the mitigations are satisfactorily installed

6 Summary of Effects Analysis Across all Alternatives

Effects to soil and water resources are summarized by ranking each indicator for each alternative. Table 6 provides the numeric value of the indicator and the ranking among alternatives in parentheses (higher rankings indicate more benefits and/or less adverse effects to soil and water resources for that alternative). The rankings are averaged for each alternative.

Table 6: Summary of Soil and Water Resource Effects

Indicators – Soil and Water Resources	Rankings of Alternatives for Each Indicator1				
	Alt 1	**Alt. 2**	**Alt. 3**	**Alt.4**	**Alt. 5**
Total miles of proposed routes and roads open to motorized traffic on Plumas National Forest Lands	5027 (1)	4,289 (2)	3,922 (5)	4,058 (4)	4,172 (3)
Total miles of proposed routes and roads open to motorized traffic on Plumas National Forest Lands that are situated in hydrologically sensitive areas	2,174 (1)	1,854 (2)	1,719 (5)	1,760 (4)	1,803 (3)
Total miles of proposed routes and roads open to motorized traffic on Plumas National Forest Lands by Maximum Potential Erosion Hazard Rating (EHR) Very High (VH), High (H), Moderate (M), Low (L)	VH: 277 H: 2,944 M: 1,593 L: 48 (1)	VH: 239 H: 2,502M: 1,387 L: 46 (2)	VH: 206 H: 2,288 M: 1,283 L: 45 (5)	VH: 210 H: 2,371 M: 1,321 L: 45 (4)	VH: 227 H: 2,443 M: 1,349 L: 45 (3)
Total miles of routes proposed for addition to NFTS that E08 effectiveness evaluation data indicate "fail" segment(s) for protection of water quality.	N/A (1)	188 (2)	N/A (5)	27 (4)	100 (3)
Total miles of routes proposed for addition to NFS that E08 effectiveness evaluation data indicates "fail" segment(s) and adverse impacts that can't be mitigated.	N/A (1)	85 (2)	N/A (5)	0 (5)	0 (5)
Numbers of locations where routes proposed for addition to NFTS divert or have potential to divert streamflow (before / after mitigation)	N/A (1)	126 (2)	N/A (5)	47 / 0 (5)	83 / 0 (5)
Average Density (mi per sq mi) of proposed routes and roads open to motorized traffic on public and private lands within Plumas National Forest watersheds (Mean, maximum and minimum)	2.44 0.13 6.53 (1)	2.14 0.13 5.24 (2)	1.99 0.04 4.60 (5)	2.04 0.04 4.58 (4)	2.09 0.13 5.08 (3)
Average for Water and Soil Resource	**1.0**	**2.0**	**5.0**	**4.3**	**3.6**

N/A – not applicable

7 Compliance with the Forest Plan and Other Direction

A list of standards and guides and best management practices that apply to this project are included in Appendix B. All standards and guides and BMPs apply to Alternatives 2, 4, and 5. Appendix B will include a list of site specific mitigation measures for each route after the completion of surveys. These mitigations measures were proposed to have compliance with the Forest Plan and Clean Water Act. Alternative 1 would not be in compliance with the Forest Plan and Clean Water Act. Alternative 1 is the No Action alternative and allows for the Forest to open to cross country travel. If no action is performed then the existing routes that are currently on the landscape and not a part of the NFTS then these trails would not be mitigated. Alternative 3 is only using roads and trails that are already a part of the NFTS. At the time these routes were constructed they were in compliance with the planning direction at the time. As reconstruction occurs on the NFTS, these routes will through time be reconstructed in compliance with the Forest Plan and Clean Water Act.

The application of BMPs and MMMs, including riparian buffers, would reduce the risks to beneficial uses of water from project activities. If cumulative effects were to occur, the most likely effect would be increased chronic sedimentation from increases in water yield and peak flow during high-intensity rain events. Peak flow changes, in particular, may cause increased sedimentation, changes in bedload transport, altered flow regimes, channel incision, undercuts and unstable banks, and channel width increases (Reid 1993).

It is assumed that protection of headwaters and tributaries to larger watersheds, along with implementation of effective non-point source conservation measures (BMPs), would provide protection of the entire watershed. If sedimentation is controlled through implementation of BMPs, the potential for project related sediment delivery to the immediate channel and channels downstream would be small.

Impacts on water quality in the analysis area could potentially occur under the following circumstances:

1. Failure to implement Best Management Practices, Riparian and Wetland Standards and Guidelines, and other required mitigation.
2. Extreme water yields resulting from abnormally high intensity, magnitude, and duration storm events.

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APPENDIX A

RIPARIAN CONSERVATION OBJECTIVES ANALYSIS

In accordance with Appendix A of the Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision (ROD), this Appendix assess whether proposed treatments are managed consistent with the riparian conservation objectives (RCOs) and associated standards and guidelines.

Riparian Conservation Objective #1: Ensure that identified beneficial uses for the water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses.

Existing and potential beneficial uses are defined for Lake Almanor, North Fork Feather River, Middle Fork Feather River, source to Little Last Chance Creek, Frenchman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lake, and Lake Oroville for the Feather River from the fish barrier dam in Oroville to the Sacramento River, for the watershed areas that are sources to Englebright Reservoir on the Yuba River, and for the Yuba River downstream of Englebright Reservoir. The defined existing beneficial uses are:

1. Municipal and domestic water supply include the uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply (North Fork Feather River, Little Last Chance Creek to Lake Oroville, Lake Oroville, Feather River and Englebright Reservoir).

2. Agricultural supply includes the uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing (Middle Fork Feather River source to Little Last Chance Creek, Lake Oroville, Feather River , Englebright Reservoir, and Yuba River).

3. Hydropower generation includes the uses of water for hydropower generation (North Fork Feather River, Lake Oroville, Englebright Reservoir, and Yuba River).

4. Water contact recreation includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skiing and scuba diving, surfing, white water activities, fishing, or use of natural hot springs (North Fork Feather River, Middle Fork Feather River source to Little Last Chance Creek, Frechman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lakes, Lake Oroville, Feather River, Englebright Reservoir, and Yuba River).

5. Non-contact water recreation includes uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities (North Fork Feather River, Middle Fork Feather River source to Little Last Chance Creek, Frechman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lakes, Lake Oroville, Feather River, Englebright Reservoir, and Yuba River).

6. Commercial and sport fishing includes uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes (Not listed as an existing or potential beneficial use for the affected water bodies in the Basin Plan, but is an existing use in these water bodies).

7. Warm freshwater habitat includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates (Middle Fork Feather River source to Little Last Chance Creek, Frenchman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lake Oroville, Feather River and Yuba River).

8. Cold freshwater habitat include uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates (North Fork Feather River, Middle Fork Feather River source to Little Last Chance Creek, Frechman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lakes Lake Oroville, Feather River, Englebright Reservoir, and Yuba River).

9. Wildlife habitat includes uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources (North Fork Feather River, Middle Fork Feather River source to Little Last Chance Creek, Frechman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lakes Lake Oroville, Feather River, Englebright Reservoir, and Yuba River).

10. Spawning, reproduction, and/or early development include uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish (North Fork Feather River, Middle Fork Feather River source to Little Last Chance Creek, Frechman Reservoir, Little Last Chance Creek to Lake Oroville, Lake Davis, Lakes Basin Lakes Lake Oroville, Feather River, Englebright Reservoir, and Yuba River).

All routes proposed for designation will be surveyed. The survey assesses stream crossing conditions and identifies trail surface erosional problems and the proximity to special aquatic features. The following determinations will be made: (1) The route was considered and the will not be adverse (assuming routine maintenance of the trail); (2) The route was considered and site-specific mitigation is prescribed to reduce soil and water resource effects to less than adverse. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts): addition or modification of existing route stream crossing structures; relocation of short segments of the existing route; and designation of acceptable seasons of use and vehicle class; and (3) The route was considered and a determination was made that the effects would be adverse. The route is not recommended by the watershed staff for inclusion on the NFS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse would not be economically feasible, meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams or RCAs, frequent stream crossings, steep slopes, or highly erosive soils). After fieldwork is completed there will be an appendix containing existing condition of all routes, recommendations, and mitigation measures for all routes that are being considered for

designation. Mitigation measures developed to maintain or restore RCO #1 are based on standards and guides found on page 63 of the SNFPA ROD and Best Management Practices (BMPs) (see Appendix B for a list of standards and guides and BMPs).

Riparian Conservation Objective #2: Maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; (2) streams, including in stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species.

All routes proposed for designation will be surveyed. The survey assesses stream crossing conditions and identifies trail surface erosional problems and the proximity to special aquatic features. The following determinations will be made: (1) The route was considered and the will not be adverse (assuming routine maintenance of the trail); (2) The route was considered and site-specific mitigation is prescribed to reduce soil and water resource effects to less than adverse. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts): addition or modification of existing route stream crossing structures; relocation of short segments of the existing route; and designation of acceptable seasons of use and vehicle class; and (3) The route was considered and a determination was made that the effects would be adverse. The route is not recommended by the watershed staff for inclusion on the NFS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse would not be economically feasible, meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams or RCAs, frequent stream crossings, steep slopes, or highly erosive soils). After fieldwork is completed there will be an appendix containing existing condition of all routes, recommendations, and mitigation measures for all routes that are being considered for designation. Mitigation measures developed to maintain or restore RCO #2 are based on standards and guides found on page 63 - 64 of the SNFPA ROD and Best Management Practices (BMPs) (see Appendix B for a list of standards and guides and BMPs).

Threatened, endangered, and sensitive (TES) aquatic species on the Plumas National Forest are mountain yellow-legged frog (MYLF), foothill yellow-legged frog (FYLF), California red-legged frog (CRLF), western pond turtle, and hardhead minnow. Habitat assessments for TES amphibians and western pond turtles will be done where proposed routes intersect streams which have not been previously surveyed for these species. Habitat measurements will be taken 500 feet upstream and 500 feet downstream of proposed route stream crossings. These habitat assessments will be used in conjunction with the hydrology surveys to make a determination of potential impacts to TES and other aquatic species and to determine mitigation measures to meet RCO #2. Habitat assessments will not be done for hardhead since there are no proposed routes which cross hardhead inhabited streams. The determinations from the hydrology surveys will meet RCO#2 for hardhead and other aquatic species. Mitigation measures will be based on standards and guides found on pages 63 - 64 of the SNFPA ROD and on Best Management Practices (BMP's) (See Appendix B).

Riparian Conservation Objective #3: Ensure a renewable supply of large down logs that: (1) can reach the stream channel and (2) provide suitable habitat within and adjacent to the RCA.

Proposed management activities in this EIS would not affect the current existing condition of the renewable supply of large down logs. This project does not propose the removal of trees off site. Mitigations measures proposed, such as modification of existing route stream crossing structures

and relocation of short segments of the existing route may require knocking down trees. However these trees will be left on-site as large down logs.

Riparian Conservation Objective #4: Ensure that management activities, including fuels reduction actions, within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic- and riparian-dependent species.

The standards and guides associated with RCO #4 include the management activities of prescribed fire, fighting wildland fire, hazard tree removal, and recreational uses. This project is not proposing prescribed fire or hazard tree removal. However, the standard and guide that is associated with this project states:

> *Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.*

All routes proposed for designation will be surveyed. The survey assesses stream crossing conditions and identifies trail surface erosional problems and the proximity to special aquatic features. The following determinations will be made: (1) The route was considered and the will not be adverse (assuming routine maintenance of the trail); (2) The route was considered and site-specific mitigation is prescribed to reduce soil and water resource effects to less than adverse. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts): addition or modification of existing route stream crossing structures; relocation of short segments of the existing route; and designation of acceptable seasons of use and vehicle class; and (3) The route was considered and a determination was made that the effects would be adverse. The route is not recommended by the watershed staff for inclusion on the NFS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse would not be economically feasible, meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams or RCAs, frequent stream crossings, steep slopes, or highly erosive soils). After fieldwork is completed there will be an appendix containing existing condition of all routes, recommendations, and mitigation measures for all routes that are being considered for designation. Mitigation measures developed to maintain or restore RCO #4 are based on standards and guides found on page 64 - 65 of the SNFPA ROD and Best Management Practices (BMPs) (see Appendix B for a list of standards and guides and BMPs).

Threatened, endangered, and sensitive (TES) aquatic species on the Plumas National Forest are mountain yellow-legged frog (MYLF), foothill yellow-legged frog (FYLF), California red-legged frog (CRLF), western pond turtle, and hardhead minnow. Habitat assessments for TES amphibians and western pond turtles will be done where proposed routes intersect streams which have not been previously surveyed for these species. Habitat measurements will be taken 500 feet upstream and 500 feet downstream of proposed route stream crossings. These habitat assessments will be used in conjunction with the hydrology surveys to make a determination of potential impacts to TES and other aquatic species and to determine mitigation measures to meet RCO #4. Habitat assessments will not be done for hardhead since there are no proposed routes which cross hardhead inhabited streams. The determinations from the hydrology surveys will meet RCO#4 for hardhead and other aquatic species. Mitigation measures will be based on standards and guides found on pages 64 - 65 of the SNFPA ROD and on Best Management Practices (BMP's) (See Appendix B).

Riparian Conservation Objective #5: Preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

All routes proposed for designation will be surveyed. The survey assesses stream crossing conditions and identifies trail surface erosional problems and the proximity to special aquatic features. The following determinations will be made: (1) The route was considered and the will not be adverse (assuming routine maintenance of the trail); (2) The route was considered and site-specific mitigation is prescribed to reduce soil and water resource effects to less than adverse. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts): addition or modification of existing route stream crossing structures; relocation of short segments of the existing route; and designation of acceptable seasons of use and vehicle class; and (3) The route was considered and a determination was made that the effects would be adverse. The route is not recommended by the watershed staff for inclusion on the NFS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse would not be economically feasible, meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams or RCAs, frequent stream crossings, steep slopes, or highly erosive soils). After fieldwork is completed there will be an appendix containing existing condition of all routes, recommendations, and mitigation measures for all routes that are being considered for designation. Mitigation measures developed to maintain or restore RCO #5 are based on standards and guides found on page 65 - 66 of the SNFPA ROD and Best Management Practices (BMPs) (see Appendix B for a list of standards and guides and BMPs).

Fens are considered significant resources due to their unique hydrologic characteristics; ability to support high levels of biodiversity, including rare species; relative rarity across the Sierra Nevada; and ability to remain relatively stable for long periods of time, storing plant and climatic data over millennia. Over seventy fens have been documented on the Plumas NF, ranging in size from 0.04 acre to over 15 acres. Twenty nine of these (39 percent) are located in the Bucks Lake Wilderness, where motorized vehicle travel is prohibited. At present, there are no fens documented within 100 feet of a proposed or existing route; however route surveys are not complete. If fens are documented during field surveys, they will be protected according to SNFPA ROD and Best Management Practices (BMPs).

Riparian Conservation Objective #6: Identify and implement restoration actions to maintain, restore or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species.

All routes proposed for designation will be surveyed. The survey assesses stream crossing conditions and identifies trail surface erosional problems and the proximity to special aquatic features. The following determinations will be made: (1) The route was considered and the will not be adverse (assuming routine maintenance of the trail); (2) The route was considered and site-specific mitigation is prescribed to reduce soil and water resource effects to less than adverse. Site-specific mitigations may include addition or modification of route drainage features (out-sloping, rolling dips, waterbars, or ditch relief culverts): addition or modification of existing route stream crossing structures; relocation of short segments of the existing route; and designation of acceptable seasons of use and vehicle class; and (3) The route was considered and a determination was made that the effects would be adverse. The route is not recommended by the watershed staff for inclusion on the NFS. The reason for this recommendation is that mitigations to reduce soil and water resource effects to less than adverse would not be economically feasible,

meet safety standards, or would not be effective due to physical constraints (such as the route's close proximity to streams or RCAs, frequent stream crossings, steep slopes, or highly erosive soils). After fieldwork is completed there will be an appendix containing includes existing condition of all routes, recommendations, and mitigation measures for all routes that are being considered for designation. Mitigation measures developed to maintain or restore RCO #6 are based on standards and guides found on page 66 of the SNFPA ROD and Best Management Practices (BMPs) (see Appendix B for a list of standards and guides and BMPs).

Threatened, endangered, and sensitive (TES) aquatic species on the Plumas National Forest are mountain yellow-legged frog (MYLF), foothill yellow-legged frog (FYLF), California red-legged frog (CRLF), western pond turtle, and hardhead minnow. Habitat assessments for TES amphibians and western pond turtles will be done where proposed routes intersect streams which have not been previously surveyed for these species. Habitat measurements will be taken 500 feet upstream and 500 feet downstream of proposed route stream crossings. These habitat assessments will be used in conjunction with the hydrology surveys to make a determination of potential impacts to TES and other aquatic species and to determine mitigation measures to maintain, restore, or enhance habitat for these species. Habitat assessments will not be done for hardhead since there are no proposed routes which cross hardhead inhabited streams. The determinations from the hydrology surveys will maintain, restore, or enhance habitat for hardhead and other aquatic species. Mitigation measures will be based on standards and guides found on page 66 of the SNFPA ROD and on Best Management Practices (BMP's) (See Appendix B).

APPENDIX B

STREAMSIDE MANAGEMENT ZONE PLAN AND RESOURCE OBJECTIVES

Plan Objectives

This plan describes goals, objectives and treatments for all streamside and riparian zones within the project area that would be impacted by management activities. As required by the Plumas Land and Resource Management Plan, this plan also identifies the vegetative treatments within riparian and streamside areas and the maximum amount of vegetation manipulation allowable to meet the stated objectives. In addition, the maximum area of soil exposure allowable is identified, as well as the necessary erosion control measures to meet the stated objectives. This plan also assesses those areas "... within the SMZ having oversteepened slopes (over 60 percent) with a very high erosion potential or high instability, and procedures to limit soil disturbance to no more than 5 percent of these areas per decade". All routes proposed for designation under alternatives 2, 4, 5, and 6 will be surveyed. The survey protocol is based on standards and guides of the 2004 SNFPA ROD and BMPs, which are listed in the table below. Site specific mitigations for each proposed route will be created after fieldwork is completed to meet standards and guides and BMPs.

Definitions Used For Determining Riparian Conservation Areas (RCAs)

Widths of RCA were determined under the provisions of the Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision (ROD) (USDA Forest Service, 2004).
The SNFPA ROD defines RCAs as the following :

Perennial Streams: *300 feet on each side of the stream, measured from the bank full edge of the stream*

Seasonally Flowing Streams (includes intermittent and ephemeral streams): *150 feet on each side of the stream, measured from the bank full edge of the stream*

Streams in Inner Gorge (defined by stream adjacent slopes greater than 70 percent gradient: *top of inner gorge*

Special Aquatic Features (lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs) or Perennial Streams with Riparian Conditions extending more than 150 feet from edge of streambank or Seasonally Flowing streams with riparian conditions extending more than 50 feet from edge of streambank: *300 feet from edge of feature or riparian vegetation, whichever width is greater*

Other hydrological or topographic depressions without a defined channel: *RCA width and protection measures determined through project level analysis.*

Standards, Guidelines, and Mitigation Measures for Hydrology and Soil Resources:

Applicable Units	Brief Description	Type of Direction	Source of Direction (LRMP, SNFPA, HFQLG, FSM, FSH, NHPA,	Provision Specifications from Specialist	Applicable Action Alternatives
All	Riparian Conservation Area (RCA) – Protect riparian areas, streams, lakes, wetlands, and ponds.	S&G, BMP 1-8, BMP 1-18, BMP 1-19, BMP 7-3	SNFPA, PNF LRMP, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All	Management activities in riparian conservation areas that delineate aquatic, riparian, and meadow habitats are to be managed consistent with riparian conservation objectives (RCOs) and associated standards and guidelines	Standard and Guide	SNFPA	Completed by ID Team during the project planning process. See Appendix A.	2, 4, 5, and 6
All proposed routes	To protect watershed resources, meet the following standards for road construction, road reconstruction, and road relocation: (1) design new stream crossings and replacement stream crossings for at least the 100-year flood, including bedload and debris; (2) design stream crossings to minimize the diversion of streamflow out of the channel and down the road in the event of a crossing failure; (3) design stream crossings to minimize disruption of natural hydrologic flow paths, including minimizing diversion of streamflow and interception of surface and subsurface water; (4) avoid wetlands or minimize effects to natural flow patterns in wetlands; and (5) avoid road construction in meadows.	Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	For waters designated as "Water Quality Limited" (Clean Water Act Section 303(d)), participate in the development of Total Maximum Daily Loads (TMDLs) and TMDL Implementation Plans. Execute applicable elements of completed TMDL Implementation Plans.	RCO #1 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.	RCO #1 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.	RCO #2 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.	RCO #2 Standard and Guide	SNFPA		2, 4, 5, and 6

Applicable Units	Brief Description	Type of Direction	Source of Direction (LRMP, SNFPA, HFQLG, FSM, FSH, NHPA,	Provision Specifications from Specialist	Applicable Action Alternatives
All proposed routes	Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.	RCO #2 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Determine if the level of coarse large woody debris (CWD) is within the range of natural variability in terms of frequency and distribution and is sufficient to sustain stream channel physical complexity and stability. Ensure proposed management activities move conditions toward the range of natural variability.	RCO #3 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.	RCO #4 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by humans and wheeled vehicles.	RCO #5 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road building, recreational use, grazing, and timber harvests, that may be contributing to the observed degradation.	RCO #6 Standard and Guide	SNFPA		2, 4, 5, and 6
All proposed routes	General Guidelines for the Location and Design of Roads – Locate and design roads with minimal resource damage.	BMP 2-1	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*		2, 4, 5, and 6
All proposed routes	Erosion Control Plan – Limit and mitigate erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.	BMP 2-2	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6

Applicable Units	Brief Description	Type of Direction	Source of Direction (LRMP, SNFPA, HFQLG, FSM, FSH, NHPA,	Provision Specifications from Specialist	Applicable Action Alternatives
All proposed routes	Timing of Construction Activities – Minimize erosion by conducting operations during minimal runoff periods.	BMP 2-3	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Stabilization of Road Slope Surfaces and Spoil Disposal Areas – Minimize erosion from exposed cut slopes, fill slopes, and spoil disposal areas.	BMP 2-4	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Road Slope Stabilization Construction Practices – Reduce sedimentation by minimizing erosion from road slopes and slope failure along roads.	BMP 2-5	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Dispersion of Subsurface Drainage From Cut and Fill slopes – Minimize the possibilities of cut or fill slope failure and the subsequent production of sediment.	BMP 2-6	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Control of Road Drainage – Minimize the erosive effects of water concentrated by road drainage features; disperse runoff from disturbances within the road clearing limits; to lessen the sediment yield from roaded areas; minimize erosion of the road prism by runoff from road surfaces and from uphill areas.	BMP 2-7	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects – Minimize erosion and sedimentation from disturbed ground on incomplete projects.	BMP 2-9	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6

Applicable Units	Brief Description	Type of Direction	Source of Direction (LRMP, SNFPA, HFQLG, FSM, FSH, NHPA,	Provision Specifications from Specialist	Applicable Action Alternatives
All proposed routes	Construction of Stable Embankments (Fills) – Construct embankments with materials and methods, which minimize the possibility of failure and subsequent water quality degradation.	BMP 2-10	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes with mitigations that require the use of mechanical equipment	Control of Sidecast Material During Construction and Maintenance – Minimize sediment production originating from sidecast material during road construction or maintenance.	BMP 2-11	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes with mitigations that require the use of mechanical equipment	Servicing and Refueling of Equipment – Prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels.	BMP 2-12	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Control of Construction and Maintenance Activities Adjacent to SMZs – Protect water quality by controlling construction and maintenance actions within and adjacent to any streamside management zone	BMP 2-13	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
All proposed routes	Controlling In-Channel Excavation – Minimize stream channel disturbances and related sediment production. During construction, heavy equipment is only permitted to cross, or work in and near streams or lakes during the construction, or removal of culverts and bridges and other facilities (e.g., water sources, boat ramp/launching sites, etc.) and only under specific protection requirements. The Engineering Representative is authorized to designate the location of crossings or work sites. Excavation during the installation of instream structures must follow all of the minimum water quality protection requirements listed with this BMP.	BMP 2-14	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
Routes with Stream Crossing Upgrade or Removals	Ensure that all stream diversions are carefully planned, to minimize downstream sedimentation, and to restore stream channels to their natural grade, condition, and alignment as soon as possible.	BMP 2-15	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*		2, 4, 5, and 6

Applicable Units	Brief Description	Type of Direction	Source of Direction (LRMP, SNFPA, HFQLG, FSM, FSH, NHPA,	Provision Specifications from Specialist	Applicable Action Alternatives
Routes with Stream Crossing Upgrade or Removals	Bridge and Culvert Installation – Minimize sedimentation and turbidity resulting from excavation for in-channel structures.	BMP 2-17	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
Routes with Stream Crossing Upgrade or Removals	Disposal of Right-of-Way and Roadside Debris – (a) ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed. (b) ensure debris dams are not formed which obstruct fish passage, or which could result in downstream damage from high water flow surges after dam failure.	BMP 2-19	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and *Clean Water Act*	—	2, 4, 5, and 6
Routes with Stream Crossing Upgrade or Removals	Specifying Riprap Composition - minimize sediment production associated with the installation and utilization of riprap material.	BMP 2-20	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and Clean Water Act	—	2, 4, 5, and 6
All routes	Maintenance of Roads – Maintain roads in a manner which provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities all of which can cause erosion and sedimentation, and deteriorating watershed conditions.	BMP 2-22	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and Clean Water Act	See maintenance plan for route designation.	2, 4, 5, and 6
All routes	Road Surface Treatment to Prevent Loss of Materials – Minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.	BMP 2-23	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and Clean Water Act	—	2, 4, 5, and 6
All routes	Traffic Control During Wet Periods – (a) reduce road surface disturbance and rutting of roads. (b) minimize sediment washing from disturbed road surfaces.	BMP 2-24	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and Clean Water Act	Season of Use Plan	2, 4, 5, and 6

Applicable Units	Brief Description	Type of Direction	Source of Direction (LRMP, SNFPA, HFQLG, FSM, FSH, NHPA,	Provision Specifications from Specialist	Applicable Action Alternatives
All routes	To provide a systematic process to determine when and to what extent OHV use will cause, or is causing adverse effects on water quality.	BMP 4-7	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and Clean Water Act		2, 4, 5, and 6
All proposed routes	Protection of Wetlands – Avoid adverse water quality impacts associated with destruction, disturbance, or modification of wetlands. The Forest Service will not permit the implementation of activities and new construction in wetlands whenever there is a practical alternative.	BMP 7-3	RCOs of the SNFPA, and Water Quality Management for National Forest System Lands in CA, BMPs (2000)	—	2, 4, 5, and 6
All routes	Management by Closure to Use (Seasonal, Temporary, and Permanent): exclude activities that could result in damages to either resources or improvements, such as roads and trails, resulting in impaired water quality.	BMP 7-7	SNFPA, Water Quality Management for National Forest System Lands in CA, BMPs (2000), and Clean Water Act		2, 4, 5, and 6
All proposed routes	Cumulative Off-Site Watershed Effects – Protect the identified beneficial uses of water from the combined effects of multiple management activities which individually may not create unacceptable effects but collectively may result in degraded water quality conditions.	BMP 7-8	RCOs of the SNFPA, and Water Quality Management for National Forest System Lands in CA, BMPs (2000)	—	2, 4, 5, and 6

Route Designation: Hydrology and Soils Evaluation Form

U Number:_____ **Road Type:** Temp Road OHV Trail Fireline Skid Trail Other_____

Location (Sec, Township, Range)**:**_____ **Road Surface:** Native Graveled Paved

Date:_____ **Data Collected By:**_____

Note: Segments changes occur every time the water drains from the road or ditch. Maximum segment length is 0.2 mile (approx. 1000 feet). Examples of road segment change points include: drainage structure such as a water bar, culvert, or stream crossing or a natural drainage feature such as an ephemeral channel crossing the road, or rutting of the road drains the water acting similar to a ditch.

***Use page 3 to view numbering scheme and fill out evaluation form**

Segment Number	Segment Length (ft)	Ending Station (ft)	Reason for Segment Change	Insloped (I), Outsloped (O), Crowned (C), or Entrenched (E)	Soil Texture (every 1000 ft)	Road Gradient	Road Width (ft)	Average Distance To Stream (ft)	Average Distance Daylight (ft)	Comment

Reason for Segment Change: D-dip, ND – natural dip W-waterbar, S-road sag, C-road crest, X-stream Xing, R-ruts leaving road, O-other (describe)
Soil Texture: Needs to be recorded from forest floor, not from road. Collect approximately every 1000 ft.
Road Gradient Categories: Low (L) -1 to 5%, Medium (M) - 6 to 10%, High (H) - 11 to 15%, Very High (VH) - 16 to 20%, Extreme (E)- greater than 20%
Average Distance Daylight: The distance needed for the dip lead off ditch to drain the water from the road.
Road Width and Average Distance to Daylight categories: 0, less than 5 ft, 5-10 feet, 10-15 feet, 15-20 feet, greater than 20 feet
Distance to Stream categories: 0, less than 20 feet, 20-50 feet, 50-100 feet, 100-300 feet, 300-600 feet, greater than 600 feet

Route Designation: Hydrology and Soils Evaluation Form

U Number:_____ Date:_____ Data Collected By:_____

***Use page 3 to view numbering scheme and fill out evaluation form**

Segment Number and Road Station	Road Surface*	Fill Slope*				Cut Slope Failure/Inside Ditch*	Cross Drain* (Pipe)		Stream Crossing*							
	Rilling	Vegetative Cover	Rilling	Sediment to Nearest Channel	Slope Failures		Scour at outlet	Plugging	Class	Type	Skew	Fill Height	Scour at Crossing*	Diversion Potential*	Plugging*	Piping*

Stream Class: Perennial (P) – flows the all year, Intermittent (I) – flows majority of the year, Ephemeral (E) – flows only in response to storms
Crossing Types: B: bridge, C: culvert (in inches, provide diameter or rise/span), LWX-A: low water crossing – armored, LWX-U: low water crossing – unarmored, N: no structure in place
Fill Height at outlet of stream crossing: Low 1-5 ft, Moderate 5-10 ft, High 11-15ft, Very High 15-20 ft, Extreme over 20ft

Evaluation Form Supplement to Pages 1 and 2

1) Road Surface

Rilling	A) Little or No Evidence	B) Some present, but occurs on<10% of road length, or where present do not leave road surface	C) 10% of surface length has rills 2" deep and 20 feet in length which continue off road surface

2) Fill Slopes:

Note RHCA is a 300 ft buffer for fish bearing streams & 150 ft buffer for non-fish bearing streams. SMZ are 50 ft buffers for streams that do not flow every year.

Vegetative Cover	D) Vigorous dense cover, or fillslope of stable material	E) Less than full cover, but >50% of fillslope has effective cover or is stable material	F) <50% fillslope has effective cover or is stable material
Rilling	G) No Rills	H) Rills present but do not extend >slope length below toe	I) Rills present and extend >slope length below toe
Sediment to nearest channel	J) No evidence of transport to RHCA or SMZ	K) Sediment deposition in RHCA or SMZ but not channel.	L) Sediment from hillslope enters channel
Slope failures	M) Less than 5 cubic yards of material moved (per 500 feet road length)	N) ≥5 cubic yards of material moved but does not enter channel (per 500 feet road length)	O) Slide material enters channel

3) Cut slope failure/inside ditch

	P) Less than 5 cubic yards of material moved and material does not enter channel (per 500 feet road length)	Q) ≥5 cubic yards of material moved but does not drainage way to channel (per 500 feet road length)	R) ≥5 cubic yards of material moved. > 1 cubic yards of material transported to channel (per 500 feet road length)

4) Cross drains (Note: use these criteria at cross drain pipes, dips, waterbars, or other cross drain structures. Use the #5 for Stream Crossings)

Scour at outlet	S) No evidence of scour	T) Scour evident, but does not extend >20' below outlet	U) Scour and/or sediment extends to stream channel
Plugging	V) No evidence of sediment or debris restricting flow	W) Sediment and/or debris is accumulating, but ≤ 30% of inlet or outlet is blocked	X) Sediment and/or debris is blocking >30% of inlet or outlet

5) Crossing

Scour at Crossing	Y) No evidence of scour	Z) Scour evident, but extends less than 2 channel width, below outlet: and no undercutting of crossing fill.	AA) Scour evident that extends more than 2 channel widths below outlet, or scour is undercutting crossing fill.
Diversion Potential (if CC provide diversion distance)	BB) Crossing is configured to pass flows without diversion if culvert fails		CC) If culvert fails, flow will be diverted out of channel and down roadway. Distance:
Plugging	DD) No evidence of sediment or debris restricting flow through pipe	EE) Sediment and/or debris is accumulating, but ≤ 30% of inlet or outlet is blocked	FF) Sediment and/or debris is blocking >30% of inlet or outlet
Piping	GG) No evidence of flow beneath or around culvert		HH) ≥ 10% if the flow passes beneath or around culvert, or substantial piping erosion evident

R5 Best Management Practice Evaluation Protocol (BMEPEP)
Scoring Rule Set

By Jim Frazier
April 13, 2004

Implementation

Pass

- All rating items are 1 or 2, and/or < ½ of rating items are 3, and none is 4 (example: if there are 5 rating items: 2 are 3's and the rest are 1 or 2)

At Risk

- ½ of rating items are 3, and none is 4 (example: if there are 5 rating items: 3 are 3's and the rest are 1 or 2)

Fail

- All rating items are 3's, or any rating item is a 4

Effectiveness

Pass

- All rating items are in column 1, or combination of column 1 and 2 with <1/2 of the rating items in column 2

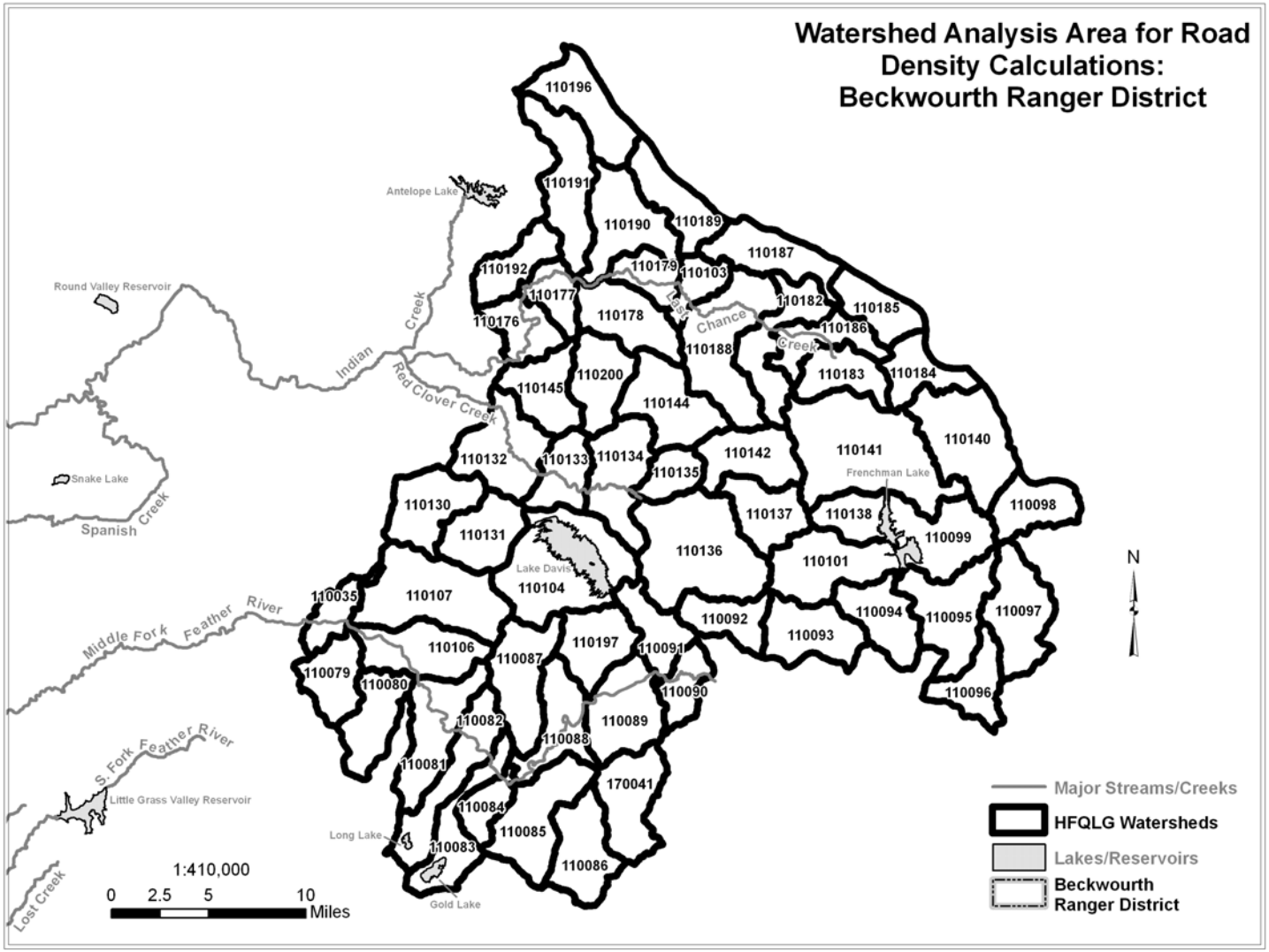
At Risk

- >= ½ of the rating items are in column 2 with no more than 1 rating item in column 3 (example: if there are 6 rating items, at least 4 are in column 2 and not more than 1 in column 3)

Fail

- 2 or more rating items are in column 3, or any rating in column 3 is a "sediment to channel" rating item

Note: Columns 1-3 as described above go from left to right on the evaluation form


Watershed Analysis Area for Road Density Calculations: Beckwourth Ranger District
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170041
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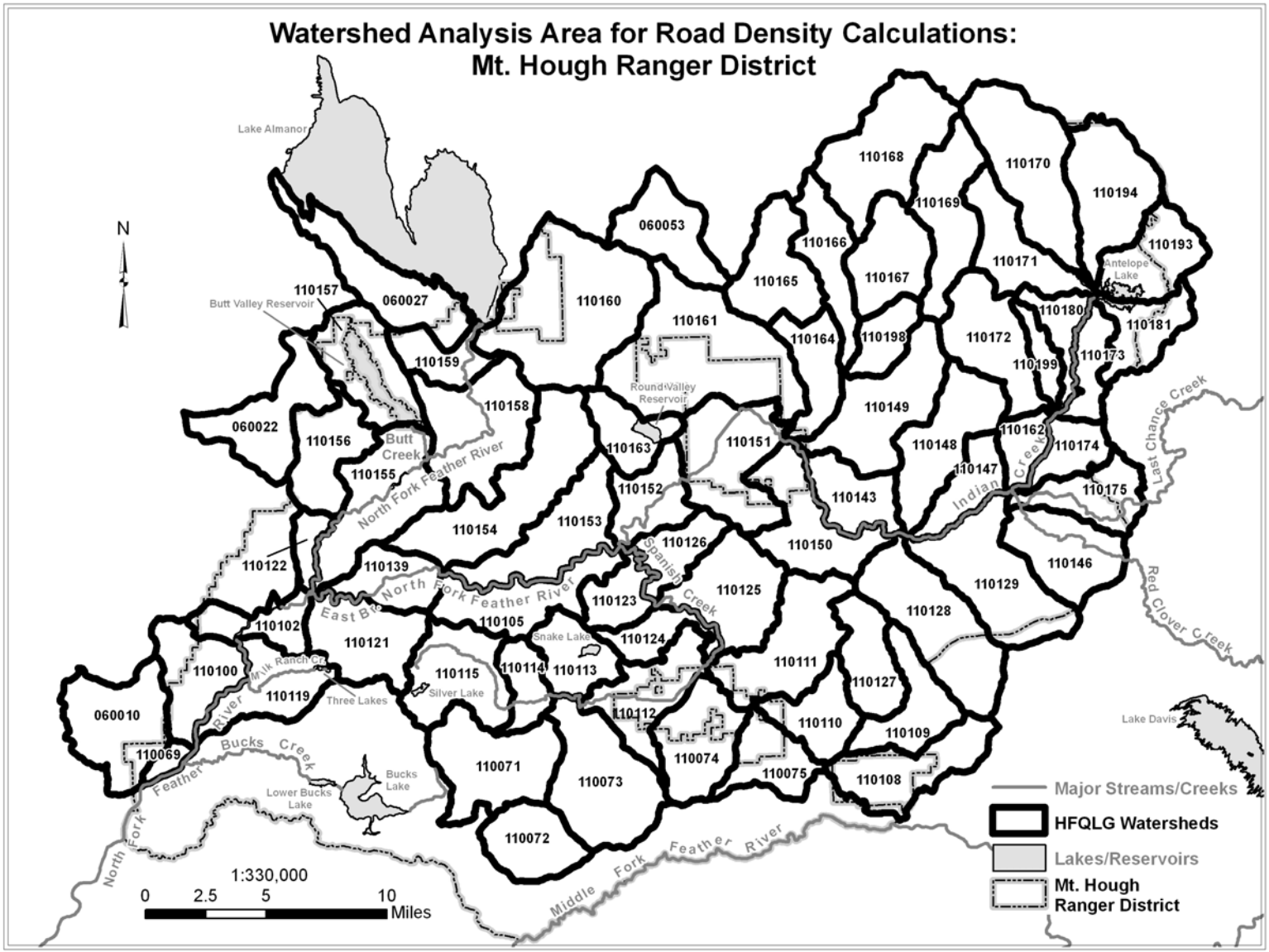
110083
110086
Antelope Lake
Round Valley Reservoir
Indian Creek
Red Clover Creek
Chance Creek
Snake Lake
Spanish Creek
Frenchman Lake
Lake Davis
Middle Fork Feather River
S. Fork Feather River
Little Grass Valley Reservoir
Long Lake
Gold Lake
Lost Creek
1:410,000
0 2.5 5 10
Miles
N
Major Streams/Creeks
HFQLG Watersheds
Lakes/Reservoirs
Beckwourth Ranger District


Watershed Analysis Area for Road Density Calculations:
Mt. Hough Ranger District
N
Lake Almanor
Butt Valley Reservoir
Round Valley Reservoir
Antelope Lake
Snake Lake
Silver Lake
Three Lakes
Bucks Lake
Lower Bucks Lake
Lake Davis
Butt Creek
North Fork Feather River
East Branch North Fork Feather River
Spanish Creek
Indian Creek
Last Chance Creek
Red Clover Creek
Milk Ranch Cr.
Bucks Creek
Feather River
North Fork Feather River
Middle Fork Feather River
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060022
060010
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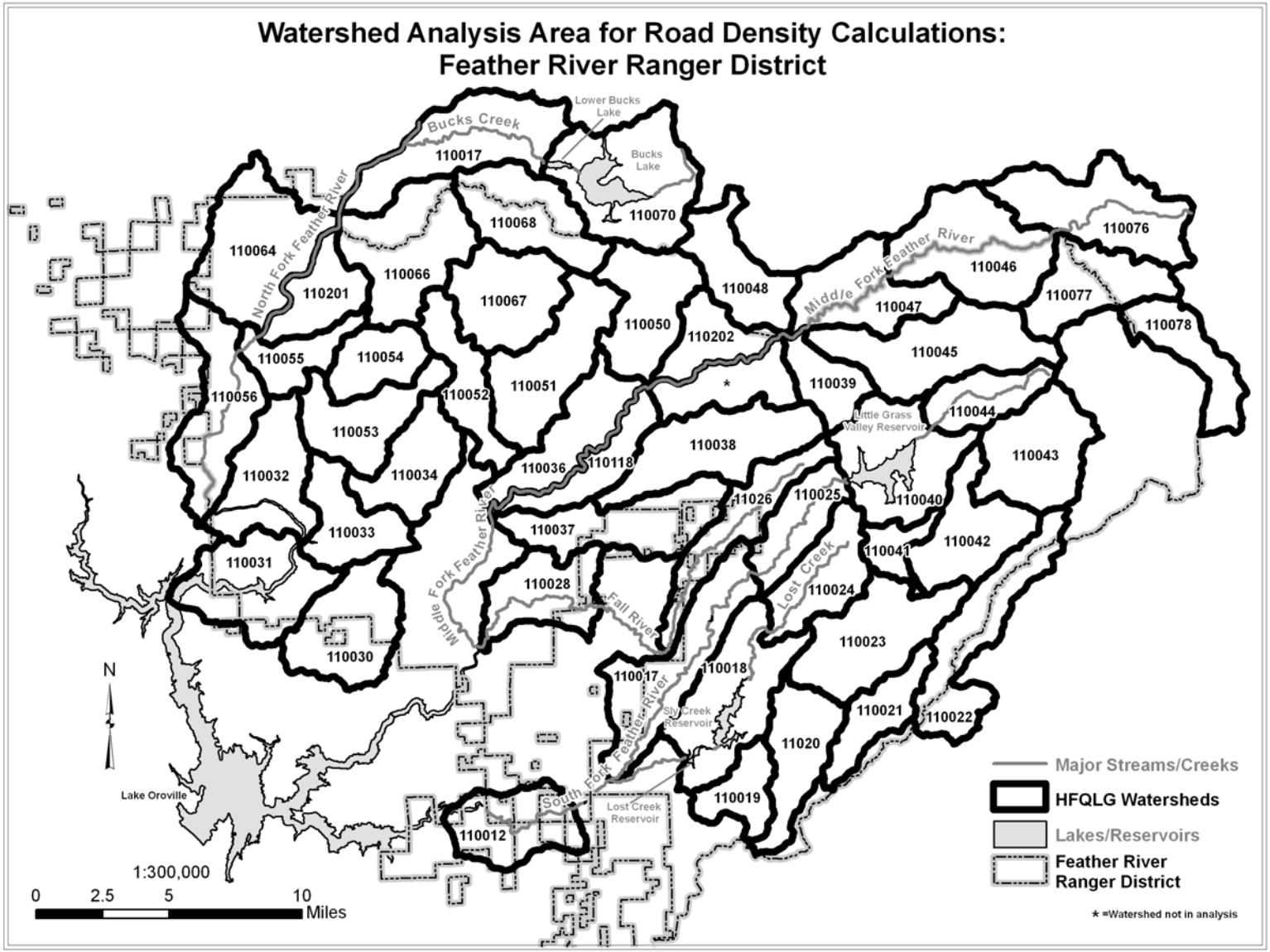
Major Streams/Creeks
HFQLG Watersheds
Lakes/Reservoirs
Mt. Hough Ranger District
1:330,000
0 2.5 5 10
Miles


Watershed Analysis Area for Road Density Calculations:
Feather River Ranger District
Bucks Creek
Lower Bucks Lake
Bucks Lake
North Fork Feather River
Middle Fork Feather River
Little Grass Valley Reservoir
Middle Fork Feather River
Fall River
Lost Creek
Sly Creek Reservoir
South Fork Feather River
Lost Creek Reservoir
Lake Oroville
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110201
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110050
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110023
110030
110018
110017
110021
110022
110020
110019
110012
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1:300,000
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Miles
Major Streams/Creeks
HFQLG Watersheds
Lakes/Reservoirs
Feather River Ranger District
* =Watershed not in analysis

Appendix E

Existing Condition and Environmental Consequences Calculations by HFQLG Watersheds

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
060010	16.74	49.5	M	N/A	0.69	0.59	0.59	0.59	0.59	0.59
060022	15.01	70.0	M	N/A	0.51	0.51	0.44	0.51	0.51	0.51
060027	15.77	54.0	M	N/A	3.23	2.98	2.79	2.98	2.98	2.98
060053	11.92	65.0	M	N/A	0.34	0.33	0.33	0.33	0.33	0.33
110012	11.79	49.5	M	N/A	2.74	2.67	2.67	2.67	2.70	2.70
110017	17.82	45.0	M	0.4	2.70	2.68	2.68	2.68	2.68	2.68
110018	18.81	70.0	M	0.9	3.81	3.61	3.58	3.61	3.61	3.61
110019	6.66	54.0	M	0.6	3.36	3.22	3.22	3.22	3.22	3.22
110020	11.62	60.0	M	2.4	3.93	3.67	3.67	3.67	3.67	3.67
110021	8.10	60.0	M	1.8	4.61	4.30	4.30	4.30	4.30	4.30
110022	16.36	60.0	M	0.8	1.81	1.71	1.54	1.60	1.71	1.71
110023	17.49	60.0	M	1.1	4.13	3.75	3.70	3.75	3.75	3.75
110024	11.18	70.0	M	0.8	1.69	1.64	1.64	1.64	1.64	1.64
110025	8.98	45.0	M	7.9	1.97	1.85	1.85	1.85	1.85	1.85
110026	11.76	55.0	M	N/A	3.65	3.62	3.62	3.62	3.62	3.62
110028	11.36	55.0	M	N/A	2.65	2.61	2.61	2.61	2.64	2.64
110030	14.83	50.0	M	0.1	4.43	4.39	4.39	4.39	4.39	4.39
110031	16.65	44.0	M	N/A	1.42	1.38	1.38	1.38	1.38	1.38
110032	14.33	54.0	M	N/A	3.50	2.88	2.46	2.48	2.85	2.85
110033	10.29	55.0	M	0	4.03	3.56	3.10	3.10	3.56	3.56

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110034	11.04	60.0	M	0	5.44	4.88	4.58	4.58	4.99	4.99
110035	6.93	71.5	M	N/A	2.61	2.33	2.29	2.33	2.33	2.33
110036	12.12	44.0	M	0	1.62	1.57	1.57	1.57	1.60	1.60
110037	15.31	50.0	M	N/A	3.66	3.56	3.53	3.56	3.56	3.56
110038	17.41	60.5	M	N/A	4.40	4.25	4.23	4.25	4.25	4.25
110039	6.83	72.0	M	0.2	2.23	2.22	2.19	2.22	2.22	2.22
110040	17.60	77.0	H	0.9	2.55	2.53	2.49	2.53	2.53	2.53
110041	4.29	66.0	M	4.7	4.57	3.83	2.93	3.83	3.91	3.91
110042	13.12	72.0	M	0.9	4.84	4.24	2.92	3.74	4.25	4.25
110043	15.03	49.5	M	0.2	2.94	2.40	2.30	2.36	2.40	2.40
110044	8.08	84.0	H	4	2.85	2.81	2.44	2.81	2.81	2.81
110045	19.35	54.0	M	N/A	1.55	1.51	1.51	1.51	1.51	1.51
110046	19.72	39.0	M	0.1	1.12	1.04	0.93	0.93	1.04	1.00
110047	13.91	52.0	M	0.1	1.21	1.05	1.05	1.05	1.05	1.05
110048	11.36	60.5	M	N/A	2.79	2.38	2.16	2.36	2.38	2.38
110050	13.79	78.0	H	0.2	3.89	3.66	3.56	3.66	3.66	3.66
110051	16.55	72.0	M	0.5	4.99	4.68	4.60	4.68	4.79	4.79
110052	9.94	42.0	M	N/A	3.50	3.26	2.90	3.26	3.26	3.26
110053	12.42	60.0	M	N/A	4.30	3.77	3.31	3.31	3.90	3.90
110054	8.05	54.0	M	N/A	5.49	4.63	3.58	3.58	4.63	4.63
110055	7.19	55.0	M	N/A	4.22	4.01	3.59	3.84	4.01	4.01
110056	15.84	55.0	M	N/A	2.04	1.92	1.72	1.78	1.92	1.92
110064	20.09	55.0	M	N/A	3.62	3.14	2.29	3.14	3.14	3.14
110066	18.64	58.5	M	N/A	2.25	2.04	1.88	2.03	2.06	2.06
110067	14.16	72.0	M	N/A	6.53	5.24	3.81	5.19	5.39	5.39

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110068	14.35	72.0	M	0.1	3.87	3.75	3.66	3.72	3.74	3.74
110069	1.86	50.0	M	N/A	4.56	3.14	3.14	3.14	3.14	3.14
110070	21.36	36.0	L	N/A	1.91	1.77	1.77	1.77	1.77	1.77
110071	17.83	85.0	H	N/A	3.20	2.93	2.88	2.92	2.94	2.94
110072	10.44	60.0	M	N/A	3.87	3.65	3.65	3.65	3.65	3.65
110073	20.34	85.0	H	N/A	3.48	3.19	2.79	3.19	3.19	3.19
110074	13.55	77.0	H	N/A	3.53	3.06	2.90	3.06	3.06	3.06
110075	9.08	80.0	H	N/A	2.75	2.75	2.61	2.75	2.75	2.75
110076	18.31	66.0	M	N/A	3.54	3.36	3.10	3.33	3.36	3.33
110077	12.32	44.0	M	0.2	1.90	1.81	1.77	1.81	1.81	1.81
110078	9.42	66.0	M	N/A	2.82	2.14	2.01	2.14	1.60	1.60
110079	10.90	65.0	M	N/A	1.38	1.29	1.25	1.29	1.29	1.29
110080	12.46	82.5	H	N/A	1.16	1.07	0.98	1.07	1.07	1.07
110081	17.06	66.0	M	N/A	1.77	1.54	1.54	1.54	1.54	1.54
110082	16.37	49.5	M	N/A	2.41	2.20	2.20	2.20	2.20	2.20
110083	13.14	49.5	M	N/A	1.85	1.64	1.58	1.64	1.64	1.64
110084	6.58	75.0	H	N/A	1.62	1.47	1.47	1.47	1.48	1.48
110085	18.27	75.0	H	0	2.65	2.36	2.32	2.36	2.41	2.41
110086	14.77	82.5	H	0.4	2.53	2.19	2.12	2.19	2.26	2.26
110087	16.83	77.0	H	1.5	1.92	1.80	1.80	1.80	1.80	1.80
110088	13.37	84.0	H	0.2	2.26	1.63	1.63	1.63	1.63	1.63
110089	16.52	55.0	M	0.1	3.19	2.82	2.70	2.82	2.82	2.82
110090	7.29	60.0	M	0	1.97	1.91	1.68	1.91	1.91	1.91
110091	10.21	60.0	M	N/A	1.29	1.03	1.03	1.03	1.03	1.03
110092	9.78	49.5	M	N/A	1.80	1.33	1.25	1.33	1.33	1.33

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110093	14.22	54.0	M	N/A	0.41	0.41	0.30	0.30	0.41	0.41
110094	12.74	54.0	M	N/A	1.16	1.03	0.69	1.02	1.02	1.02
110095	18.26	65.0	M	0.2	2.42	1.94	1.86	1.94	2.04	2.04
110096	10.08	45.0	M	N/A	1.62	1.36	1.26	1.36	1.36	1.36
110097	16.79	45.0	M	N/A	0.21	0.16	0.16	0.16	0.16	0.16
110098	10.67	63.0	M	N/A	1.41	0.75	0.68	0.68	0.75	0.75
110099	17.46	58.5	M	1.2	2.71	2.39	2.35	2.36	2.47	2.47
110100	12.21	31.5	L	N/A	1.04	0.93	0.93	0.93	0.93	0.93
110101	18.28	70.0	M	N/A	1.43	1.06	1.06	1.06	1.08	1.08
110102	7.67	60.0	M	N/A	1.20	1.00	1.00	1.00	1.00	1.00
110103	6.31	90.0	VH	2.4	2.43	1.80	1.80	1.80	1.80	1.80
110104	31.01	96.0	VH	0.2	2.42	2.33	2.33	2.33	2.35	2.35
110105	13.63	55.0	M	N/A	3.05	2.83	2.56	2.83	2.83	2.83
110106	15.82	82.5	H	N/A	2.64	2.38	2.36	2.38	2.38	2.38
110107	25.80	82.5	H	0	2.28	2.19	2.19	2.19	2.19	2.19
110108	13.67	80.0	H	N/A	2.02	1.54	1.43	1.54	1.54	1.54
110109	10.91	75.0	H	N/A	3.24	3.00	2.63	2.63	3.00	2.84
110110	9.38	80.0	H	N/A	3.30	3.18	3.17	3.18	3.18	3.18
110111	17.80	72.0	M	N/A	3.14	2.61	2.41	2.61	2.67	2.67
110112	13.26	80.0	H	N/A	2.89	2.31	1.86	2.31	2.31	2.31
110113	8.99	45.0	M	N/A	4.28	3.55	2.85	3.55	3.55	3.55
110114	6.00	77.0	H	N/A	5.84	4.49	3.96	4.47	4.49	4.47
110115	15.13	58.5	M	N/A	2.70	2.41	2.15	2.36	2.41	2.37
110117	18.57	58.5	M	N/A	1.10	1.02	1.01	1.02	1.02	1.02
110118	8.18	42.0	M	N/A	1.05	1.03	1.03	1.03	1.03	1.03

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110119	11.72	58.5	M	N/A	0.58	0.54	0.54	0.54	0.54	0.54
110121	14.29	31.5	L	N/A	0.33	0.23	0.23	0.23	0.23	0.23
110122	3.38	49.5	M	N/A	2.09	2.05	2.05	2.05	2.05	2.05
110123	6.56	72.0	M	N/A	3.79	2.78	2.61	2.78	2.78	2.78
110124	6.29	60.0	M	N/A	4.77	3.33	2.68	3.33	3.33	3.33
110125	15.66	45.0	M	N/A	3.10	2.43	1.82	2.43	2.43	2.43
110126	7.37	60.0	M	N/A	3.11	2.99	2.72	3.06	3.06	3.06
110127	10.26	56.0	M	N/A	1.60	1.60	1.51	1.58	1.60	1.60
110128	21.29	60.0	M	N/A	1.99	1.80	1.66	1.74	1.80	1.76
110129	20.34	55.0	M	N/A	2.58	2.24	2.10	2.25	2.25	2.25
110130	14.32	66.0	M	N/A	3.20	2.81	2.77	2.81	2.81	2.81
110131	12.91	99.0	VH	N/A	3.78	3.62	3.62	3.62	3.66	3.66
110132	17.61	82.5	H	0.7	3.16	2.85	2.63	2.82	2.84	2.84
110133	9.78	67.5	M	-0.8	2.50	1.90	1.90	1.90	1.94	1.94
110134	16.60	71.5	M	0.8	1.22	1.01	1.01	1.01	1.01	1.01
110135	6.85	82.5	H	N/A	1.76	1.28	1.28	1.28	1.28	1.28
110136	31.18	66.0	M	N/A	1.57	1.34	1.31	1.31	1.34	1.31
110137	11.94	75.0	H	N/A	1.59	1.40	1.40	1.40	1.47	1.47
110138	8.36	63.0	M	N/A	1.48	1.39	1.39	1.39	1.39	1.39
110139	9.10	54.0	M	N/A	1.37	1.21	1.21	1.21	1.21	1.21
110140	22.58	45.0	M	0.4	1.22	0.86	0.67	0.67	0.80	0.80
110141	36.74	75.0	H	0.8	1.91	1.38	1.35	1.37	1.40	1.40
110142	13.98	70.0	M	N/A	1.10	0.83	0.83	0.83	0.86	0.86
110143	9.24	49.5	M	0.4	2.14	1.86	1.47	1.73	1.86	1.86
110144	16.86	77.0	H	N/A	2.21	1.62	1.10	1.10	1.62	1.10

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110145	12.63	55.0	M	0.3	1.93	1.47	1.09	1.43	1.51	1.51
110146	13.73	42.0	M	N/A	1.82	1.61	1.29	1.32	1.69	1.41
110147	7.62	44.0	M	N/A	1.07	0.82	0.82	0.82	0.82	0.82
110148	15.84	40.0	M	N/A	2.45	1.78	1.71	1.78	1.78	1.78
110149	18.31	36.0	L	0.2	2.66	2.17	1.94	2.16	2.17	2.17
110150	15.20	54.0	M	N/A	1.44	1.30	1.28	1.30	1.30	1.30
110151	18.05	49.5	M	N/A	1.44	1.36	1.27	1.35	1.35	1.35
110152	9.49	49.5	M	N/A	2.30	1.85	1.81	1.85	1.85	1.85
110153	15.60	45.0	M	0.7	2.58	2.08	2.08	2.08	2.08	2.08
110154	24.42	49.5	M	1.8	3.27	2.86	2.50	2.86	2.89	2.89
110155	18.57	50.0	M	3.2	2.93	2.35	2.03	2.35	2.35	2.35
110156	11.76	45.0	M	N/A	2.17	1.90	1.89	1.90	1.90	1.90
110157	14.25	50.0	M	N/A	1.64	1.48	1.48	1.48	1.48	1.48
110158	20.20	65.0	M	1.2	3.88	3.35	3.16	3.35	3.35	3.35
110159	6.93	77.0	H	0.7	4.29	3.40	2.68	3.40	3.40	3.40
110160	33.11	58.5	M	0.1	2.42	2.01	1.90	2.01	2.01	2.01
110161	32.90	45.0	M	N/A	2.14	1.85	1.65	1.79	1.85	1.79
110162	5.01	45.0	M	N/A	1.80	1.74	1.45	1.50	1.74	1.74
110163	8.01	45.0	M	N/A	1.25	1.16	1.16	1.16	1.16	1.16
110164	9.39	84.0	H	N/A	1.10	0.87	0.67	0.81	0.87	0.81
110165	13.24	54.0	M	N/A	2.01	1.89	1.69	1.69	1.78	1.69
110166	10.56	66.0	M	N/A	2.58	2.22	2.00	2.22	2.24	2.24
110167	12.48	45.0	M	N/A	2.06	1.84	1.58	1.84	1.84	1.84
110168	20.57	70.0	M	N/A	2.62	2.51	2.48	2.51	2.51	2.51
110169	15.06	58.5	M	N/A	2.43	2.21	2.10	2.20	2.21	2.20

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110170	21.27	90.0	VH	N/A	2.91	2.79	2.71	2.77	2.79	2.79
110171	12.25	71.5	M	N/A	1.74	1.62	1.55	1.62	1.62	1.62
110172	14.85	65.0	M	N/A	2.84	2.72	2.55	2.72	2.72	2.72
110173	6.48	60.5	M	N/A	2.82	2.71	2.70	2.71	2.71	2.71
110174	6.40	55.0	M	N/A	1.74	1.64	1.64	1.64	1.64	1.64
110175	9.99	39.0	M	N/A	1.18	0.92	0.50	0.50	1.03	0.91
110176	9.52	66.0	M	0	2.86	2.13	1.90	2.12	2.13	2.13
110177	7.35	88.0	VH	0.3	3.94	2.80	1.90	2.52	2.81	2.81
110178	14.67	54.0	M	0.3	2.68	1.91	1.69	1.74	1.91	1.89
110179	7.29	93.5	VH	N/A	2.18	1.86	1.86	1.86	1.86	1.86
110180	5.81	70.0	M	N/A	3.71	3.38	3.33	3.38	3.38	3.38
110181	8.90	77.0	H	3.2	3.32	3.00	2.83	3.00	3.00	3.00
110182	15.37	85.0	H	N/A	2.32	1.92	1.92	1.92	1.94	1.94
110183	10.60	77.0	H	N/A	1.67	1.40	1.17	1.40	1.40	1.40
110184	9.89	36.0	L	N/A	0.45	0.23	0.23	0.23	0.23	0.23
110185	10.21	45.0	M	N/A	0.17	0.16	0.04	0.04	0.16	0.15
110186	10.12	82.5	H	N/A	2.04	1.70	1.53	1.55	1.74	1.63
110187	14.13	63.0	M	0.2	1.05	0.78	0.74	0.74	0.78	0.78
110188	24.17	85.0	H	0.2	2.66	2.17	2.07	2.17	2.17	2.17
110189	12.27	45.0	M	0.1	0.56	0.46	0.39	0.46	0.49	0.49
110190	17.60	90.0	VH	0.3	2.30	2.07	1.93	2.07	2.12	2.12
110191	18.58	93.5	VH	0.3	3.80	3.09	2.83	3.07	3.12	3.12
110192	9.88	71.5	M	3.5	4.08	1.81	1.75	1.81	1.90	1.90
110193	11.64	78.0	H	4.2	3.28	2.56	2.34	2.56	2.57	2.57
110194	16.98	90.0	VH	N/A	2.67	2.23	2.02	2.23	2.27	2.27

HFQLG FRA Watershed Identification Number	HFQLG FRA Watershed Area, square mile	1999 Watershed Sensitivity Condition Rating (a)	1999 Risk of Cumulative Effects (a)	Percent Change in ERA, 1999-2007 (b)	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 1	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 2	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 3	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 4	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 5	Density of Roads and Routes open to motorized traffic (mi per sq mi), Alt. 6
110196	15.61	45.0	M	N/A	1.39	0.95	0.95	0.95	0.96	0.96
110197	12.79	77.0	H	0.5	1.53	1.37	1.37	1.37	1.37	1.37
110198	6.22	44.0	M	N/A	1.83	1.74	1.65	1.74	1.74	1.74
110199	3.89	55.0	M	N/A	2.36	2.28	2.28	2.28	2.28	2.28
110200	12.60	55.0	M	N/A	1.59	1.15	0.53	0.57	1.17	0.73
110201	8.67	55.0	M	N/A	1.93	1.88	1.77	1.88	1.88	1.88
110202	7.81	52.0	M	N/A	1.89	1.85	1.85	1.85	1.85	1.85
70041	15.13	88.0	VH	N/A	0.13	0.13	0.13	0.13	0.13	0.13

Appendix F

Feather River Ranger District Route Analysis

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
4M01	**1.55**	**1.55**	**1.55**	Extreme	Low to Extreme	Loam and Sandy Loam	16	44	40	0	High	W, D, or O, X, S - May 1 to Dec 1	Trail is on a steep slope, entrenched, rutting greater than 2" in many sections and in some sections rutting is so deep another trail was formed. There are 2 ephemeral crossings and 1 perennial crossing with sediment to channel, slopes that range from high to extreme and some rutting. Trail needs waterbars, dips, or minor relocations, and perennial crossing needs a structure (user made bridge has washed down creek).
4M02	**0.76**	**0**	**0**								Extreme		Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. This trail was rated extreme due to major relocations needed that would be outside the scoop of this project on hill climbs in and out 4 stream crossings with sediment to channel. Trail also ends on private land.
5M01	**2.16**	**0**	**2.16**	Very High	Low to Extreme	Sandy Clay Loam, Sandy Clay, Silty Clay Loam, Silty Clay, and Clay Loam	23	43	34	3	Medium	W, D, O, X, S - May 1 to Dec 1	Improved drainage is needed on sections with rutting greater than 2". There are 5 intermittent stream crossings, 6 ephemeral team crossing, and a meadow. Some work is needed on the crossings to prevent the potential of sediment reaching the stream. Season of use is needed to prevent increased rutting on wet soils.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M02	**2.74**	**0**	**2.54**	High	Low to Extreme	Loam, Clay Loam, Silty Loam, and Silty Clay Loam	46	54	0	0	Medium	W, D, O, X, S - May 1 to Dec 1	Trail is entrenched, has rutting greater than 2" and drainage of trail needs improvement. There are 2 ephemeral crossings that need improvement to prevent the potential of sediment reaching the channel. Most of trail is in good shape. The trail is in wrong location from the original inventory. 5M03 was surveyed with 5M02. A portion of 5M02 does not exist and 5M03 is actual trail used.
5M04	**1.92**	**0**	**1.92**	High	Low to Extreme	Clay Loam	53	47	0	0	Medium	W, D, O, S - May 1 to Dec 1	There are no stream crossing on this trail. Trail is entrenched and has some rutting occurring, therefore the trail needs drainage improvements. Season of use is needed to prevent increased rutting of wet soils.
5M05	**0.88**	**0**	**0.88**	High	Low to Extreme	Clay Loam	68	32	0	0	Medium	W	This is an old temp road, for the most part in good condition. Waterbars are failing, which is causing rutting of road, however sediment is not reaching a stream channel. Mitigations needed are repair existing waterbars and add additional waterbars to reduce rutting of road surface.
5M06	**0.47**	**0**	**0**	Low	Low to Very High	Sandy Loam	48	4	48	0	Extreme		This is the trail has erosional issues that effect red-legged frog habitat.
5M07	**0.29**	**0**	**0.29**	High	Low to Extreme	Silty Loam and Loam	16	75	9	0	High	W, D, O, X, S - May 1 to Dec 1	The perennial stream crossing (Chino Creek) is causing sediment to channel and is effecting stream morphology (width increased, increased fines in stream substrate, and undercutting banks). In additional the trail parallels the creek on both sides of the stream banks. The stream crossing approach needs to be fixed. The trail also has rutting greater than 2" and drainage improvements such as waterbars or dips to reduce rutting and sediment to channel.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M08	**0.45**	**0**	**0.45**	Very High	Low to Extreme	Loamy Sand and Sandy Clay	0	96	4	0	High	W, D, O, S - May 1 to Dec 1	Trail has entrenchment greater than 1' however sections of entrenchment. Switchbacks can be constructed within the old temp road that the trail is within. Perennial crossing does not have sediment reaching channel because blackberries and riparian vegetation cover trail surface.
5M08A	**0.12**	**0**	**0**										This trail is an old temp road where vegetation has grown back in fully.
5M09	**0.65**	**0**	**0.65**	High	Low to Extreme	Sandy Loam and Silty Clay Loam	4	96	0	0	Medium	W, S - May to Dec 1	This is an old temp road that needs maintenance, because the waterbars are failing. There are no stream crossings. Season of use is needed to prevent increase rutting of wet soils.
5M10	**0.28**	**0**	**0.28**	High	Low to Very High	Loam, Silty Clay Loam, and Silty Loam	24	36	40	3	Medium	W, D, O, X	Trail is entrenched and has 3 ephemeral stream crossing where trail is in the stream channels for a total of ~1000 ft. Trail needs waterbars, dips, switchbacks, and/or minor relocations.
5M11	**0.65**	**0**	**0.65**	Medium	Low to Extreme	Silt Loam	48	46	6	1	Medium	W, D, O, X, S - May 1 to Dec 1	Trail looks good for most part needs rolling dips and switchbacks. There is a 100% blocked culvert that needs to be removed on the perennial springs. Road 23N00C is now a single track trail only and needs work. It cross the West Branch Middle Fork. The road has diverted the stream channel, old pipe on Forest Service road is 100% blocked and major scouring has occurred on the outlet.
5M12	**1.69**	**1.69**	**1.69**	Very High	Medium to Extreme	Silt Loam and a Silty Clay Loam	30	62	7	1	Medium	W, D, O, X, S - May 1 to Dec 1	This is an old road bed that needs drainage improvements. The trail does cross 4 ephemeral stream channels that need improvement on the approaches to prevent sediment to channel. Season of use is needed to prevent increased rutting of wet soils.
5M13	**1.11**	**0**	**1.11**	High	Low to Extreme	Silty Clay Loam	10	48	42	3	Medium	W, D, O, X	Trail is entrenched, there is rutting greater than 2", and a portion of the trail parallels an intermittent stream where sediment is reaching the channel. Trail needs improved drainage and a season of use is needed to prevent increased rutting of wet soils.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M14	**0.55**	**0**	**0**	Very High	Low to Extreme	Silty Loam and Silty Clay Loam	30	70	0	0	Extreme		Trail did not exist on the ground originally. A Fireline was placed in this location and has been fully rehabbed. The ground is very steep and difficult to put a trail here.
5M15	**1.05**	**0**	**0**	High	Low to Extreme	Loam, Silt Loam and Sandy Loam	0	100	0	0	Extreme		Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. However, surveyed portion has very steep long entrenched sections and there are 2 ephemeral stream crossings. The Forest Service Road connection to trail is planned for decommissioning under the original proposed action for the Flea project. Mitigations for this trail includes major relocation outside the scope of this project.
5M16	**0.84**	**0.84**	**0.84**	Medium	Low to High	Silt Loam and Clay Loam	92	2	7	0	Medium	W, D, O, S - May 1 to Dec 1	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks and a season of use to prevent increased rutting on wet soils.
5M17	**0.90**	**0**	**0.90**	High	Low to Extreme	Clay Loam	54	46	0		Medium	W, D, O, X, S - May to Dec 1	Trail is entrenched, steep slopes, and has rutting greater than 2" deep. There is one ephemeral stream crossing with sediment to channel. Mitigations included repair existing waterbars, and additional waterbars, dips, and/or switchbacks, and a minor relocation is needed on the stream crossing. Season of use is needed to prevent increased rutting on wet soils. Original inventory has the trail is drawn wrong on the map.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M18	**1.00**	**0**	**0**								Extreme		Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. This trail connects to FS road 23N01 which has been determined to be an egregious rd with agreement by the ranger and two Forest Supervisors. The Forest Service road is planned for decommissioning under the proposed action for the Flea Project. Without this road this trail has no connector on the network until a re-route can be proposed.
5M19	**0.60**	**0**	**0.60**	High	Low to Very High	Sandy Loam and Loamy Sand	11	42	48	0	High	W, D, O, S - May 1 to Dec 1	This trail is located on top of a ridge and has no stream crossings or sediment reaching channel. The failed segments are due to rutting greater than 2" on steep slopes and numerous failed waterbars (8 out of 15). Due to the failed waterbars on steep slopes the trail is eroding and has the potential to deeply rut and cause the trail to no longer be substantial. When this happens new trails are formed and increased soil loss occurs. Waterbars need to be repaired, additional waterbars are dips are needed, and in some cases construct switchbacks and have minor relocations.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M20	**0.85**	**0**	**0.85**	High	Low to Extreme	Sandy Loam	28	33	38	3	High	W, D, or O, X, S - May 1 to Dec 1	This trail is entrenched, has numerous sections where the rutting is greater than 2" deep, one segment has rutting for 300 ft that is knee deep. Rutting is so deep in some locations multiple trails have been created and is causing soil loss. There are 8 ephemeral and 3 intermittent crossing and all stream crossings have sediment to channel. Trail is located within the stream channels for a approximately 400 feet. One ephemeral channel has numerous trails crossing due to the deep entrenchment forming on the steep slopes.
5M21	**1.32**	**0**	**0**	Very High	Low to Extreme	Sandy Loam	30	6	63	0	Extreme		This trail is entrenched, has sections where the rutting is greater than 2" deep, has 11 ephemeral, 1 intermittent, and 1 perennial stream crossing. All stream crossings have sediment to channel with very high to extreme slopes and rutting greater than 2". This trail has several sections that need major relocation that is outside the scope of this project.
5M22	**1.60**	**0**	**0**								Extreme		Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. This trail has 3 major hill climbs requiring extensive relocations outside of the analysis area, need to move out of proximity of drainage.
5M23	**1.69**	**0**	**0**								Extreme		Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. This trail has 5 major hill climbs requiring extensive relocations outside of the analysis area and reinforced low water crossing.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M24	**1.17**	**0**	**1.17**	High	Low to Extreme	Loamy Sand, Sandy Loam, and Sand	31	62	7	0	High	W, D, O, X, S - May 1 to Dec 1	This trail has 2100 feet of extreme slopes with deep rutting. Due to the rutting multiple trail segments have been created on the areas of the extreme slopes which has caused soil loss and effects soil productivity. Also this trail parallels on top of a stream channel for 290 feet and there are 6 ephemeral and 1 perennial stream crossing with sediment to channel. Waterbars, dips, switchback, and/or minor relocations are needed as mitigations.
5M25	**0.76**	**0**	**0.76**	High	Low to Extreme	Loam and Sandy Loam	32	28	40	0	High	W, D, O, X, S - May 1 to Dec 1	This trail is entrenched and is rutting with some trail sections with ruts greater than 2" on steep slopes. There are 11 ephemeral and 1 intermittent stream crossing. Two of the ephemeral channels and the intermittent have sediment to stream and the other 9 ephemeral channels have sediment deposition in the stream habitat protection areas. Waterbars, dips, switchbacks, and/or minor relocations are need as mitigations.
5M25A	**0.34**	**0**	**0**										Ends on private land.
5M26	**0.49**	**0.49**	**0.49**	High	Low to Very High	Loamy Sand and Sandy Loam	87	13	0	0	Medium	W, D, S - May to Dec 1	There are failed waterbars, trail is entrenched and has some rutting. There is 1 ephemeral channel that has the potential for sediment to enter channel. Mitigations are to repair existing waterbars and new waterbars or dips to reduce the risk of sediment to stream.
5M27	**1.22**	**0**	**0**	High	Low to Extreme	Loamy Sand	59	14	27	0	Extreme		Trail is entrenched, steep, and has rutting greater than 2". There are 5 ephemeral and 1 perennial stream crossing all with sediment to channel. Mitigations for this trail would include major relocation that is outside the scope of this project. In addition to the soil/water concerns the trail leads to private land and continues through it. Relocation would be needed to keep trail off private land.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
5M28	**1.19**	**0.43**	**0.43**	High	Low to Extreme	Loamy Sand and Sandy Loam	16	44	41	0	Low/Extreme		West of end of trail has 2 ephemeral stream crossings with sediment to channel and some failed waterbars, so rutting is occurring on trail segments. This portion of trail is in good shape and needs maintenance on existing drainage structures. Drop Eastern portion - There are 3 ephemeral, 5 intermittent, and 1 perennial stream crossing all with sediment to channel. The trail has several steep portions with rutting greater than 2". This portion of the trail requires major relocations that is outside the scope of this project.
5M29	**2.34**	**2.34**	**2.34**								Low	S - May to Dec 1	Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. This is a road to access powerlines.
5M30	**1.42**	**0**	**0**								Extreme		Detailed survey was not completed due to the Butte Lightning Complex Fire. However, an abbreviated survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Trail has 2 stream crossings and would need 7 relocations outside of the analysis area.
5M32	**0**	**0**	**0**	Very High	Low to Extreme	Sandy Loam, Loam, Silty Clay Loam, Silt Loam, and Sandy Clay Loam	10	75	15	2	Extreme		From start of trail at 22N71 it begins in plantation on an old temp road that is now a single track trail only. From this point to first perennial stream crossing (~1/2 mile) entrenchment is 1' deep of majority of the 1/2 mile. 1' deep entrenchment continues on to other side of perennial stream crossing. Mitigations needed is major relocation outside the scope of this project.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M02	**0.87**	**0**	**0.87**	High	Low to Extreme	Loam, Silt Loam, and Clay Loam	10	90	0	0	High	W, D, O, X, S - May 1 to Dec 1	22N44 at first perennial crossings becomes a single track trail only due to erosional problems and needs work. 6M02 is part of a loop system and has entrenched sections 1' deep, switchbacks can be constructed within the old temp road, which the trail follows. There are no stream crossings on the trail, however sediment from this trail reaches channel to the perennial crossing on 22N44. Season of use is needed to prevent increased rutting of wet soils.
6M03	**1.15**	**0**	**1.15**	High	Low to Extreme	Silt Loam and Silty Clay Loam	21	72	7	1	High	R, O, X, S - May 1 to Dec 1	Trail is entrenched and has some sections with rutting greater than 2" on steep slopes. There are 2 perennial stream crossing with sediment is entering channel. Waterbars, dips, switchbacks, and/or minor relocations are needed. Season of use is needed to prevent increased rutting of wet soils.
6M03A	**0.08**	**0**	**0**	Medium	Medium	Silt Loam	100	0	0	0		S - May to Dec 1	This piece is actually mostly on Forest Service road 21N44. It is only 15 feet long.
6M04	**1.39**	**0**	**0**	Very High	Low to Extreme	Loamy Sand, Sandy Loam, Silt Loam, and Loam	49	42	8	2	Extreme		Starting 22N79Y. Approx. 100' trail follows creek. Trail is very entrenched 1' + for about 1/2 mile to first perennial stream crossing. In this section there are failed waterbars, multiple constructed trails. Trail is on an ephemeral and perennial crossing and there is sediment to channel. Mitigations would be major relocation outside the scope of this project. After the multiple perennial stream crossings the rest of trail is in good shape and would be a medium.
6M05	**0.41**	**0**	**0.41**	Medium	Low to Extreme	Sand, Sandy Loam, and Loam	3	97	0	0	Medium	D, O, S - May 1 to Dec 1	Trail needs drainage improvements because of the steep slopes, minor rutting, and the potential for increased entrenchment. South edge of trail needs have a minor relocation due to deep entrenchment greater than 1'. A season of use is needed to prevent rutting of wet soils. There are no stream crossings on this trail.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M06	**0.88**	**0**	**0**										This FS road 22N49, a major route below Brush Creek station that connects from French Creek Road and Oro Quincy Highway. It access private property.
6M08	**0.56**	**0**	**0.56**	Medium	Low to Extreme	Sandy Loam and Sandy	35	47	18	0	High	W, D, O, S - May 1 to Dec 1	Has entrenchment and major erosional problems that need repair. The trail is an old roadbed that is entrenched on both sides with the banks ranging for 5-10 ft in height. Constructing effective waterbars will be difficult. It does not cross a stream channel is close to tops of channels. Season of use is needed to prevent increased rutting on wet soils.
6M09	**0.37**	**0**	**0.37**	High	Low to Extreme	Loam and Sandy Loam	46	41	13	0	Medium	W, S - May to Dec 1	Trail looks good. It needs waterbar maintenance and additional waterbars to prevent rutting of trail on steep slopes. There are no stream crossings. Season of use is needed to prevent increased rutting on wet soils.
6M10	**3.60**	**0**	**1.70**	High	Low to Extreme	Sandy Loam, Loamy Sand, Loam, and Silty Clay Loam	19	39	42	0	Medium/ Extreme	W, D, O, X, S - May 1 to Dec 1	N. end Includes 22N11X (0.34 mi), road needs improved water bars, trail needs water bars. S end drop within drainage, crossing drainage many times, hard to follow surveys not completed on this portion
6M11	**0.98**	**0**	**0.98**	High	Low to Extreme	Sandy Loam, Sand, Loamy Sand, and Loam	21	24	56	0	High	W, D, O, S - May 1 to Dec 1	Approximately first 1000 ft of trail was impacted by a dozer line constructed during the Canyon Complex Fire. The trail has been blocked in several places by down logs and the waterbars on dozer line were not built properly. Rest of trail needs drainage improvements due to entrenchment and rutting greater than 2". There are no stream crossings. Failed segments are due to rutting and sags that cannot drain. Season of use is needed to prevent increased rutting of wet soils.
6M12	**0.43**	**0**	**0**	High	Low to Very High	Loamy Sand and Sandy Loam	100	0	0	0	Medium/ Extreme		Need mitigations for surface erosion due to rutting on trail. This trail needs is an extreme because it is part of the loop to 6M13. However, it would be a medium if 6M13 is relocated.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M13	**1.41**	**0**	**0**	Very High	Low to Extreme	Loam, Sandy Loam, and Loamy Sand	15	85	1	1	Extreme		On south end of trail is crosses a perennial stream (Rody Creek) with steep side slopes and sediment enters channel. Then the trail continues up extreme slopes (55%). The trail is entrenched and has rutting greater than 2". Mitigations would be major relocation outside the scope of this project.
6M14	**2.62**	**0**	**2.62**	High	Low to Extreme	Loam, Sandy Loam, and Loamy Sand	51	38	11	1	High	W, D, O, X, S - May 1 to Dec 1	The trail has failed waterbars, and rutting greater than 2". It crosses a perennial stream and the approach to stream from both sides are long segments with slopes ranging from high to very high and sediment to channel. Mitigations include constructing waterbars, dips, switchbacks, and or minor relocations. Season of use is needed to prevent increased rutting on wet soils.
6M14A	**0.17**	**0**	**0**										Trail does not exist on the ground
6M15	**0.40**	**0**	**0.40**	Medium	Low to Very High	Loam	23	77	0	0	Medium	W, D, O, S - May 1 to Dec 1	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks. Season of use is needed to prevent increased rutting on wet soils.
6M16	**2.26**	**0**	**2.26**	High	Low to Extreme	Sandy Loam, Loam, and Loamy Sand	25	62	13	4	High	W, D, O, X, S - May 1 to Dec 1	Trail is entrenched and has rutting greater than 2" on the steeper slopes. Also has an a perennial stream crossing and a intermittent stream crossing that needs to be fixed. Sediment reaches channel. Total there are 7 ephemeral crossings, 3 intermittent crossings, and 5 perennial crossings. Mitigations include constructing waterbars, dips, switchbacks, and or minor relocations. Season of use is needed to prevent increased rutting on wet soils.
6M16A	**0.29**	**0**	**0.29**	High	Low to Extreme	Loamy Sand, Loam, and Sandy Loam	46	37	17	1	High	W, D, O, X, S - May 1 to Dec 1	There are entrenched section with rutting greater than 2" and has an intermittent stream crossing with sediment to channel. Mitigations include waterbars, dips, switchbacks, and/or minor relocations and a season of use to prevent rutting of wet soils.
6M16B	**0.11**	**0**	**0.11**								High		Have not found location of this trail.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M19	**3.02**	**3.02**	**3.02**	Medium	Low to Extreme	Clay Loam, Loam, and Silty Clay Loam	41	47	12	0	Medium	W, D, O, X	There are entrenched section with rutting greater than 2". The trail crossed 2 perennial streams, 3 intermittent and 4 ephemeral channels, sediment reaches channel. This trail is mostly on the ridge top and is in good shape. Mitigations include waterbars, dips, switchbacks, and/or minor relocations.
6M20	**1.72**	**1.27**	**1.27**	High	Low to Extreme	Loamy Sand, Silty Clay Loam, Silty Loam, and Sandy Loam	46	18	36	0	Medium/ Extreme	W, D, O	There are several sections on the trail that have deep entrenchment and soil loss has occurred. There are also multiple trails formed in areas where entrenchment has gotten deep enough to prevent the bike from being able to use these sections. The stream crosses a perennial stream (The Little North Fork) with extreme slope and deep rutting accruing, causing sediment to channel. Mitigations needed would be numerous sections of trail need relocation, including the stream crossing. Only keep the portion to 23N18S because it is in good shape with some minor repairs needed. Drop rest of the trail due to hydrology concerns on the slope into the Little North Fork.
6M20A	**0**	**0**	**0**										Leads to private land.
6M21	**0.77**	**0**	**0**	High	Low to Very High	Sandy Loam and Silty Clay Loam	65	33	0	0			This Forest Service road 23N18S.
6M22	**2.83**	**0.93**	**2.98**	Medium	Low to Extreme	Sandy Loam, Loam, and Loamy Sand	22	29	49	4	High	W, D, O, X	Decomposing Grantic soil is eroding on the steep slopes and depositing sediment into 18 ephemeral, 1 intermittent and 3 perennial stream channels. Mitigations include waterbars, dips, switchbacks, and/or minor relocations.
6M22A	**0.65**	**0.65**	**0.65**	High	Low to Extreme	Sandy Loam	94	6	0	1	High	W, D, O, X	Decomposing grantic soil is eroding on the steep slopes and depositing sediment into 1 perennial stream channels. Mitigations include waterbars, dips, switchbacks, and/or minor relocations.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M23	**1.29**	**0**	**0.99**	Medium	Low to Extreme	Loamy Sand and Sand	69	23	8	2	High	W, D, O, X	The main issue on this trail is it crosses the same ephemeral channel 4 times at the top of the channel and has sediment entering channel. Another issue is the majority of this trail is on DG or granitic outcrops, and trail is eroding on the steep slopes. However, it is mostly on the ridge top. Mitigations include waterbars, dips, switchbacks, and or minor relocations.
6M23A	**0**	**0**	**0**	Medium	Low to Very High	Loamy Sand	100	0	0	0	Medium	W, D, O	6M23A is used as the main loop that connects to 6M23. The southwest portion of 6M23 is not used at all from the intersection 6M23 and 6M23A. There is erosion occurring on the trail so drainage features need to be added.
6M24	**0.23**	**0**	**0.23**	Medium	Low to High	Silty Clay Loam and Sandy Loam	80	20	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
6M25	**0.20**	**0**	**0**										This trail does is actually FS road 23N63.
6M26	**1.36**	**0**	**0**	Medium	Low to Extreme	Clay Loam, Silty clay Loam, Silty Loam, Sandy Clay Loam, and Loam	79	13	8	0	Medium	W, D, O, X	There is 1 perennial stream crossing and 2 ephemeral channel crossing with some rutting on the steep approaches, sediment enters channel. Waterbars, dips, and, switchbacks, and/or minor relocations are needed to prevent increased erosion and sediment reaching channel.
6M27	**0.83**	**0**	**0**	Medium	Low to Very High	Silt Loam, Loam, and Silty Clay Loam	60	22	18	1	Medium	W, D, O, X	There are 4 stream crossing and a meadow. The trail does cause an ephemeral channel to be diverted. Sediment from trail does enter streams. Mitigations include waterbars, dips, switchbacks, and/or minor relocations.
6M28	**0.09**	**0**	**0**	Medium	Low to High	Loam	100	0	0	0	Low		There are no stream crossings. This road has waterbars and they are properly functioning.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M29	**3.91**	**0**	**3.91**	High	Low to Extreme	Loam and Sandy Loam	51	35	14	0	High	W, D, O, X	Trail is entrenched and has rutting greater than 2" on steep sections. The trail crossed 4 perennial streams and 3 ephemeral channels, sediment reaches channel on all crossings. Mitigations needed include waterbars, dips, switchbacks, and/or minor relocations.
6M29A	**0.20**	**0**	**0.20**	Medium	Low to Very High	Loam	13	70	18	0	High	W, D, O	Trail is rated as high because it connects to the 6M29 loop. There are no stream crossings on this trail. However the end of the trail has sediment coming from it that reaches a stream. Erosion on a trail is occurring on steeper slopes and trail needs drainage improvements such as waterbars, dips, or switchbacks.
6M29B	**0.47**	**0**	**0.47**	High	Low to Very High	Loam	21	79	0	0	High	W, D, O	Trail is rated as high because it connects to the 6M29 loop. There are no stream crossings on this trail. However the end of the trail has sediment coming from it that reaches a stream. Erosion on a trail is occurring on steeper slopes and trail needs drainage improvements such as waterbars, dips, or switchbacks.
6M29C	**0.76**	**0**	**0.76**	Medium	Low to Extreme	Loam	59	27	14	0	High	W, D, O, X	The trail crossed 2 perennial streams and 1 intermittent stream, sediment reaches channel. Mitigations includes waterbars, dips, switchbacks, and/or minor relocations.
6M29D	**0**	**0**	**0.52**	Very High	Low to Extreme	Sandy Loam	60	37	3	0	High	W, D, O, X	The trail crosses a perennial stream and sediment reaches channel. Mitigations includes waterbars, dips, switchbacks, and/or minor relocations.
6M30	**0.50**	**0.33**	**0.50**	Medium	Low to Extreme	Silty Loam, Loamy Sand, and Sand	5	43	52	0	Medium/ High	W, D, O, X	The trail crosses 5 ephemeral stream crossings and sediment reaches channel. The trail does not cross Boulder Creek (a perennial stream), but sediment form the trail is reaching the stream. From 6M30A east is High and west is Medium. Mitigations includes waterbars, dips, switchbacks, and/or minor relocations.
6M30A	**0.30**	**0.30**	**0.30**								Medium		Survey data is incorporated with trail 6M30 or 6M31.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M31	**0.67**	**0.20**	**0.35**	Medium	Low to High	Sandy Loam and Loam	5	58	37	1	Medium/ High	W, D, O, X	Trail crosses a perennial stream and 4 ephemeral channels, some are diverted by trail, sediment enters channel. From 6M0A east High and west Medium. Mitigations includes waterbars, dips, switchbacks, and/or minor relocations.
6M32	**0.36**	**0**	**0**	Very High	Low to Extreme	Silty Loam, Sandy Loam, and Loam	65	13	22	0	Extreme	W, D, O, X	Water diversion features needed. The trail crosses 2 ephemeral stream crossings and sediment reaches channel. Approaches to stream needs to be fixed.
6M33	**0.65**	**0**	**0.65**	Very High	Low to Extreme	Silty Loam, Silty Clay Loam, and Loam	89	11	0	0	High	W	The trail has failed waterbars at almost every segment. There are no stream crossings. The south end of the trail is off. It does not end east of 23N95YB. The south end of the trail ends east of 23N95YB and 23N95YC.
6M34	**0.52**	**0.52**	**0.52**	Medium	Medium	Silty Clay Loam, Silty Loam	100	0	0	0	Low		The trail is a good temporary road with rolling dips that are still functioning. There are no stream crossings.
6M34A	**0.37**	**0**	**0.37**	Medium	Medium to High	Silty Clay Loam	83	17	0	0	High	W, D, O	This trail is an old skill trail that has some rutting occurring on the steeper slopes.. DG soil is eroding on trail surface and depositing on to a FS road and sediment enters a stream channel that the FS road crosses. However, there are no stream crossings on the trail. Mitigations include waterbars, dips, and/or switchbacks to decrease erosion of trail.
6M35	**0.47**	**0**	**0**	Low	Low to High	Silty Loam	50	50	0	0	Medium	W	Waterbars are not properly functioning and need to be repaired. There are no stream crossings
6M36	**0.86**	**0**	**0.86**	High	Low to Extreme	Loamy Sand and Loam	40	33	27		High	W, D, O, X	Trail is entrenched and has rutting greater than 2" on steep sections.. Trail crosses a perennial stream, 1 intermittent channel and 5 ephemeral channels, and sediment enters channel. Mitigations include constructing waterbars, dips, switchbacks, and/or minor relocations.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M47	**0.74**	**0**	**0.94**	Medium	Low to Very High	Loamy Sand, Loam, and Sandy Loam	62	29	9	0	Medium	W, D, O, X	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are 2 ephemeral channels with sediment entering channel. Mitigations include constructing waterbars, dips, switchbacks, and/or minor relocations.
6M48	**0**	**0**	**0.28**										Trail does not exist. Could just be the B spur.
6M49	**0**	**0**	**0**										Trail is FS Road 23N46X.
6M50	**0**	**0**	**0**	Medium	Low to High	Sandy Loam	25	75	0	0	Extreme		Old Road to Mining Claim. Trail cannot be day lighted and every segment of road has sediment entering into an ephemeral stream crossing and a perennial stream crossing.
6M51	**0**	**0.77**	**0.77**	High	Low to Extreme	Loam and Loamy Sand	31	64	5	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
6M52	**0**	**0**	**0**	Medium	Low to High	Silty Loam	23	77	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
7M01	**0.59**	**0**	**0**	High	Low to Extreme	Sand and Loamy Sand	18	11	73	1	Extreme		This trail is with in the drainage channel of the West Branch Middle Fork Feather River. It crosses the stream 6 times, has sediment to channel, entrenchment, and B and C rilling.
7M02	**1.12**	**0**	**0**	High	Low to Very High	Sand and Silty Clay Loam	67	28	5	0	Extreme		The trail is mostly the road, expect for the curve in-between 22N29K and 22N29. This piece of trail is now gone because it was rehabbed post fire suppression activities. There are no stream crossings, but lead off ditches have sediment reaching channel.
7M03	**0.36**	**0**	**0**	Medium	Low to Very High	Sand and Silty Clay Loam	62	27	11	0	Medium	R, X	This is an old skid trail with surface erosion occurring, rutting greater than 2" on steeper slopes, and crosses an ephemeral channel. Waterbars, dips, and/or switchback are needed to decrease trail erosion and prevent risk of sediment reaching channel.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
7M04	**0.85**	**0**	**0.85**	Medium	Low to High	Loam	36	51	13	0	High	X	This trail is a temp road accessing a landing and then becomes a connector for a steep skid trail that reconnects into 7M05 across the perennial stream channel. This old skid trail was not a part of the original inventory, however is being used by single tracks. The landing and old skid trail are on top of the banks of an intermittent channel just above the perennial stream. This intermittent channel is now a gully and is geographically changed due to the landings and skid trail. Mitigations proposed for this trail is to block access to creek to prevent traffic in and on stream channel.
7M05	**0**	**0**	**0**	Medium	Low to Extreme	Sandy Loam and Loam	63	10	27	0	Medium	W, D, X	Trail is in good condition for the most part. There are 3 perennial and intermittent stream crossings with some sediment to channel that needs work on the approach to the streams to prevent increased sedimentation. In addition some waterbars or dips need to be added.
7M07	**0.39**	**0**	**0.39**	Medium	Low to Very High	Silt Loam, Loam, and Sandy Loam	60	40	0	0	High	W, D, O, X	Trail has no constructed water diversion features and has an ephemeral stream crossing with sediment reaching the channel that was not included in the original survey. Trail does not actually stop at the original spot marked on the map where the trail & 23N95YA intersects. The trail continues to go downhill along the 23N95YA & it is approximately 50-100 west of rd. Trail ends 100 feet away from the intersection of 23N95YA & 6597. Where the trail 6598 ends is where it actually comes into 23N95YA.
7M08	**0.86**	**0**	**0**										Trail does not exist on the ground
7M09	**0.26**	**0**	**0**										Trail does not exist on the ground
7M10	**0.54**	**0**	**0**	Medium	Low to High	Clay Loam and Silty Clay Loam	72	28	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
7M11	**0.48**	**0**	**0.48**	Very High	Medium to Extreme	Loam	81	19	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
7M12	**0.94**	**0**	**0**										This trail was obliterated in 1997 and relocated. Trail on map on longer exist. It is was rerouted and now called Forest Service road 23N56Y.
7M27	**0**	**0**	**0**								Extreme		Trail parallels or is within a perennial stream channel.
7M28	**0**	**0.39**	**0.39**	High	Medium to Extreme	Silty Clay Loam and Sandy Clay Loam	94	6	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
8M01	**0.50**	**0**	**0**	Very High	Low to Extreme	Silty Clay Loam, Loam, and Sandy Loam	49	2	49	0	Extreme		Every low use, trail is barley visible. Major surface erosion problems and entrenchment. The trail also leads to private land. The trail has no stream crossing. The failed segments are due to rutting and waterbars failing.
9M01	**0.91**	**0.91**	**0.91**	Medium	Low to Extreme	Clay Loam, Silt Loam, and Clay Loam	48	51	1	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
9M02	**0.39**	**0.39**	**0.39**	High	Medium to Extreme	Silty Clay Loam and Silty Clay	35	33	32	1	Medium	W, D, O, X	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There is 32% failure on this trail because sediment reaches an ephemeral channel due to entrenchment of the trail. Mitigations include constructing waterbars, dips, and/or switchbacks.
9M03	**0.56**	**0**	**0**	High	Low to Very High	Clay Loam and Silty Clay Loam	48	11	41	1	Extreme		This trail has multiple springs, ephemeral, intermittent, and perennial crossings. Major relocations would be needed on this trail that are outside the scope of this project. Waterbar construction is not possible on this trail because lead of ditches would directly deposit sediment into a stream.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
9M04	**0.18**	**0**	**0**	Medium	Low to High	Loamy Sand	43	34	22	0	High	R, W, O, X	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There is an intermittent stream crossing with sediment to channel. Mitigations include constructing waterbars, dips, switchbacks, and/or minor relocations.
9M05	**1.66**	**1.57**	**1.57**	Low	Low to Very High	Loam and Silty Clay Loam	33	2	65	4	Medium	W, D, O, X	Some long segments that could use waterbars. Delete the first 500 feet or so that was surveyed (the spur north of the intersection with 9M06) - this spur goes to stream and un-proposed play area. Cross drain outlets could use armor at streamside segments.
9M06	**0.14**	**0**	**0**	Low	Low		0	0	100	2	Medium/ Extreme	W, D, O, X	Much of the southern portion appears to be on private land (cabins). (Incidentally, this section is severely entrenched for a long way and drains directly to stream). West half drop, East half make part of 9M05.
9M07	**0.08**	**0**	**0**	Low	Low to Medium		100	0	0	0	Low		There are no stream crossings.
9M08	**2.11**	**2.11**	**2.11**	Low	Low to Very High		43	57	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
9M08A	**0.13**	**0.13**	**0.13**	Low	Low		100	0	0	0	Low		There are no stream crossings.
9M09	**0.84**	**0.84**	**0.84**	Medium	Low to Extreme	Loamy Sand	40	36	23	0	Medium	W, D, O, X	A suitable trail with the exception of a stream crossing/spring area where it crosses the stream path perpendicularly and water bars for the last 1000' feet. The area in which there is a stream crossing should be addressed using a culvert installation and water bars on both sides of the stream crossing.
9M10	**1.65**	**1.65**	**1.65**	Medium	Low to Extreme	Loamy Sand and Loam	29	44	27	0	Medium	W, D, O	Entrenchment occurs 6" in some places, but gives no proof that sediment enters stream channels. Sediment is stopped by vegetation. Waterbars and rolling dips should be installed every 100'. There are no stream crossings. Failed segments are due to rilling and blocked sags.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
9M11	**0.65**	**0.65**	**0.65**	High	Low to Extreme	Loam and Sandy Loam	1	68	31	0	Low		"C" rilling on first survey is actually shallow ruts, many less than 2" deep, caused by single-track vehicles and not by surface drainage. Any ruts > 2" deep drain readily due to short route segments. "C" + "X" (plugged sags) ratings on first survey cause many "Fail" segments but the rilling should not be "C" and, while some sags may be plugged (entrenched), those sags do not discharge sediment. There are no stream crossings.
9M12	**0.38**	**0**	**0.38**	Medium	Low to Very High	Loam	30	48	22	1	Medium	W, D, O, X	Plugged stream / spring crossing needs work. Add a few waterbars.
9M13	**0.48**	**0**	**0.48**	High	Low to High	Silty Clay Loam and Sandy Clay Loam	7	26	68	0	High	W, D, O	The last segment is approx. 1400 feet long, much of it has H or VH gradient (although it is labeled as moderate gradient) and sediment is delivered directly to channel. The sediment does not look too substantial on Aug 7, likely because traffic has erased the evidence. The "L" ratings for sediment to channel from fill slope are artificially raising the segments to "Fail" ratings. There are 2 crossings with sediment reaching trail.
9M14	**1.50**	**0**	**0.94**										Trail does not exist on the ground. It is a system road.
9M14A	**0.58**	**0**	**0**	Medium	Low to High	Sandy Clay Loam, Silty Clay Loam, and Silty Loam	59	14	27	1	High	W, D, O, X	Has an undersized pipe on an intermittent stream crossing. The pipe is blocked and water is flowing over road and piping around pipe on the outlet.
9M15	**0.81**	**0.81**	**0.81**	Medium	Low to Very High	Sandy Loam, Silty Clay Loam, and Clay Loam	64	19	17	0	Medium	W, D, O, X	Visited only to the culvert at segments 9-11. Could use a few waterbars on longer segments. "L" ratings artificially cause the "Fail" segments.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
9M16	**1.22**	**1.22**	**1.22**	Medium	Low to Very High	Clay Loam, Loam, Loamy Sand	34	6	60	0	Medium	W, D, O, X	Again, "L" segments artificially raise the impacts to "Fail" rating. Most of those segments should pass. Needs a few waterbars on longer segments. Stream Xings at segments 11 and 16 should have "BB" for diversion potential. In prioritizing Category 2A routes, mitigations for this route should be a lower priority.
9M16A	**0.57**	**0**	**0**	Medium	Low to Very High	Sandy Loam and Sandy Clay Loam	20	14	65	0	Extreme		Major stream crossing issues on perennial streams, issues most likely from legacy mining. There are 4 failed culverts and mass wasting occurring in the stream channel. Mitigations would include major rerouting outside the scope of this project.
9M17	**1.38**	**0**	**0**	Medium	Low to Extreme	Silty Loam, Loamy Sand, Clay Loam, and Sand	68	32	0	2	Extreme		There are multiple stream crossings with sediment to channel and sediment impacts to a multiple meadows. Mitigations would include major rerouting outside the scope of this project.
9M18	**0.05**	**0**	**0**	High	Low to High		14	0	86	0	Extreme		Trail ends in an ephemeral stream, direct sediment to channel. Mitigations would include major rerouting outside the scope of this project.
9M19	**0.67**	**0**	**0**	Low	Low to Medium	Loam and Sandy Loam	15	19	66	2	Extreme		Sediment from trail enters the various ephemeral to intermittent streams, is on top of an ephemeral channel streambank, and is through 2 meadows. Mitigations would include major rerouting outside the scope of this project.
9M20	**1.39**	**0**	**0**	Medium	Low to High	Silty Clay and Silty Loam	17	0	83	7	Extreme		Major stream crossing issues. There are 9 stream crossing with undersized culverts. This has caused scouring at inlet and outlet and pipes are blocked or partially blocked so the streams have been diverted. This road would need to be entirely reconstructed to a level that is outside the scope of this project.
9M21	**1.63**	**1.63**	**1.63**	Low	Low to Very High	Silt Loam and Loam	87	3	10	1	Medium	W, D, O, X	Old temp road that needs some improvements on stream crossings and waterbars

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
9M22	**0.75**	**0.37**	**0.37**	High	Low to Very High	Silty Clay Loam, Silty Loam, and Loam	46	39	15	1	Medium	W, D, O, X	The majority of the trail is on the ridge top. However there are sections that are not the ridge that have entrenchment, rutting greater than 2", and no drainage features on steep slopes. There are 2 culvert stream crossings that are partially blocked which is why this trail has diversion potential. Mitigations needed are waterbars or dips and clean culverts.
9M23	**0.69**	**0.69**	**0.69**	Low	Low to High	Silty Loam	100	0	0	0	Low		Combining 9M23 with 9M22, and dropping west half of 9M22 trail for wildlife concerns. There are no stream crossings.
9M24	**0.85**	**0.85**	**0.85**	Medium	Low to Extreme	Loam and Silty Loam	20	80	0	0	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
9M25	**1.72**	**1.72**	**1.72**	Low	Low to Medium	Sandy Loam and Loam	0	25	75	2			This went through an old plantation and middle section is gone. Portion that is there has 4 crossing with sediment reaching channel.
9M25A	**0.14**	**0**	**0**										Trail does not exist on the ground
9M26	**0.90**	**0**	**0**										Trail does not exist on the ground
9M27	**0.24**	**0**	**0**	High	Medium to Very High	Loam	0	100	0	0	Extreme		Old temp road, has a lot of down trees in road, does not look like it has been used in a very long time. Trail has no stream crossings.
9M62	**0.48**	**0.48**	**0.48**	Medium	Low to High	Loam, Sand, and Silty Loam	69	31	0	1	Medium	W, D, O	Trail is entrenched and has rutting greater than 2" on the steeper slopes. There are no stream crossings. Mitigations include constructing waterbars, dips, and/or switchbacks.
9M63	**0**	**0**	**0**	Medium	Low to High	Clay Loam, Silty Clay Loam, and Sandy Clay Loam	2	20	78	1	Extreme		This trail leads to a play area, including jumps. The trail has failure on the majority of the segments due to sediment to channel problems.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
9M64	**0**	**0**	**0**	Medium	Low to Medium	Sandy Loam and Silty Clay Loam	0	18	82	0	Extreme		A highly erosive, un-proposed play area exists among the mine tailings piles at the end of this route. At least 2 routes access this area from County Road 890. The one that was not surveyed has excessive "C" rilling that, delivers sediment to channels and cannot be mitigated.
10M01	**0.45**	**0**	**0**										Trail does not exist. Could not flagging from users. This area is very steep and rocky.
10M02	**1.25**	**0**	**0**	High	Low to Extreme	Sandy Loam and Loam	29	42	29	0	High	W, D, O, X	South end of trail is an old narrow road bed, entrenched with rutting greater than 2" deep on several sections, very steep (30-38% slope), and sediment directly deposits into a perennial stream channel. Also there are 2 perennial springs on the road. There are several down logs on trail. Mitigations needed are waterbars, dips, or switchbacks, and minor relocations.
10M03	**0.97**	**0**	**0**	Medium	Medium to Extreme	Sandy Loam, Silty Loam, and Loam	0	66	34	0			Inventoried Roadless Area
10M04	**1.70**	**0**	**0**	Very High	Low to Extreme	Sandy Loam	88	12	0	0			Survey Crew could not find the trail past the meadow.
10M04A	**0.27**	**0**	**0**	Low	Low to High	Sandy Loam	28	72	0	0			Inventoried Roadless Area
10M07	**2.64**	**0**	**0**								Extreme		Trail is not existing on the ground, it would have to be constructed. Users just flagged the general area. Surveys did try to follow a trail for almost a mile. However there are landslides and 4 stream crossings that have sediment entering the channel.
10M09	**0.84**	**0**	**0**	High	Low to Extreme	Loam and Sandy Loam	100	0	0	0	Low		There are no stream crossings

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
10M11	**1.36**	**0**	**1.36**	High	Low to Very High	Silty Clay Loam, Loamy Sand, and Sand Loam	94	6	0	1	Medium	W, D, O, X	Trail is entrenched, has rutting greater than 2" in some sections, and sediment to channel. The trail needs improved drainage (waterbars or dips) to prevent increased erosion, an intermittent stream crossing needs to have a constructed crossing, currently just has one log across it, and a minor relocation is need on 1 perennial spring on cut bank has been diverted by trail and a channel is flowing down road for 30ft.
30 Acre Play Area	**x**	**x**	**x**	Extreme		Sand (Decomposing Granite Outcrop)					High	W, D, O, X	Need to fix approached into play area, and prevent riding in ephemeral stream channel that flows into the campground. As a note users are also obviously riding on adjacent private land. The play area does not provide a sediment source to the reservoir. All sediment drains into road ditch.

W = Waterbars
D = Dips
O = Switchbacks and/or minor relocations
X = Stream Crossing
S = Season of Use

Appendix G

Mt. Hough River Ranger District Route Analysis

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	E08 Ratings (percent of trail length)			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
6M37	**1.42**	**1.42**	**1.42**	Medium	Low to High	Loamy Sand	78	22	0	3	Moderate	D, X	Clean Corrugated Metal Pipe, add waterbars
6M38	**0.38**	**0**	**0**	Low	Low to High	Sandy Loam	77	23	0	0	Extreme		Near stream channel for last 800 feet. Rilling indicates excessive loss of soil from road surface.
6M39	**0.66**	**0**	**0.66**	Low	Low	Loam	66	34	0	3	High	D, X	Multiple intermittent stream crossing issues leading to erosive channel/road interaction. More than 10 cubic yards of soil loss. Needs well defined armored dips.
7M13	**0.70**	**0**	**0**	High	Low to Extreme		100	0	0	0	Extreme		Channel in road at 4 places for a total of 150 feet. Route needs to be relocated.
7M14	**0.25**	**0.25**	**0.25**	Extreme	Very High to Extreme	Silty Loam	100	0	0	0	Moderate	D	Needs rolling dips
7M15	**1.20**	**1.20**	**1.20**	Medium	Low to Very High	Loam Sand	100	0	0	0	Low		

							E08 Ratings (percent of trail length)						
7M16	**0.94**	**0.94**	**0.94**	Medium	Low to High	Sandy Loam & Clay Loam	100	0	0	0	Low		
7M17	**1.73**	**1.73**	**1.73**	High	Medium to Very High	Silty Loam & Clay Loam	100	0	0	0	Moderate	D	Construct waterbars or rolling dips
7M18	**0.66**	**0.66**	**0.66**	Medium	Low to High	Loam & Clay Loam	91	9	0	0	Low		
7M22	**0.72**	**0.72**	**0.72**	Extreme	Extreme	Loam	100	0	0	0	Moderate	D	Construct waterbars or rolling dips
8M02	**0.78**	**0.78**	**0.78**	Medium	Low to Very High	Loam	92	8	0	1	Moderate	X	Pull culvert, construct low water crossing
8M03	**1.57**	**1.57**	**1.57**	Low	Low to High	Sandy Loam	82	12	6	1	Moderate	X	Pull culvert, construct low water crossing
8M04	**0.69**	**0**	**0**				100	0	0	0			Obliterated by thinning operation. Trail does not exist.
8M10	**0.67**	**0**	**0.67**	Low	Low to High		100	0	0	0	Low		
8M11	**1.73**	**1.73**	**1.73**	Medium	Low to Extreme	Loam	89	9	2	0	Moderate	D, X	Maintain waterbars and construct low water crossing.
8M11A	**0.12**	**0.12**	**0.12**	Low	Low		0	100	0	0	Moderate	D	Construct waterbars or rolling dips

							E08 Ratings (percent of trail length)						
8M13	**0.96**	**0**	**0**	Medium	Low to Extreme	Loam Sand	100	0	0	0	Extreme		Route crossing several ephemeral channels in limited distance, rutting is occurring up 12 inches deep. Crossing structures are not feasible to convey stream channels across trail. Single track on extreme gradients leads to excessive erosion and cannot be mitigated with waterbars or rolling dips.
8M14	**0.27**	**0**	**0**	Low	Low	Silty Clay Loam	100	0	0	5	Extreme		Trail in channel or channel in trail for most of the length causing excessive disturbance to steam channel.
8M15	**0.32**	**0**	**0.32**	Low	Low to Extreme		100	0	0	0	Low		
8M16	**0.77**	**0**	**0.77**	High	Low to Extreme	Loam, Silty Clay Loam	90	10	0	0	High	D, X	Route has about 700 feet of very high to extreme gradient which could lead to excessive soil loss from trail. Route also crosses an ephemeral stream. Construct waterbars or rolling dips and low water crossing
8M17	**1.28**	**0**	**0**	Low	Low to Very High		97	3		0	Moderate	X	Install culvert or construct low water crossing
8M18	**0.41**	**0**	**0**	Low	Low to Extreme	Loamy Sand	100	0	0	0	Moderate	D	Maintain waterbars

							E08 Ratings (percent of trail length)						
8M19	**1.27**	**0**	**0**	High	Low to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars
8M20	**0.19**	**0**	**0**	Low	Low		100	0	0	5	Extreme		Route needs to be moved uphill outside of meadow. There is too much interaction between trail and stream channels. Extreme gradient at north end needs waterbars.
8M21	**0.72**	**0**	**0**										System road 25N56B
8M22	**0.48**	**0**	**0**										Trail does not exist on the ground.
8M23	**0.49**	**0**	**0.49**	Medium	Low to High	Sandy Loam, Clay Loam	57	43	0	0	High	D	Trail entrenched for 1000 feet on high gradient (11-15%) without drainage. Construct waterbars or rolling dips.
8M24	**2.71**	**2.71**	**2.71**	Medium	Low to Very High	Sandy Clay Loam	100	0	0	0	Moderate	D, X	Construct and maintain waterbars or rolling dips. Install culvert or low water crossing.
8M25	**1.03**	**1.03**	**1.03**	High	Low to Extreme	Loam	100	0	0	0	Low		
8M26	**1.01**	**1.01**	**1.01**	High	Medium to Extreme	Loam & Clay Loam	100	0	0	1	Moderate	D	Maintain drainage features

							E08 Ratings (percent of trail length)						
8M27	**2.26**	**2.26**	**2.26**	Low	Low to Medium	Loam, Silty Clay Loam	83	17	0	3	High	D, X	North end requires numerous drainage structures to stabilize intermittent channels where route crosses. Construct and maintain waterbars or rolling dips. Install culvert or low water crossings.
8M27 (EXT)	**0**	**0**	**0.80**										This is a proposed route that does not exist at this time. It would begin at a perennial stream, cross it and continue on the other side.
8M27A	**0.33**	**0**	**0.33**	Medium	Low to Extreme	Sandy Loam, Loam & Clay Loam	100	0	0	0	Moderate	D	Construct waterbars or rolling dips
8M28	**1.08**	**1.08**	**1.08**	Low	Low to Medium	Loam & Silty Loam	100	0	0	0	Low		
8M28A	**0.10**	**0**	**0**	Low	Low	Loam	100	0	0	0	Moderate		Maintain waterbars and dips
8M29	**0.66**	**0.66**	**0.66**	Low	Low to Medium	Loam	100	0	0	0	Low		
8M30	**0.49**	**0.49**	**0.49**	Low	Low	Loam	100	0	0	0	Low		
8M31	**1.11**	**1.11**	**1.11**	Low	Low to Medium	Clay Loam	100	0	0	0	Low		
8M32	**0.64**	**0.64**	**0.64**	Medium	Low to Medium	Loam	95	5	0	0	Low		

							E08 Ratings (percent of trail length)						
8M33	**0.96**	**0.96**	**0.96**	Medium	Low to High	Loam	100	0	0	0	Low		
8M34	**0.06**	**0**	**0**	Extreme	Extreme	Loam	100	0	0	0	Moderate		Extreme gradient, construct waterbars
8M35	**1.57**	**1.57**	**1.57**	Low	Low to Medium	Loam	100	0	0	1	Low		
8M36	**0.96**	**0.96**	**0.96**	Medium	Low to High	Loam & Clay Loam	89	11	0	0	Moderate	D	Construct or maintain waterbars or dips.
8M37	**0.82**	**0.82**	**0.82**	Very High	Very High	Sandy loam	100	0	0	0	Moderate	D	Construct or maintain waterbars and dips.
8M37A	**0.08**	**0**	**0**	High	Medium to Very High	Sandy loam	100	0	0	0	Low		Drop, redundant
8M37B	**0.15**	**0.15**	**0.15**	Medium		Sandy loam	100	0	0	0	Moderate	D	Construct or maintain waterbars and dips.
8M38	**0.54**	**0**	**0.54**	High	Low to Very High	Silty Loam	100	0	0	1	High	D, X	Spring runs straight down trail for 200 feet. Construct waterbars or rolling dips. Construct low water crossing.
8M39	**0.71**	**0.71**	**0.71**	Low	Low to Medium	Loam & Clay Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
8M39A	**0.32**	**0.32**	**0.32**	High	Medium to Very High	Loam	100	0	0	0	Low		
8M40	**0.34**	**0.34**	**0.34**	High	low to Very high	Loam	59	41	0	0	Moderate	D	Construct and maintain waterbars or rolling dips

							E08 Ratings (percent of trail length)						
8M41	**0.33**	**0**	**0.33**	Very High	High to Extreme	Loam	100	0	0	0	High	D	Steep trail gradient. Construct and maintain waterbars or rolling dips.
8M42	**0.98**	**0**	**0.98**	High	High to Very High	Loam	100	0	0	1	High	D, X	Spring running down road for 150 feet. High to very high trail gradient. Construct low water crossing and maintain waterbars
8M43	**0.36**	**0.36**	**0.36**	Medium	Low to Medium		100	0	0	0	Moderate	D	Maintain waterbars and rolling dips.
8M44	**0.30**	**0.30**	**0.30**	High	High to Extreme	Loam	59	41	0	0	Moderate	D	Construct and maintain waterbars or rolling dips
8M45	**0.46**	**0.46**	**0.46**	High	Moderate to Very high	Loam	100	0	0	0	Moderate	D	Maintain waterbars
8M46	**0.61**	**0.61**	**0.61**	High	Moderate to Very high	Loam	100	0	0	0	Moderate	D	Maintain waterbars
8M47	**1.46**	**1.46**	**1.46**	Medium	Low to Extreme	Clay Loam, Loam	100	0	0	1	Moderate	D, X	Construct and maintain waterbars or rolling dips.
8M47A	**0.35**	**0**	**0**	Medium	Low to Extreme	Loam	100	0	0	0	Moderate	D	Drop, redundant
8M48	**0.49**	**0.49**	**0.49**	Extreme	Very High to Extreme	Loam	100	0	0	0	High	D	Very high to extreme route gradients without drainage could lead to excessive loss of soil. Construct waterbars or rolling dips.
8M49	**0.32**	**0.32**	**0.32**	Low	Low	Clay loam	100	0	0	0	Moderate	X	Construct low water crossing

							E08 Ratings (percent of trail length)						
8M50	**0.83**	**0.83**	**0.83**	Low	Low to Medium	Loam, Sandy loam	100	0	0	0	Moderate	D	Maintain waterbars and rolling dips.
8M51	**0.84**	**0.84**	**0.84**	Low	Low to Medium	Loam	100	0	0	0	Moderate	D, X	Maintain waterbars and low water crossings.
8M52	**1.39**	**1.39**	**1.39**	Medium	Low to Extreme	Sandy Loam & Loam	100	0	0	0	Moderate	D, X	Maintain waterbars and low water crossings.
8M53	**0.66**	**0.66**	**0.66**	Low	Low to Medium	Loam	100	0	0	0	Moderate	D	Maintain waterbars
8M54	**0.82**	**0.82**	**0.82**	Low	Low to high	Loam, Sandy Loam	100	0	0	0	Moderate	D, X	Maintain rolling dips and low water crossings. Follows path of 26N60A. Could be a system road.
8M57	**0**	**0**	**0**	Low	Low	Clay Loam	100	0	0	0	Extreme		Crosses perennial stream into wet meadow. Extensive rutting on meadow areas.
9M32	**0.96**	**0.53**	**0.53**	Medium	Low to High	Loam	49	51	0	2	Extreme		Ephemeral channel on the road for 1500 feet above junction with route 9M32A. More than 50 cubic yards of material has been lost.
9M32A	**0.37**	**0.37**	**0.37**	Medium	Low to Medium		72	28	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M33	**2.66**	**0**	**0**	High	Low to Extreme	Loam, Silty Clay Loam	100	0	0	0	Extreme		Single track on gradients up to 35%. Potential for excessive soil loss is high and can't be mitigated. Relocate trail.

							E08 Ratings (percent of trail length)						
9M34	**0.55**	**0.55**	**0.55**	High	Low to Extreme		100	0	0	0	Moderate	D	No sign of use, poor vegetative cover, high gradients. Construct and maintain waterbars or rolling dips.
9M35	**0.69**	**0**	**0.69**	High	Low to Very High	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M36	**1.33**	**0**	**0**	No sign of use, native terrain						0			Does not exist on ground.
9M37	**1.68**	**0**	**1.68**	Low	Low to High	Loam, Clay Loam	94	6	0	0	High	D, X	Plugged culvert at perennial stream leading to flow over road. About 5 more intermittent or ephemeral stream crossings need to be armored. Improve stream crossings. Construct and maintain waterbars or rolling dips.
9M37A	**0.43**	**0**	**0**	High	Medium to Very High	Loam	100	0	0	0	Low		
9M37B	**0.25**	**0**	**0**	Medium	Low to Very High		95	5	0	0	Low		
9M38	**1.61**	**1.61**	**1.61**	High	Low to Extreme	Loam	96	4	0	0	Moderate	D	Construct and maintain waterbars or rolling dips to compensate for steep gradient.

							E08 Ratings (percent of trail length)						
9M39	**1.13**	**1.13**	**1.13**	Medium	Low to High	Loam	96	4	0	1	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M39A	**0.69**	**0.69**	**0.69**	Low	Low to Extreme	Loam	67	33	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M40	**1.01**	**0**	**0**	Medium	Low to Extreme	Clay Loam	65	35	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M41	**0.67**	**0**	**0**	High	Low to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M41A	**0.19**	**0**	**0**	Medium	Low to Medium	Loam	100	0	0	0	Low		
9M42	**0.81**	**0.49**	**0.49**	High	Low to Extreme	Loam, Clay Loam	86	14	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M42A	**0.17**	**0**	**0.17**	High	High to Very High		100	0	0	0	High	D	Trail less than 100 feet to channel. With high and very high trail gradients the potential for excessive soil loss and delivery to the channel is great. Construct and maintain waterbars or rolling dips, 50' apart on steep areas
9M42B	**0.52**	**0**	**0.52**	Very High	Low to Extreme	Loam	100	0	0	0	High	D	Approximately 800 feet of trail has a gradient greater than 35%. The chances of excessive soil loss from the trail is good. Construct and maintain waterbars or rolling dips. 50' apart on steep areas

							E08 Ratings (percent of trail length)						
9M43	**0.26**	**0.26**	**0.26**	Medium	Low to Medium		100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M44	**0.49**	**0.49**	**0.49**	High	Low to Extreme	Clay Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M45	**0.61**	**0**	**0.61**	Very High	Low to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M46	**0.95**	**0**	**0.95**	Low	Low to Medium	Loam	100	0	0	0	Low		
9M46A	**0.49**	**0**	**0.49**	High	Low to Very High	Loam, Clay Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips. High gradient relief.
9M47A	**0.47**	**0.47**	**0.47**	High	High to Very High	Silty Clay Loam	81	19	0	0	Moderate	D	Construct and maintain waterbars or rolling dips. High gradient relief.
9M48	**0.96**	**0.96**	**0.96**	Very High	Low to Extreme		72	28	0	0	Moderate	D	Construct and maintain waterbars or rolling dips. High gradient relief.
9M49	**1.76**	**1.76**	**1.76**	High	Low to Extreme	Loam, Silt Loam	93	7	0	0	Moderate	D	Construct and maintain waterbars or rolling dips. High gradient relief.
9M50	**0.47**	**0.33**	**0.33**	Low	Low to Medium		100	0	0	1	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M50A	**0.14**	**0**	**0**	Low	Low to Medium		100	0	0		Moderate	X	Improve stream crossing
9M51	**1.27**	**1.27**	**1.27**	Low	Low to High	Loamy Sand	65	35	0	~1	Moderate	D	Construct and maintain waterbars or rolling dips.
9M52	**0.63**	**0.63**	**0.63**	Medium	Low to Very High	Loam	100	0	0		Moderate	D	Construct and maintain waterbars or rolling dips.

							E08 Ratings (percent of trail length)						
9M53	**0.59**	**0**	**0**	Low	Low to Medium	Silt Loam	100	0	0	1	Moderate	D	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M53A	**0.46**	**0**	**0**	Extreme	Medium to Extreme		100	0	0	0	High	D	No waterbars or rolling dips present on trail. Sections of the trail (2000 ft) have gradients of 30% or greater. This could lead to excessive soil loss from the trail. Construct and maintain waterbars or rolling dips for rills/steep gradient.
9M54	**1.00**	**1.00**	**1.00**	Medium	Low to Very High	Sandy Loam	100	0	0	None	Moderate	D	Construct and maintain waterbars or rolling dips.
9M55	**0.53**	**0.53**	**0.53**	Medium	Low to High	Loam	100	0	0	None	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M56	**0.73**	**0**	**0.73**	Medium	Low to Very High		84	16	0	2 crossings	High	D, X	Road is in ephemeral channel at two spots for 175 and 350 feet. Improve stream crossings. Construct and maintain waterbars or rolling dips.
9M56A	**0.38**	**0**	**0.38**	Medium	Low to Very High	Loam	79	21	0	0	High	D	Excessive rilling is occurring on 350 feet of the trail. Construct and maintain waterbars or rolling dips to mitigate serious rilling.

							E08 Ratings (percent of trail length)						
9M57	**0.82**	**0.82**	**0.82**	Medium	Low to Extreme	Loam	100	0	0	1	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M57A	**0.17**	**0.17**	**0.17**	Low	Low to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M58	**1.11**	**1.11**	**1.11**	High	Low to Extreme		44	56	0	1	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M58A	**0.63**	**0.63**	**0.63**	High	Low to Extreme		83	17	0	2	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M58B	**0.56**	**0.56**	**0.56**	Medium	Low to Extreme	Sandy Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M59	**0.66**	**0.66**	**0.66**	Low	Low to Medium		100	0	0	1	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
9M59A	**0.47**	**0**	**0**	Medium	Low to Extreme	Loam	100	0	0	1	High	D, X	Deep rutting is occurring on the trail without diversion off the trail. Trail is in channel for 100 feet. Construct and maintain waterbars or rolling dips. Improve stream crossings
9M59C	**0.18**	**0**	**0**	Medium	Low to Extreme		100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.

							E08 Ratings (percent of trail length)						
9M59D	**0.18**	**0**	**0**	High	Low to Extreme	Loam	100	0	0	0	Extreme	D	Route crosses alluvial fan with intermittent channels. There is no good mitigation for this condition. Route is in an intermittent channel for 125 feet. High trail density in this area makes this trail redundant.
9M59E	**0.43**	**0**	**0**	High	Medium to Extreme		87	13	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M60	**0.42**	**0.42**	**0.42**	Medium	Low to Very High		100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
9M65	**0.63**	**0.63**	**0.63**	Medium	Low to very high					0	Moderate	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Construct and maintain waterbars or rolling dips.
10M14	**0.12**	**0.12**	**0.12**	Medium	Medium		100	0	0	0	Low		

							E08 Ratings (percent of trail length)						
10M16	**1.09**	**0**	**0**	Medium	Low to Extreme		100	0	0	0	High	D	Section of route south of 24N13 has a 150 foot section of 30% gradient with failing waterbars resulting excessive loss of soil from trail surface. Construct and maintain waterbars.
10M19	**1.26**	**1.26**	**1.26**	Low	Low to Medium	Silty Clay Loam	98	2	0	3	Moderate	D	Clean culverts and construct rolling dips at culverts to reduce diversion potential.
10M20	**1.31**	**1.31**	**1.31**	High	Low to Extreme	Loam	37	63	0	0	Moderate	D, X	Maintain rolling dips and low water crossings.
10M20A	**0.48**	**0.48**	**0.48**	Very High	Low to Extreme		100	0	0	0	Moderate	D, X	Maintain waterbars rolling dips and low water crossings
10M20B	**0.13**	**0**	**0**	High	Low to Extreme	Clay loam	100	0	0	2	Low		
10M21	**1.24**	**0**	**1.24**	Medium	Low to Very High	Loam	26	68	6	0	Low		
10M21A	**0.27**	**0.11**	**0.11**	Very High	Low to Extreme	Sandy Clay Loam	43	57	0	0	Low		
10M21B	**0.91**	**0.91**	**0.91**	Low	Low to Medium		100	0	0	0	Low		
10M21C	**0.13**	**0**	**0**	Low	Low to Medium		100	0	0	0	Low		
10M22	**0.50**	**0**	**0**	High	Low to Very High	Loam, Clay	30	70	0	1	Low		

							E08 Ratings (percent of trail length)						
10M23	**2.07**	**0**	**2.59**	Low	Low to Medium	Loam	96	0	4	0	Moderate	D, X	Maintain waterbars. Improve low water crossings.
10M23 (EXT)	**0**	**0**	**0.52**								High		Proposed extension of 10M23 to 25N73 road. See 10M23 for details. Extension of route would cross a perennial stream and proceed up a steep slope causing additional watershed degradation. Construct and maintain waterbars.
10M24	**1.28**	**0**	**1.28**	Medium	Low to Very High		53	16	31	2	High	D	First few segments of route (1600 ft) are deeply channelized and diversion potentials of 600 and 420 feet at two ephemeral stream crossings. Heavy machinery would be required to rebuild road surface. Construct rolling dips or waterbars.
10M25	**1.14**	**1.14**	**1.14**	Low	Low to High	Loam to Sandy Loam	100	0	0	0	Moderate	D, X	Construct waterbars and amour low water crossings.
10M27	**0.96**	**0**	**0.96**	Medium	Low to Medium		83	0	17	0	High	D	Rilling on road surface indicates the need for more waterbars to keep soil on road surface. Construct waterbars

							E08 Ratings (percent of trail length)						
10M28	**1.38**	**0**	**1.38**	Extreme	Very High to Extreme		83	17	0	0	Moderate		Maintain waterbars
10M28A	**1.01**	**0**	**1.01**	High	Medium to High		17	83	0	0	Moderate		Maintain waterbars
10M29	**1.56**	**0**	**1.56**	High	Low to Extreme	Loam, Sandy Loam	89	11	0	0	Moderate	D	Serious rilling is occurring on 450 feet of route. Construct waterbars
10M30	**0.83**	**0.83**	**0.83**	Very High	Medium to Very High	Sandy Loam	19	81	0	0	Low		
10M30A	**0.24**	**0.24**	**0.24**	Medium	Medium to High		69	31	0	0	Low		
10M30B	**0.27**	**0**	**0**	Extreme	Extreme	Loam	0	100	0	0	Extreme		Trail is 750 ft long with extreme gradient and no drainage and heavy rilling. The excessive soil loss from the trail surface cannot be mitigated.
10M30C	**0.09**	**0**	**0**	High	High	Loam	44	56	0	0	Low		
10M30D	**0.18**	**0**	**0**	High	Low to Very High	Loam	100	0	0	0	Low		
10M31	**0.24**	**0.24**	**0.24**	High	Medium to Very High	Loam	100	0	0	0	Moderate	D	Construct additional waterbars in steep sections.

							E08 Ratings (percent of trail length)						
10M32	**1.26**	**0**	**1.26**	High	Low to Extreme	Loam	100	0	0	0	High	D	Top 850 ft of trail is has extreme gradient (up to 40%) without any waterbars. Construct waterbars
10M33	**0.70**	**0**	**0**	Medium	Low to Extreme	Loam	100	0	0	0	Moderate	D	Maintain waterbars
10M34	**1.83**	**1.83**	**1.83**	Medium	Low to Extreme	Loam	100	0	0	0	Moderate	D	Construct waterbars
10M35	**0.51**	**0**	**0**	Medium	Low to Very High	Loam	94	6	0	1	Moderate	D, X	Maintain rolling dips and waterbars. Improve low water crossings
10M36	**1.01**	**0**	**1.01**	Medium	Low to High	Loam	65	35	0	1	High	D, X	Waterbars needed to keep sediment from road going into a stream crossing. Construct waterbars.
10M36A	**0.17**	**0**	**0**	High	High	Loam	100	0	0	1	Extreme		Route in ephemeral channel for 300 feet. Unable to mitigate without rerouting.
10M38	**2.47**	**0**	**0**	High	Low to extreme	Loam, Sandy Loam	90	10	0	0	Moderate	D, X	Construct waterbars. Improve low water crossings.
10M39	**0.17**	**0**	**0**	Medium	Low to High	Sandy loam	100	0	0	0	Moderate	D	Construct waterbars
10M40	**1.35**	**0**	**1.35**	Medium	Low to Very High	Loam	94	6	0	0	Moderate	D	Maintain waterbars and rolling dips.
10M42	**1.44**	**0**	**0**	Low	Low to High		100	0	0	0	Moderate	D	Maintain low water crossings

							E08 Ratings (percent of trail length)						
10M43	**1.15**	**0**	**0**	Low	Low to High	Loam	100	0	0	2	Moderate	D	Fix diversion potential.
10M44	**0.45**	**0.45**	**0.45**	Medium	Low to High	Loam	100	0	0	0	Low		
10M45	**0.67**	**0.67**	**0.67**	Low	Low to High	Loam	100	0	0	0	Low		
10M46	**0.71**	**0.71**	**0.71**	Medium	Low to Very High		100	0	0	0	Moderate	D, X	Maintain rolling dips and low water crossing.
10M47	**1.50**	**1.50**	**1.50**	Medium	Low to High	Loam	100	0	0	0	Moderate	D, X	Maintain rolling dips and low water crossing.
10M52	**0**	**0**	**1.02**	Medium	Low to high	Loam	83	17	0	3	High	D, X	Five waterbars not effective in draining water from route. Rebuild or maintain waterbars. Diversion of water from stream channel onto trail exists at 3 crossings. Pull 2 culverts and construct low water crossings. Amour other crossings.
10M54	**0.83**	**0.83**	**0.83**	Low	Low to High	Loam	90	10	0	0	Moderate	D	Maintain waterbars
10M55	**0**	**0**	**0.25**	Medium	Low to Medium	Loam	100	0	0	0	Moderate	X	Amour low water crossing.

							E08 Ratings (percent of trail length)						
11M08	**1.16**	**0**	**0**	High	Low to Extreme	Sandy Loam	100	0	0	1	High	D, X	This route has 350 feet of extreme gradient (30%) with no drainage which could lead to excessive soil loss from road surface. Construct and maintain waterbars or rolling dips. Improve stream crossings. An active headcut below the first stream crossing needs to be stabilized or it will eventually take out the trail.
11M08A	**0.27**	**0**	**0**	Extreme	Extreme	Loam	100	0	0	0	High	D	Approximately 2000 feet of extreme gradient (25-30%) exist on this route without any drainage. Construct and maintain waterbars or rolling dips to reduce excessive loss of soil from trail surface.
11M08B	**0.09**	**0**	**0**	Low	Low		100	0	0	0	Low		
11M09	**1.07**	**0**	**0**	Medium	Low	Sandy Loam & Sandy Clay Loam	100	0	0	0	High	D, O	Much of the upper half of route (3000 ft) is either insloped or entrenched with no drainage. Soil from road entering ephemeral stream. Construct and maintain waterbars or rolling dips. Potential to outslope road.
11M10	**1.97**	**0**	**0**	High	Medium to High	Sandy Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.

							E08 Ratings (percent of trail length)						
11M11	**1.03**	**0**	**0**	Very High	Medium to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M13	**1.03**	**0**	**1.03**	High	Low to Very High	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M13A	**0.35**	**0**	**0.35**	Medium	Low to High	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M13B	**0.53**	**0**	**0**	Medium	Low to High	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M13C	**0.06**	**0**	**0**	Medium	Low to High	Loam	100	0	0	0	Low		
11M13D	**0.08**	**0**	**0**	Medium	Low to High	Loam	100	0	0	0	Low		
11M14	**0.42**	**0**	**0**	Medium	Low to Extreme	Loam	100	0	0	0	Low		
11M15	**0.38**	**0**	**0.38**							0	Low		Unused, vague traces in skid trail, no data collected, no impacts yet
11M15A	**0.25**	**0**	**0**							0	Low		Unused, vague traces in skid trail, no data collected, no impacts yet
11M16	**0.65**	**0**	**0**	High	Low to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M17	**0.96**	**0**	**0.96**	Low	Low	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips. Rills present.
11M18	**0.23**	**0**	**0.23**	High	Medium to Extreme	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.

							E08 Ratings (percent of trail length)						
11M18A	**0.54**	**0**	**0.54**							0	Low		Unused, vague traces in skid trail, no data collected, no impacts yet
11M19	**0.66**	**0**	**0**	Medium	Medium	Loam	100	0	0	0	Low	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
11M20	**3.33**	**3.33**	**3.33**	Medium	Low to High	Clay Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M22	**0.40**	**0**	**0.40**	Medium	Low to High	Clay Loam	67	33	0	0	Low		
11M23	**0.67**	**0**	**0.67**	Medium	Low to High	Loam	87	13	0	0	High	D	3,300 feet of route has rilling and rutting on the surface leading to excessive soil loss. Construct and maintain waterbars or rolling dips.
11M24	**0.47**	**0**	**0.47**	Low	Low to High	Silty Loam	100	0	0	0	Low		
11M25	**0.43**	**0.43**	**0.43**	Low	Low to Medium	Loam	100	0	0	0	Low		
11M30	**0.58**	**0.58**	**0.58**	Low	Low to Medium	Loam	100	0	0	0	Moderate	D, X	Construct and maintain waterbars or rolling dips. Improve stream crossings
11M34	**0.73**	**0.73**	**0.73**	Medium	Low to High		100	0	0	0	Low		
11M35	**0.71**	**0**	**0.71**	Medium	Low to High		89	11	0	Snow melt diversion	High	D	Snow melt erosion has caused excessive erosion on route surface. More drainage is needed to limit excessive erosion. Construct and maintain waterbars or rolling dips. .

							E08 Ratings (percent of trail length)						
11M36	**1.36**	**0**	**1.36**	Medium	Low to High	Loam, Sandy Loam	97	3	0	1	Moderate	D	Construct and maintain waterbars or rolling dips.
11M37	**2.15**	**2.15**	**2.15**	Low	Low to High	Loam	79	21	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M38	**0.53**	**0.53**	**0.53**	Low	Low to Medium	Loam	100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M39	**0.55**	**0.55**	**0.55**	Medium	Medium to High		100	0	0	0	Low		
11M40	**0.64**	**0**	**0**	High	Medium to Extreme	Sandy Loam to Loam				1	Moderate	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Perennial spring on road surface needs a french drain constructed to minimize erosion. Maintain rolling dips and waterbars.
11M41	**1.29**	**1.29**	**1.29**	Medium	Low to Very High	Sandy Loam	100	0	0	0	Low		
11M41A	**0.35**	**0.35**	**0.35**	Very High	High to Extreme		100	0	0	0	Moderate	D	Construct and maintain waterbars or rolling dips.
11M42	**0.16**	**0**	**0**	Low	Low to Medium	Loam, Sandy Loam	100	0	0	1	Extreme		Trail goes through a wet meadow and down a ephemeral channel. Unable to mitigate without rerouting trail.

							E08 Ratings (percent of trail length)						
12M09	**3.08**	**0**	**3.08**	Medium	Low to Medium		94	6	0	5	High	D, X	Excessive rilling occurs on 1,000 feet of route. Five stream crossings have a total diversion potential of 500 feet. Maintain rolling dips and improve low water crossings.
12M09A	**0.84**	**0**	**0.84**	Low	Low to High	Sandy loam	100	0	0	0	Moderate	D, X	Maintain rolling dips, clean culverts and amour low water crossings.
12M15	**0.23**	**0**	**0.23**	Medium	Low to Medium		100	0	0	0	Moderate	D	Maintain rolling dips. Block creek to prevent vehicles from crossing.
12M16	**1.21**	**0**	**0**	Medium	Low to Very High					0	Moderate	D, X	Maintain dips, waterbars and stream crossings. Unable to calculate E08 because some segments were covered with snow.
12M17	**0.16**	**0.16**	**0.16**	Low	Low		100	0	0	0	Low		
12M18	**0.14**	**0**	**0**	Medium	Medium	Loam	100	0	0	0	Low		
12M19	**0.68**	**0.68**	**0.68**	Medium	Low to High	Sandy Loam	100	0	0	0	Low		
12M20	**0.11**	**0.11**	**0.11**	Low	Low	Silt Loam	100	0	0	0	Low		
12M21	**0.23**	**0**	**0.23**	Extreme	Extreme	Sandy loam	100	0	0	0	Moderate	D	Maintain waterbars
12M21A	**0.05**	**0**	**0.05**	Low	Low		100	0	0	0	Low		
12M22	**0.15**	**0**	**0.15**	Medium	Medium to High		100	0	0	0	Low		

							E08 Ratings (percent of trail length)						
12M23	**0.91**	**0.91**	**0.91**	Medium	Low to High	Sandy Loam	100	0	0	0	Moderate	D	Maintain waterbars and rolling dips.
12M24	**0.28**	**0**	**0**	Medium	Low to Med		100	0	0	0	Extreme		100 feet from Willow Creek.
12M25	**1.44**	**0**	**0**	Low	Low to High	Sandy Loam	100	0	0	0	Moderate	X	Construct low water crossing at system road.
12M26	**1.55**	**0**	**0**	Low	Low to High	Sandy Loam	100	0	0	0	Extreme		Route crosses many springs, seeps and a meadow. Sediment is reaching Thompson Creek.
12M27	**0.91**	**0.91**	**0.91**	Medium	Low to Extreme	Sandy Loam	100	0	0	0	Moderate	D	Maintain waterbars
12M30	**0.04**	**0**	**0**										Not located on map or ground
12M31	**0**	**0**	**0.99**	Medium	Low to Very High	Sandy loam	100	0	0	0	High	D	Deep rilling is occurring on 3,000 feet of this route on 11-20% gradients. More drainage is necessary. Construct rolling dips or waterbars.
12M32	**0**	**0.16**	**0.16**	Low	Low	Sandy loam	100	0	0	0	Low		
12M33	**0**	**0**	**0.42**	Low	Low to Medium	Sandy loam	100	0	0	0	Extreme		Adjacent to creek for entire length. Road crosses spring. Spring subsurfaces 10 feet below fill slope. No suitable drain structure for crossing due to size of saturated zone (10 square feet of road surface).
12M34	**0**	**0.25**	**0.25**	Low	Low		100	0	0	0	Low		

							E08 Ratings (percent of trail length)						
12M38	**0**	**0.26**	**0.26**	Medium	Low to High		100	0	0	None	Low		

D = Dips
X = Stream Crossings

Appendix H

Beckwourth River Ranger District Route Analysis

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
10M12	**0.95**	**0.95**	**0.95**	Medium	Low to Very High	Silty Clay Loam & Clay Loam	79	15	6	0	Medium	D	Needs some drainage work. Entrenchment areas and rilling are mitigateable with blading.
10M13	**0.2**	**0.2**	**0.2**	High	High	Silty Clay Loam	60	40	0	0	Medium	D	End of Road. Camping spot and fishing access.
10M14	**0.07**	**0.07**	**0.07**	Low	Low	Loam Sand	100	0	0	0	Low		Short road. Access to river for fishing, camping and restrooms.
10M15	**0.54**	**0**	**0.54**								Medium	D	Needs some drainage work. Entrenchment areas and rilling are mitigateable with blading.
11M02	**1.72**	**0**	**1.72**	Medium	Low to High	Clay	81	19	0	2	Low		An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. There are no hydrology concerns.
11M03	**0.52**	**0**	**0.52**	Medium	Low to Very High	Silty Clay & Clay	62	38	0	0	Medium	D	Needs some drainage work. Entrenchment areas and rilling are mitigateable with blading. "Caution" there is a wooden culvert near the top of rd.
11M04	**0.76**	**0.76**	**0.76**	Medium	Low to Very High	Loam & Silty Clay Loam	88	12	0	0	Medium	D	Road dead ends at the creek with very heavy vegetation on sides of road. Rilling leave the road into the forest not near any creek. Some of the "lead off ditches" have debris blocking water from running off.
11M05	**0.96**	**0.96**	**0.96**	Low	Low	Silty Clay Loam	100	0	0	0	Low		No hydrology concerns. Road is very overgrown. It dead ends at a campfire ring. This road needs to be brushed out, but it didn't seem to have drainage problems.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
11M06	**0.42**	**0.42**	**0.42**	Medium	Low to High	Sandy Loam	93	7	0	0	Medium	D	There is a water hole at 0.2 miles is still full on 08/28/2008. An overall pretty good road, it could use more drainage and blade work. The road is closed due to a berm at the water hole. Most of the work needs to be done past the water hole. Note: Spring needs protecting.
11M07	**0.16**	**0.16**	**0.16**	Low	Low	Sandy Loam	97	3	0	0	Medium	D	Very slight rilling otherwise the road is in good shape.
11M09	**1.07**	**0**	**0**	Low	Low	Sandy Clay Loam	100	0	0	0	High	D	Road goes in and out of the Scenic River Corridor of the Middle Fork. Road crosses creek at hair-pin turn on Mt. Hough RD. Direct sedimentation to stream channel at creek crossing. Road continues on past creek crossing, but is only passable with quads. Road is mitigateable by putting in culvert at crossing (24" diameter) and reconstruction.
11M10	**1.97**	**0**	**0**										Road is non-existent
11M11	**1.03**	**0**	**0**										Road is non-existent
12M02	**1.23**	**1.23**	**1.23**								Medium	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. There are no hydrology concerns.
12M03	**0.76**	**0.76**	**0.76**	Low	Low to High	N/A	100	0	0	0	Medium	D	Drainage issues. Erosion and entrenchment. Needs a blade dropped on road and drainages need to be fixed.
12M04	**0.41**	**0.41**	**0.41**	Low	Low	Sandy Loam	88	8	4	0	Medium	D	Culvert - Plugging potential
12M06	**0.85**			Low	Low	Sandy Loam, Sandy Clay Loam & Silty Clay Loam	100	0	0	0	Medium	D	This entire route was dropped due to redundant access. System road 2409B, has road sign, entrenchment at beginning.
12M07	**0.44**	**0.44**	**0.44**	Low	Low	Sandy Loam	100	0	0	0	Medium	D	Drainage and entrenchment issues. Needs a blade dropped on road and drainages need to be fixed. Road is currently not drivable due to down logs crossing the road and mixed conifers and thick brush growing on road.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
12M08	**0.72**	**0**	**0.72**	Low	Low to Very High	Sandy Loam & Silty Clay Loam	100	0	0	0	Low		No hydrology concerns. There is a dirt bike trail leaving the campsite at the end of the road.
12M10	**2.96**	**0**	**2.96**	Medium	Low to High	Loam Sand	87	11	2	1	High	D, X	Road has a potential to contribute direct sedimentation into stream channel and currently is situated next to channel in a couple of locations allowing vehicle access into drainage.
12M10A	**0.58**	**0**	**0.58**	Medium	Low to Extreme	Loam Sand	100	0	0	0	High	D, X	Similar hydrology concerns as indicated for road 12M10.
12M11		**0**	**1.71**	Low	Low to High	Silty Clay Loam & Silty Loam	98	2	0	0	Medium	D	Drainage issues.
12M12	**0.67**	**0**	**0.67**	Very High	Medium to Extreme	Silty Clay Loam & Sandy Loam	89	11	0	0	High	X	Ford needed where road crosses Last Chance Creek. Road has direct sedimentation into stream channel due to road crossing channel in a couple of locations. Very high gradient and sandy soils. Road will need a lot drainage work for entrenchment and stream crossing.
12M13	**0.4**	**0.4**	**0.4**	High	High	Loam Sand	73	7	20	0	Medium		Heavy gulling on road. Road leads to a Quartz Mine with heavy use. May want to close road due to public safety, but hydrology concerns are mitigateable. Road will need reconstruction and drainage work. Very high gradient and sandy soils.
12M14	**0.58**	**0**	**0**	Low	Low	Silty Clay Loam & Silty Loam	86	11	3	0	Extreme		Redundant road that currently goes through meadow.
12M35	**0**	**0.11**	**0.11**	Low	Low to Moderate	Sandy Loam & Clay	88	6	6	0	Low		No hydrology concerns.
12M36	**0**	**0**	**0.54**	Low	Low to Moderate	Loam, Silty Loam, Silty Clay Loam, Clay	100	0	0	0	Low		System road 24N76Y needs more drainage work.
12M37	**0**	**0.17**	**0.17**	Low	Low to Moderate	Loam & Silty Clay Loam	100	0	0	0	Low		Started at microwave facilities, complete with running generator. Maintenance road. No hydrology issues.
13M01	**1.07**	**1.07**	**1.07**	Low	Low to Very High	Sandy Loam & Clay	87	13	0	0	Medium	D, X	Drainage issues. Waterbars need repairing.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M03	**0.45**	**0**	**0**	Medium	Low to High	Loam, Silty Loam & Silty Clay Loam &Loam, Clay Loam	85	9	6	0	Extreme	D	This entire route was dropped because of botany issues. This road crosses a creek and has sediment directly entering the channel.
13M04	**0.49**	**0.49**	**0.49**	Medium	Low to Medium	Sandy Loam, Loam	92	8	0	0	Medium	D	Some rills on road. Camping area that is not a big issue because of its location. Drainage structure /needs drainage work.
13M04A	**0.16**	**0**	**0**								Medium	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Road is partially entrenched with minor rilling.
13M04B	**0.11**	**0.11**	**0.11**								Medium	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Road is partially entrenched with minor rilling.
13M05	**0.58**	**0**	**0**				89	7	4				Road is non-existent.
13M06	**1.63**	**0**	**1.63**	Medium	Low to Medium	Sandy Loam	78	3	19	0	High	D	At first crossing sediment is entering the channel. Large ruts 12" + leaves the roadway and deposits sediment into the stream at a second location. One of the water bars transports water and sediment directly into stream channel. Road and channel intersect at this location.
13M07	**1.24**	**0**	**0**				66	16	18				Road is non-existent.
13M08	**1.39**	**0**	**0**	Low	Low	Clay Loam, Silty Clay Loam, Sandy Loam	97	2	1	0	Extreme	D	This route is just a shortcut crossing mesic meadow and several streams where sediment can easily enter into the channel.
13M09	**0.46**	**0.46**	**0.46**	Low	Low	Survey not completed at this time.	50	50	0	0	Low		No hydrology concerns.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M09A	**0.06**	**0**	**0**								Low		An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Road was dropped due to redundant access.
13M10	**12.04**	**0**	**0**	Low	Low to Medium	Survey not completed at this time.	82	13	5	0	Extreme	D	Road was dropped due to redundant access and hydrology issues.
13M10A	**0.04**	**0**	**0**								Extreme		An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Road was dropped due to redundant access and hydrology issues. The road is the creek. Would have to move the creek or road to prevent vehicles driving down creek.
13M10B	**0.13**	**0**	**0**	Low	Low	Silty Clay, Silty Clay Loam, Sandy Loam, Loamy Sand, Loam	98	2	0	0	Medium	D	Road was dropped due to redundant access.
13M10C	**0.04**	**0**	**0**								Medium		An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Road was dropped due to redundant access.
13M11	**1.97**	**0**	**0**				85	4	11				Road is non-existent.
13M12	**1.5**	**1.5**	**1.5**	Low	Low to High	Sandy Loam	86	11	3	0	Medium	D, X	Start at the 01 road there is a culvert under the road at a meadow with stream crossing. An attempt to fix the road here still allows sediment to leave road very near channel.
13M12A	**0.25**	**0.25**	**0.25**	Low	Low	Silty Loam	97	3	0	0	Medium	D	Waterbar/berm ineffective. Major gulling on side of road.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M13	**1.07**		**0.67**	Low	Low to High	Sandy Loam & Loam Sand	93	4	3	0	High	D, X	Drainage will be an issue on this portion. There is a rill that is deeper than 12" and about 20 feet long. Water leaves the road at a berm. There was a culvert, but it has been removed. Water is evenly dispersed as it enters a meadow. Use of this road during the wet season will lead to rills and ruts.
13M14	**1.33**	**1.33**	**1.33**	Low	Low to Medium	Sandy Clay Loam, Sandy Loam, Silty Loam	92	8	0	0	Medium	D	Entrenched, but can be easily fixed.
13M15	**0.81**	**0.81**	**0.81**	Low	Low to Medium	Clay Loam, Sandy Clay Loam	90	10	0	0	Medium	D	Rilling and ruts. Road starts out entrenched, 0.3 miles some rills present. Sediment being transported to stream at 26N15X.
13M16	**0.54**	**0.54**	**0.54**	Low	Low to Medium	Sandy Loam, Loam Sand	90	10	0	0	Medium	D	Generally in good condition needs more drainage.
13M17	**1.02**	**1.02**	**1.02**	Low	Low	Clay Loam, Clay	95	5	0	0	Medium	D	Over all, this road is in good condition, but needs more drainage, at 0.8 miles intersects with 13M34.
13M18	**0.65**	**1.5**	**1.5**	Low	Low	Clay Loam	100	0	0	0	Low		This entire route was dropped due to redundancy.
13M19	**1.19**	**0**	**0**	Low	Low to Medium	Clay Loam, Clay	85	3	12	0	Extreme		Stream crossing washed out road (minor). This entire route was dropped due to road located in drainage.
13M20	**0.22**	**0**	**0**	Medium	Low to Medium	Clay Loam	80	8	12	0	Extreme		This entire route was dropped due to road located in drainage issues.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M21	**1.31**	**0.6**	**0.6**	Medium	Low to High	Loam Sand	87	10	3		Medium/ Extreme	D	Entrenched with ruts and rills. Road has several water bars. Currently there is a road closure sign at road entrance and there is an active hazard tree removal operation. At the end of the road where it meets the 27N59 there are several large ruts and rills. One is 12" deep and 60 to 70 feet long and is deflected by a waterbar or berm. Here the down cutting leaves the road and transports sediment into the channel. Road was split into 13M21 S and 13M21 N where 13M21 N was dropped due to hydrology concerns with road located in drainage.
13M21A	**0.22**			Low	Low	Loam Sand	100	0	0	0	Low		This entire route was dropped due to road redundancy. No apparent hydrology issues.
13M21B	**0.16**	**0.16**	**0.16**	Low	Low	Silty Clay Loam, Loam	100	0	0	0	Low		No apparent hydrology issues.
13M22	**1.12**	**0**	**0**	Low	Low	Loam Sand	99	1	0	0	Extreme		Road proposed for removal due to crossing of wet meadow. Several attempts to close and add drainage to this road have failed. Appears that users have created access to this route by using the FS 27N25 road and crossing the creek nearest that road. At this crossing sediment does enter the channel and there is a very large head cut that appears will deteriorate into the road if left unchecked. The road has poor drainage. Some of the berms / waterbars consist of digging a pit in the road and piling up the dirt to block access, but these themselves are entrench because of the pits/ hole created when the berm was made.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M23	**0.6**	**0**	**0**	Low	Low	Sandy Loam	94	6	0		Extreme		Road proposed for removal due to paralleling drainage. This road is currently closed with boulders and a berm. There are drainage issues along the road especially where it intersects with the 13M22 road. This road is access to a piece of private ground, but it is not the primary access. It appears that the paved road is the primary access. This road dead ends at a landing.
13M24	**0.64**	**0**	**0**	Medium	Medium	Silty Clay Loam & Loam	70	13	17		Extreme		Road proposed for removal due to road crossing channel and contributing direct sedimentation.
13M25	**0.7**	**0**	**0.7**	Low	Low to Medium	Silty Loam, Loam Sand	96	4	0	0	Medium	D, S	This road is very sandy and lends itself to be eroded. This road needs more drainage, there are ruts and rills. The road has sunk below natural grade at this point. Raising the road or seasonal closure should be a part of the consideration for this road.
13M26	**0.59**	**0.59**	**0.59**	Low	Low to High	Sandy Loam	93	7	0	0	Medium	D	Drainage issues. Fairly flat ground. Road doesn't go anywhere.
13M27	**0.93**	**0**	**0**				100	0	0				This entire route was dropped due to road being non-existent.
13M28	**0.45**	**0.45**	**0.45**	Low	Low to High	Silty Loam & Loam Sand	82	18	0	0	Medium	D	Extreme dirt bike damage/rutting. Needs work.
13M29	**2.24**	**2.24**	**2.24**	High	Medium to Extreme	Sandy Loam	76	24	0	0	Medium	D	Long and undulating ruts.
13M30	**0.43**	**0**	**0.43**	Low	Low to Extreme	Sandy Loam & Sandy Clay Loam	76	11	13	0	High	D	Sediment enters into the stream channel at two places. One at the beginning where it intersects the 28N02F road about half way thru the route. This is mostly a single track route which gets a lot of use. All of which cause drainage problems. This route will have to be repaired by hand due to the proximity of several large boulders.
13M31	**2.33**	**0**	**2.33**	Low	Low		100	0	0	0	Medium	D	Road needs more drainage work, has several rills.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M31A	**1.56**	**0**	**1.56**	Medium	Low to High		83	11	6	0	Medium	D	Rill and ruts, entrenched with dense vegetation near the top. At inslope area road captures water and diverts from inslope by a bush, at which point the water crosses the road. There is mass wasting where the water leaves the road approximately 5'X50'.
13M32	**0**	**0**	**0.21**	Low	Low		100	0	0	0	Medium	D	Minor drainage needs.
13M33	**0**	**0**	**0.42**	Low	Low		77	23	0	0	Medium	D	This entire route was dropped due to redundancy. Good shape, stream crossing needs improvement
13M34	**0**	**0.54**	**0.54**	Medium	Low to Very High		100	0	0	0	Medium	D	Ties into 13M17 loop, has lots of water bars, but still is not adequately drained. Native road surface is highly erodible. There is evidence the road surface is actively eroding, but sediment is not being transported to a waterway or waterbody.
13M35	**0**		**0.08**	Medium	Medium		100	0	0	0	Medium	D	Needs grading and more water bars.
13M36	**0**	**0.13**	**0.13**	Medium	Low to Medium		100	0	0	0	Low		No hydrology concerns. Road is in good condition.
13M37	**0**	**0.57**	**0.57**	Medium	Low to Medium		100	0	0	0	Medium	D	Dead-end road with 12 foot trees, well vegetated.
13M38	**0**	**0.47**	**0.47**	Low	Low to High	.	94	6	0	0	Medium	D	Entrenched ground is flat so sediment entering channel filters out before getting into main stream.
13M39	**0**		**0.32**	High	Low to Extreme		85	13	2	0	Extreme		This road was dropped due to road being currently decommissioned and hydrology concerns. To use this road it will need to be completely rebuilt. There are large rocks and trees in the road as well as several large down logs. A portion of the road is in the stream channel. The second part of the route is a single track.
13M40	**0**	**1.02**	**1.02**	Low	Low to High		95	2	3	0	Medium	D	Road crosses a couple of drainages. Needs drainage work.
13M41	**0**		**0.82**	High	Low to Very High		90	3	7	2	High	D, X	Drainage and culvert issues.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
13M42	**0**	**0**	**0.08**								High	D, X	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Drainage and crossing issues. Direct sediment into channel at crossing. Also there is potential for addition direct sedimentation into channel.
13M43	**0**	**0**	**0.15**				100	0	0				Road is non-existent.
14M01	**1.76**	**1.76**	**1.76**	Medium	Low to Very High	Sandy Clay Loam	96	4	0	0	Medium	D, X	Needs drainage work especially near the bottom of road. Drainage issues 14M01 A, B, and C were combined with this route.
14M01A	**0.22**	**0**	**0**	Low	Low to Medium	Sandy Clay Loam, Silty Clay Loam	77	20	3	0	Medium	D	This entire route was dropped due to redundancy.
14M01B	**0.17**	**0**	**0**	Medium	Medium	Clay Loam, Sandy Clay Loam, Sandy Loam	76	24	0	0	Medium	D	This entire route was due to redundancy.
14M01C	**0.24**	**0**	**0**	Very High	Low to Very High	Loam, Sandy Loam	76	6	18	0	Medium	D	This entire route was dropped due to redundancy.
14M02	**1.24**	**0.45**	**0.45**	Medium	Low to Very High	Silty Clam Loam & Sandy Clay Loam	78	20	2	0	Medium	D	Portion YA to YB does not exist.
14M04	**0.7**	**0**	**0.7**	Low	Low to Medium	Sandy Loam	52	38	10	0	Medium	D	Road dead ends at a spring with good flow, signs of an old camp 50-75 feet from a stream crossing. Road stops 20 feet beyond crossing not 150 feet like documented. Close road off around the spring.
14M05	**0.72**	**0**	**0.72**	Medium	Low to Medium	Loam, Sandy Loam	65	24	11	0	High	D	Extensive rilling over 80% of road. Spring crosses after running down ruts in road.
14M06	**0.37**	**0**	**0.37**	Medium	Medium	Loam, Sandy Loam	45	73	20	1	High	D, X	Ephemeral stream enters road and flows down road.
14M07	**0.49**	**0**	**0**	Low	Low	Sandy Loam	93	7	0	0	Medium		Dropped no access without 13M10
14M08	**0.48**	**0**	**0**	Low	Low	Loam Sand				0	Medium		Dropped no access without 13M10

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
14M09	**1.41**	**0**	**0**	Low	Low to Medium	Sand Loam, Silty Loam, Sandy Clay Loam, Loam	96	2	2	0	Extreme		Dropped no access without 13M10. Large ruts and rills (approximately 10-12" deep) goes around waterbar and continues down the middle of the road. Directly above the waterbar road is insloped. Direct sedimentation into channel at natural dip approximately 0.3 of mile form 13M10 road. The road is eroding away due location of channel at several locations.
14M10	**0.57**	**0.57**	**0.57**	Low	Low to High		94	6	0	0	Medium	D	Needs drainage road continues past the end of route on map
14M11	**2.27**	**2.07**	**2.07**	Low	Low to Medium	Loamy Sand	51	8	41	1	Medium	D, X	Road is outsloped and drops sediment directly into creek. A lot of sediment from fill slope and road into channel. Drainage, reroute away from stream channels.
14M12	**1.52**	**1.52**	**1.52**	Low	Low to Medium	Sandy Clay Loa, Loam, Silty Loam, & Sandy Loam	76	24	0	0	Medium	D	Entrenched, ruts, needs some minor drainage
14M13	**0**	**0**	**0.26**								Medium	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey.
14M14	**0**	**0**	**0.94**	Low	Low		73	9	18	0	Medium	D	Spring in middle of road, which is single track. This entire route was dropped due to hydrology issues.
14M15	**0**	**0**	**0.37**	Low	Low	Silty Clay Loam				0	Medium	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Dropped due to redundancy.
14M16	**0**	**0.29**	**0.29**	Medium	Low to Medium	Silty Clay Loam				0	Low		An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Road is in good condition.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
15M01	**1.46**	**0**	**0**	Extreme	Low to Extreme	Silty Clay Loam	66	17	17	0	Medium	D	Very steep ground, but all the rilling / erosion appears to be small and mitigateable with drainages / waterbars. Road may be needed by permittee to access trough near spring. Road is also being accessed by private land owners.
15M01A	**0.16**	**0**	**0**	High	Low to Extreme	Silty Clay Loam & Clay Loam	100	0	0	0	Medium	D	Short dead end spur. On steep ground. Needs drainage improvements.
15M02	**1.46**	**0**	**0**	Medium	Medium to High	Silty Clay Loam	41	22	37	0	Extreme		Sediment enters directly into channel. Road parallels channel for the 1st 0.5 mile, intermittently going inside channel. Road dead ends in conifer forest with no exit. Road will have to be relocated out of channel in order for it to remain open.
15M02A	**0.09**	**0**	**0**	Medium	Low to Extreme		87	7	6	0	Extreme		Short spur off the 15M02 about 100'. Road shoots up 45% slope (high gradient), however it doesn't exhibit a large amount of rilling or erosion. NOTE: This road will be closed due to primary access road 15M02 being an Extreme. It appears that the 25N52 FS road has been relocated/rerouted adding to the confusion of roads 15M02, 15M02B and 15M02C.
15M02B	**1.08**	**0.86**	**0.86**	Medium	Low to Very High	Silty Clay Loam, Sandy Clay Loam, Clay Loam	69	12	19	0	Extreme		Split 15M02B into north segment from 15M02C, cat 2 with water bar improvements for better drainage & Extreme rating for southern 15M02B rd segment due to crossing drainage and direct sediment into channel. The stream crossing needs major relocation to drain back into main channel or forest off of 15M02B road. This type of relocation is outside the scope of this project.
15M02C	**0.36**	**0.36**	**0.36**	Low	Low		70	13	17	0	Medium	D	Fairly short segment towards 24N52 FS road, high gradient failure for first 500'. Road ties into 15M02B at the top of the ridge. C spur is extended.
15M03	**0.29**	**0**		Low	Low	Silty Clay Loam	51	38	11	0	High	D	Road goes along creek and contributes sediment directly to the creek.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
15M04	**0.32**	**0**	**0.32**	Low	Low to Medium	Silty Clay Loam	64	31	5	0	Medium	D	Channel crossing at beginning of road, contributing sediment into channel. Needs more drainage. Need to relocate road away from channel.
15M05	**2.83**	**0**	**2.83**	Medium	Low to Extreme	Silty Clay Loam, Sandy Loam, Sandy Clay Loam,	94	6	0	0	Medium	D	Drainage issues.
15M07	**0**	**0.76**	**0.76**										Trail does not exist.
15M08	**0**	**0.4**	**0.4**	High	Medium to High	Silty Clay Loam, Silty Loam	79	16	5	0	Medium		This road is actually FS system road 28N03K.
15M09	**0**	**0**	**0.42**	Low	Low	Silty Clay Loam, Silty Loam	100	0	0	0	Medium	D	This entire route was dropped due to redundancy. Started on Dixie Valley Road. Route is entrenched and goes through the meadow, which may be a problem if route is used when meadow is wet. Route appears to be access to a piece of private land. Route also crosses a drainage.
15M10	**0**	**0.34**	**0.34**	Medium	Low to Very High		100	0	0	0	Medium	D	Road is almost non-existent needs minor drainage work.
16M01	**1.78**	**0**	**0**	Low	Low	Silty Loam	72	18	10	0	Medium	D	Trail does not exist. Started on FS 24N00 Road and drove 0.8 miles. The lack of use made it difficult to find end. There are a lot of entrenched portions of the road that appear to be a result of compaction from use. The road also crosses 24N00 and continues on, but was not identified as part of the 16M01 route. Route is identifiable from aerial photo 505-61.
16M03	**0.77**	**0.77**	**0.77**	Low	Low to Medium	Silty Clay Loam, Sandy Clay Loam, Clay Loam, Loam	68	22	10	0	Medium	D	Has rills and ruts, large boulders, entrenched, and dead ends.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
16M03A	**0.12**	**0**	**0**								Medium	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Dropped due to redundancy. Some drainage concerns. Rilling and ruts on road.
16M03B	**0.27**	**0**	**0**	Low	Low	Loamy Sand	86	9	5	0	Medium	D	This entire route was dropped due to redundancy. This road dead ends at a fence on private property. Parallels an existing road approx 15 to 25 feet away. Some drainage concerns due to rilling and ruts on road.
16M04	**2.08**	**0**	**2.08**	Medium	Low to High	Sandy Loam	71	29	0	1	High	D	Entrenched, needs more drainage, and sediment enters channel at crossing
16M04A	**0.54**	**0**	**0.54**	Low	Low to Medium	Silty Loam, Loam, Sandy Loam	68	24	8	0	High	D	Scouring at beginning of road, sediment enters channel at road crossing, needs more drainage, and has large gullies/ruts leaving road.
17M01	**0.28**	**0.28**	**0.28**	High	Low to Very High	Sandy Loam, Sandy Clay Loam	74	16	8	0	Medium	D	Entrenched. Needs more drainage.
17M02	**0.66**	**0**	**0**	Medium	Medium to High	Sandy Loam	58	18	24	0	Medium	D	This trail is a Forest Service system road. No hydrology concerns.
17M03	**0.51**	**0.51**	**0.51**	Low	Low to Medium	Loamy Sand	65	33	2	0	Medium	D	Some entrenchment and rills. Needs more drainage work.
17M04	**1.22**	**0**	**1.22**	Low	Low	Sandy Clay Loam	96	4	0	0	Medium	D	No access. Westside of the road is currently obliterated. There is access from the 22N55X a non-identified OHV route. No real hydrology concerns. Rutting and rilling is mitigateable.
17M05	**3.87**	**0**	**0**	Medium	Low to Very High	N/A	87	8	5	0	High	D	Sediment enters channel. Large rut eroding road etc.
17M06	**0.72**	**0**	**0**	Low	Low to Medium	Loamy Sand	100	0	0	0	Low		This entire route was dropped due to no right of way.

Trail #	Alt 2	Alt 4	Alt 5	Average Slope	Slope Range	Soil Type	Percentage of Trail with E08 Ratings			Diversion Potential	Impact Rating for Soil/Water	Mitigation	Comments
							Pass	At Risk	Fail				
17M06A	**0.69**	**0**	**0**			Loamy Sand				0	Low		An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. This entire route was dropped due to no right of way.
17M07	**0**	**0**	**2.57**	Medium	Low to Extreme		90	5	5	2	High	D	This entire route was dropped due to redundancy. Road is in close proximity of stream channel. Rutting and rilling on road. There is a probability of direct sedimentation to steam channel.
17M08	**0**	**0**	**0.58**								High	D	An abbreviated field survey was performed to determine impact rating based upon key elements of the detailed survey protocol. Mitigations were also formulated during the abbreviated survey. Similar hydrology concerns as indicated for road 17M07.

D = Dips
X = Stream Crossing
S = Season of Use

APPENDIX I

PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS

The following projects were considered as present and reasonably foreseeable future actions for cumulative effects analysis.

Table 1: Present and Reasonably Foreseeable Future Actions

District	Project Name	Project Description	Location
Forest-wide	Temporary OHV Forest Order Project CE 31.b(1)	Implement interim OHV forest orders that prohibit wheeled vehicle travel off of existing inventoried roads, areas, and trails for an interim period, until site specific designation can occur utilizing appropriate levels of NEPA.	Forest-wide
Forest-wide	Backcountry Discovery Trail	Designation of Backcountry Discovery Trail (BCDT) on existing roads within the Plumas National Forest to tie together statewide motorized trail	Forest-wide
Forest-wide	Integrated Noxious Weed Control Program	Mechanical, prescribed fire and chemical control to manage invasive plants.	Forest-wide
Beckwourth	Mabie DFPZ	Approximately 7181 acres of DFPZ inlcuding underburning, hand thinning, and mechanical treatment. May include road relocation/obliteration.	South of Highway 70 and west of highway 89 near the communities of Graeagle, Portola, Clio, and Blairsden.
Beckwourth	Freeman Project	Reduce Hazardous Fuels, Improve Forest Health, Improve Bald Eagle Habitat, Support Local Communities, Improve Aspen Stands, Transportation Improvements	West of Lake Davis up to Grizzly Ridge.
Beckwourth	Plumas-Sierra Rural Electric Co-op	Construction of 69kv powerline (3-6 miles) and access road construction (3 miles).	S. Hwy 16, south of Honey Lake.
Beckwourth	Camp 14 Salvage and Reforestation Project	Approximately 249 acre salvage of dead and dying trees that resulted from the Antelope Complex Fire that occurred in July 2007.	The project is located approximately 12 miles northeast of Taylorsville, CA, about 2 miles east of Antelope Lake
Beckwourth	Horizon Wind Energy Site Testing	Issue a 3 year Special Use Permit to Horizon Wind Energy to install meterological test towers on several locations.	Several locations on the Beckwourth Ranger District.
Beckwourth	Lake Davis Trails	Build an interpretive trail from Catfish Cove to the lake. Build a trail around the lake using the old railroad grade and connecting inbetween these	Lake Davis southeast side

District	Project Name	Project Description	Location
		sections with new trail. The first section is between the 24N10 intersection and lightning tree CG	
Beckwourth	Sulphur - Barry Stream Restoration Project	Restore approximately 0.5 mile of Sulpher Creek (0.28 mile) and Barry-Creek (0.24 mile) using pond-and-plug technique. Project also includes a Timber Sale for the removal of encroaching conifers on cottonwood stands within the project area.	Middle Middle Fork Feather River HUC 5 Watershed
Beckwourth	Clark's Creek Aspen Restoration and Ecosystem Enhancement Project	Thin conifers from three meadows, plant willows and aspent. Desired result: Re-establish naturally occuring riparian vegetation in meadows to improve habitat for deer fawning, willow flycatchers, and other riparian species.	Situated in Clark's Creek, a 10,000 acre tributary watershed to Last Chance Creek, which flows to the North Fork of the Feather River.
Beckwourth	Mills Peak Trail	Construct a seven (7) mile non motorized trail on Beckwourth Ranger District. Starting at Forest Service (FS) Road 22N98 and ending on FS road 822 at Mills Peak. The trail would be 24 to 36 inches wide.	Lakes Basin Recreation Area Beckwourth Ranger District Plumas National Forest
Beckwourth	Smith Lake & Mt Elwell trails reroutes	The Smith Lake Trail reroute will move the trail to the north side of the lake and out of the wet reparian area. The Elwell Trail reroute would install sweeping switchbacks to eliminate the steep grade. A bridge installed at the creek crossings.	Lakes Basin Recreation Area
Beckwourth	Grizz Project	Defensible Fuel Profile Zone (DFPZ), Group Selections (GS) and Individual Tree Selection (ITS). In th past, these types of projects have also involved the treatment of noxious weeds, road decommissioning and upgrades.	Along Grizzly Ridge, approximately 5 miles from Spring Garden and 3.5 miles from Cromberg
Beckwourth	Jackson Project (old name Happy Jack Project)	Defensible Fuel Profile Zone (DFPZ), Group Selection (GS) and Individual Tree Selection (ITS) in addition to, Wildland Urban Interface fuels reduction. Road reconstruction, decommissioning and construction.	Approximately 4-11 miles northwest of Portola and 1-7 miles north of Graeagle.

District	Project Name	Project Description	Location
Beckwourth	Ingalls DFPZ	Defensible Fuel Profile Zone (DFPZ), Group Selection (GS) and Individual Tree Selection (ITS) in addition to, Wildland Urban Interface fuels reduction. Road reconstruction, decommissioning and construction.	Approximately 3 miles north of Lake Davis
Beckwourth	Big Hill DFPZ	Defensible Fuel Profile Zone (DFPZ), Group Selection (GS) and Individual Tree Selection (ITS) in addition to, Wildland Urban Interface fuels reduction. Road reconstruction, decommissioning and construction.	Approximately 3 miles north of the town of Old Sloat, California
Beckwourth	Dixie Valley and Little Dixie Sheep Allotments	Change the 12,880-acre Dixie Valley Allotment and the 9,170-acre Little Dixie Allotment from vacant cattle allotments to sheep allotments.	10 to 14 miles north-northeast of the city of Portola, California
Beckwourth	Last Chance Water Quality Improvement Projects	Stream channel stabilization and road improvements	Last Chance watershed, Roads 25N66, 25N72, 25N78, 25N08, 25N65, 25N65A, 25N03
Beckwourth	Red Clover Water Quality Improvement Projects	Stream channel stabilization and road improvements	Red Clover watershed, Roads 24N03Y, 22N22Y, 25N05
Beckwourth	Frenchman Water Quality Improvement Projects	Stream channel stabilization and road improvements	Frenchman watershed
Beckwourth	Lake Davis Water Quality Improvement Projects	Stream channel stabilization and road improvements	Lake Davis watershed
Beckwourth	Nelson-Onion Water Quality Improvement Projects	Stream channel stabilization and road improvements	Nelson-Onion watershed
Beckwourth	Last Chance Meadow Restoration	Pond and plug to raise level of creek and reconnect the floodplain	Last Chance watershed from Doyle crossing to Road 26N20
Beckwourth	Sulphur Creek and Barry Creek Meadow Restoration	Pond and plug to raise level of creeks and reconnect the floodplain	Sulphur and Barry Creek at their confluence
Beckwourth	Red Clover and Poco Creeks Meadow Restoration	Pond and plug to raise level of creeks and reconnect the floodplain	Red Clover and Poco Creeks
Beckwourth	Dotta Canyon Meadow Restoration	Pond and plug to raise level of creeks and reconnect the floodplain	Dotta Canyon
Beckwourth	Last Chance (Meadowview) and Little Last Chance (Rowland	Pond and plug to raise level of creeks and reconnect the floodplain	Meadowview and Rowland Creeks

District	Project Name	Project Description	Location
	Creek)		
Beckwourth	Middle Fork Whitetop Project	Eradicate tall whitetop along the Middle Fork Feather River using both mechanical and chemical means to control and eradicate this invasive plant species.	Middle Fork Feather River
Feather River	Basin Group Selection	Timber harvest of approximately 1215 acres of group selection and 80 acres of individual tree selection harvest under the Herger-Feinstein Quincy Library Group Forest Recovery Act pilot project.	Approximately 10 miles southwest of Quincy, CA
Feather River	Slapjack Project	Construct Defensible Fuel Profile Zones and harvest trees using group selection and individual tree selection under the Herger-Feinstein Quincy Library Group Forest Recovery Act of 1998.	Southwest of Quincy, CA in the vicinity of Challenge, Clipper Mills, Feather Falls, Forbestwon, and Dobbins, CA
Feather River	Yuba Feather K-8 School Expansion DM	Amend an existing special use authorization to allow construction & maintenance of restroom, relocate propane tank, install an emergency power generator, upgrade septic system, renovate play field, & install a track w/in boundaries of play field.	Feather River Ranger District
Feather River	Watdog	Defensible Fuel Profile Zone and Group Selection Harvest as part of the HFQLG Pilot Project	Southwest of Quincy, CA in the Fall River and South Branch Middle Fork Feather River watersheds
Feather River	Hard Quartz Abandoned Mine Hazard Abatement	Includes removal of six buildings and misc. improvements, i.e. water lines, abandoned personal property; removal of exterior structure associated with mine shaft; closure of vertical mine shaft and interior mine roads	T22N, R7E, Section 4, approximately 17 air miles southwest of Quincy, Ca
Feather River	Phat Chance Mining Claim	Mining Plan of Operation approval for exploratory mining activities	Near Haskins Valley
Feather River	Winkeye Mining Claims	Minerals Plan of Operation - Continuation/Development	Six miles northeast of LaPorte, CA in the Howland Flat area.
Feather River	Sugarberry Project	Construction of fuel breaks (defensible fuel profile zones or DFPZs) on approx. 2,100 acres; group selection timber harvest on approx. 1,000 ac; and individual tree selection on approx. 155 ac. enahance	South and east of Little Grass Valley Reservoir, from Gibsonville Ridge in the north to the North Yuba River in the south

District	Project Name	Project Description	Location
		approx 100 ac. of black oak stands, 20 ac aspen	
Feather River	Pike County Peak Microwave Relay	South Feather Water & Power Agency propose to construct and maintain a microwave system to include new equipment at Pike County Peak.	Feather River Ranger District
Feather River	Flea Hazardous Fuels Reduction Project	Construction of approx. 2,500 ac of fuel breaks known as Defensible Fuel Profile Zones, approx. 350 ac of group selection timber harvest, and approx. 300 ac of individual tree selection in Wildlife Urban Interface near Paradise, Pulga, and Concow, CA	The Flea Project Area is bounded by the North Fork of the Feather River on the east and Little Butte Creek on the west, in the Wildland Urban Interface near Paradise, Magalia, Pulga, and Concow, CA.
Feather River	Lower Middle Fork Feather River Water Quality Improvement Projects	Meadow improvement, stream stabilization, and road improvments	Cleghorn Bar Road, Boulder Creek
Feather River	South Fork Feather River Water Quality Improvement Projects	Meadow improvement, road improvements	South Fork Feather River
Mount Hough	Empire Vegetation Management Project	Construction of a Defensible Fuel Profile Zone, Group Selections, and Individual Tree Selection. May involve temporary road construction, road reconstruction, and road closure/decommissioning.	North of Quincy, California
Mount Hough	Meadow Valley Defensible Fuel Profile Zone and Group Selection	Construction of a Defensible Fuel Profile Zone and Group Selections. May include temporary road construction and road decommissioning	Surrounding the community of Meadow Valley, CA
Mount Hough	Canyon Dam Fuel Treatment Project	Mechanical/Hand Thinning and underburning to treat fuels	
Mount Hough	Copper Penny & Two Penny mining Plan of Operation	Mining Plan of Operation for placer mining and mining related activities along Lights Creek, on the Mt. Hough Ranger District	On or near Lights Creek, on the Mt. Hough Ranger District; the nearest town is Greenville
Mount Hough	UC Berkeley Forestry Camp Permit Amendment	Amendment to realign 200 feet of road and widening of the existing road within permit boundary to provide better access. Road project activities will require felling of 25 trees from 4-25 inches in diameter	UC Berkeley Forestry Camp, Meadow Valley, CA
Mount Hough	Moonlight Road Relocation Project	The proposal is to relocate Forest Service Road 28N03 to a stable location. A landslide blocked access and indicates that the existing road location	The project is located about 10 miles north of Taylorsville, California on Forest Service Road 28N03

District	Project Name	Project Description	Location
		is on an unstable slope. To prevent further erosion, the existing road will be decommissioned.	
Mount Hough	Moonlight Project Amendment	Amendment to current mining Plan of Operation for the Moonlight Project. American Sheffield Inc.has proposed to conduct approximately 6,000 feet of additional exploratory drilling.	Proposed operations are in the area of Moonlight Valley
Mount Hough	Plan of Operation - Dredger's Delight and High Grade Placer Claims	Approval of a plan of operation for placer mining activities which include suction redging, sluicing, and panning on Thompson Creek. Trail improvement and minor construction are required for access to mining operations.	near Quincy on La Porte - Quincy Highway, on Thompson Creek
Mount Hough	Corridor Wildland Urban Interface (WUI) Fuels Reduction Project	Reduce fuels within Quincy Wildland Urban Interface on approximately 550 acres through mechanical removal of biomass and merchantable material, under burning, mastication of brush, hand thinning, piling, and pile burning.	The project is located adjacent to the community of Quincy within the ¼ mile WUI of Chandler Road and Highway 89.
Mount Hough	Keddie Hazardous Fuels Reduction Project	Construction of fuelbreaks known as Defensible Fuel Profile Zones, thinning and group selection harvests, road improvements, and noxious weed treatments	Keddie Project is within the vicinity of Keddie Ridge, Round Valley Reservoir, and Mt. Jura. Communities within include Greenville, Crescent Mills, and Taylorsville, California.
Mount Hough	Moonlight and Wheeler Fires Recovery and Restoration Project	Harvest dead trees utilizing ground-based, skyline, and helicopter logging systems. Construct about 25 miles of temporary roads to access the treatment units. Include reforestation on approximately 17,000 acres.	The project area is located northeast of Greenville and north of Taylorsville in the Lights Creek and surrounding drainages.
Mount Hough	Upper Indian Creek Water Quality Improvement Projects	Stream channel stabilization and road improvements	Upper Indian Creek watershed, Roads 27N25Y, 27N19Y, 27N20Y, 27N22Y, 29N43